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Radiol Iugosl October – December 1990; 24:313-431


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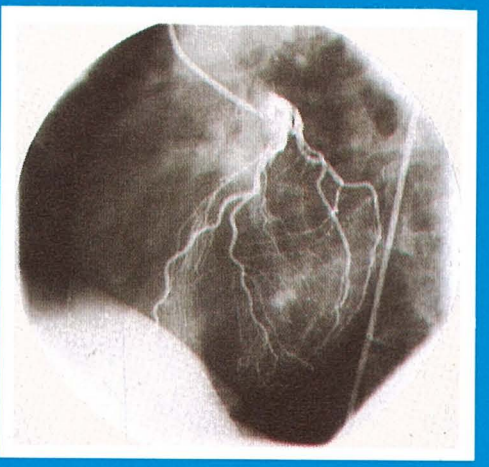

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DIGITALNA VS KONVENCIONALNA SPLENOPORTOGRAFIJA

DIGITAL VS CONVENTIONAL SPLENOPORTOGRAPHY

Jankulov V, Lincender L, Lovrinčević A, Obradov M, Jokić A

Abstract – The aim of the paper was to evaluate the advantages of digital splenoportography in patients with portal hypertension.
Twenty-three patients with clinic indications underwent digital splenoportography, followed by conventional splenoportography. Comparing the results, the authors concluded that the digital method of imaging provided the same information, although small amount of diluted contrast material was administered (30% contrast material with iodine concentrentration 300 mg/ml). Relating to the smaller gauge of puncture needle for digital techniques, the method proved to be more *practic* and less risky.

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Key words: portography-methods

Orig sci paper

Radiol Iugosl 1990; 24:319-22.

Uvod – Splenoportografija kao metoda evaluacije portalnog krvotoka se izvodi od 1951. godine[1,2]. Kontrastni prikaz sistema vene porte nakon punkcije slezene je superiorniji u odnosu na prikaz u toku indirektne splenoportografije (3, 4, 5). Uvođenjem digitalne subtrakcione angiografije pruža se nova dijagnostička dimenzija u evaluaciji ovog dijela krvotoka (6, 7).

Pacijenti i metod rada – Vršena je evaluacija splenoportograma kod 23 pacijenta sa postavljenom sumnjom ili klinički dokazanom portalnom hipertenzijom. Nakon standardne laboratorijske obrade vršena je punkcija slezene u srednjoj aksilarnoj liniji što bliže hilusu. Punkcija je vršena iglom od 20 gauge sa teflonskim sheath-om. Snimanja su vršena u dva akta. U prvom aktu snimanje je vršeno preko aparata za digitalnu subtrakcionu angiografiju (DVI_2 – Philips), a zatim u produžetku procedure na istom stolu seriografsko snimanje preko spot-kamere na formatu filma 10 x 10 cm. Aplikacija kontrastnog sredstva je vršena ručno, uz protok od 7-8 cm^3. Za digitalni prikaz korišteno je razblaženo kontrastno sredstvo u odnosu 1:2 sa fiziološkom otopinom u količini tečnog medijuma od 20 ml.

Za konvencionalni prikaz korišteno je nerazblaženo kontrastno sredstvo u ukupnoj količini od 40 cm^3. U toku rada nismo mjerili pritiske obzirom da na stolu na kojem smo izvodili pretrage nemamo mogućnost snimanja preko aparata za digitalnu angiografiju. Nakon pretrage pacijenti su provodili cca 6 sati u krevetu.

Rezultati – Prikazani su na tabeli 1. Iz nje se vidi da smo kod digitalne tehnike snimanja uz aplikaciju razblaženog kontrastnog sredstva u 18/23 slučajeva dobijali dobar prikaz portalnog krvotoka (sl. 1a, 1 b, 2 a, 2 b), dok smo kod konvencionalnog metoda kod istih pacijenata dobivali adekvatan prikaz u 10/23, odnosno 43,6% slučajeva. U jednom slučaju nismo dobili prikaz portalnog sistema jer se radilo o trombozi v. lijenalis.

Diskusija – Splenoportografija je još uvijek nezamjenjiva metoda prikaza portalnog krvotoka kod pacijenata sa portalnom hipertenzijom koji su kandidati za hirurški zahvat (3, 8, 9). Uvođenjem digitalne subtrakcione angiografije omogućen je odličan kontrastni prikaz vaskularnih struktura uz smanjenu količinu kontrasta, zahvaljujući većoj kontrastnoj rezoluciji u poređenju sa konvencionalnom angiografijom (7), (sl. 3).

Tehnika digitalne splenoportografije uz korištenje punkcione igle od 21 gauge se opisuje u

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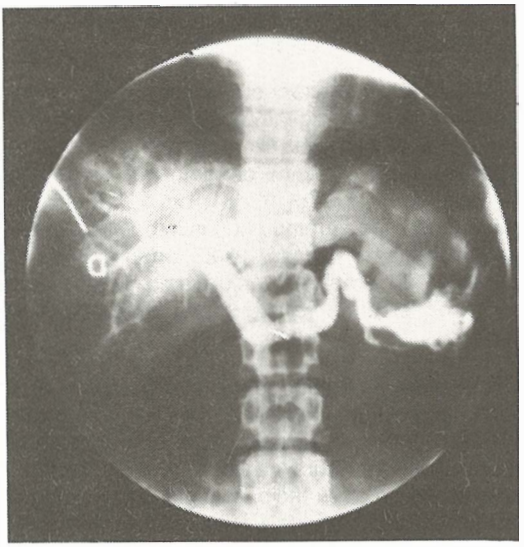
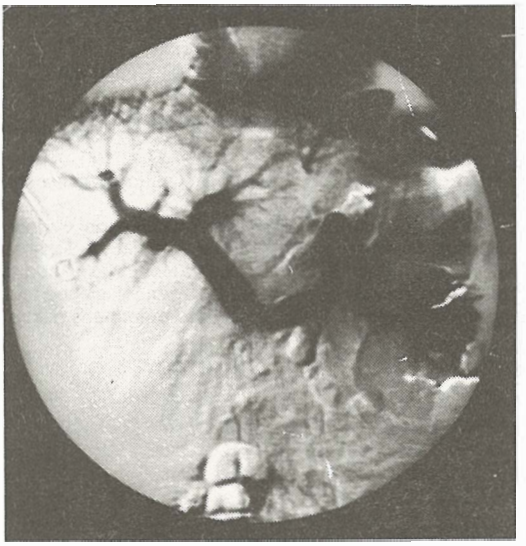
Tabela 1 – Korelacija angiografskih nalaza između digitalne i konvencionalne splenoportografije
Table 1 – Correlation of angiographic results of digital and conventional splenoportography

	Digitalna splenoporto-grafija Digital splenoporto graphy	Konvencionalna splenoporto-grafija Conventional splenoporto graphy
Dobar prikaz kolateralnog krvotoka Good presentation of collateral circulation	18 (78,2%)	12 (52,1%)
Nedovoljan prikaz kolateralnog krvotoka Inadequate presentation of collateral circulation	4 (17,5%)	10 (43,6%)
Bez prikaza sistema vene porte No presentation of vena porta system	1 (4,3%)	1 (4,3%)
Ukupno Total	23 (100%)	23 (100%)



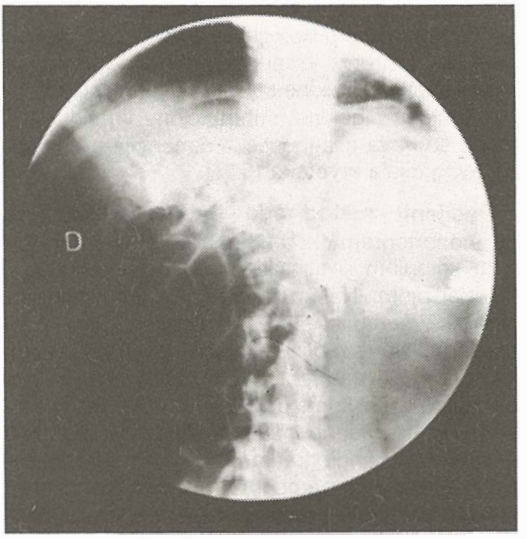
Slika 1a – Konvencionalna splenoportografija: normalan nalaz

Fig. 1a – Conventional splenoportography: Normal finding



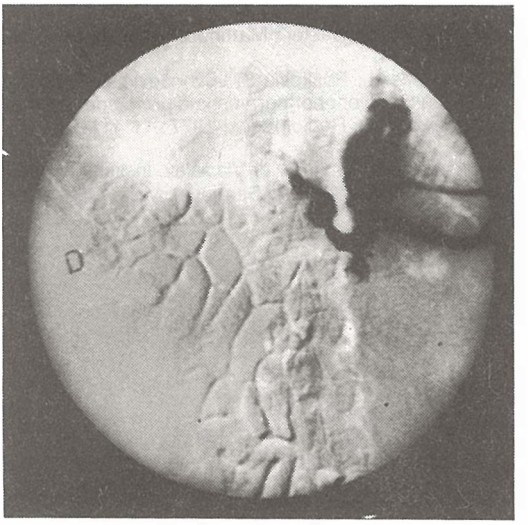
Slika 1b – Digitalna splenoportografija kod istog pacijenta

Fig. 1b – Digital splenoportography – the same patients



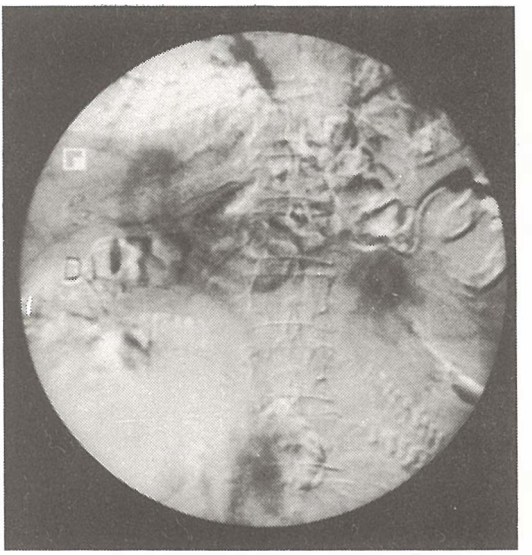
Slika 2a – Konvencionalna splenoportografija: portalna hipertenzija sa kolateralnim krvotokom preko gastričnih vena

Fig. 2a – Conventional splenoportography: portal hypertension with collateral circulation through gastric veins



Slika 2b – Digitalna splenoportografija kod istog pacijenta: Prikaz kolateralnog krvotoka i preko retroperitonealnih vena

Fig. 2b – Digital splenoportography – the same patient: Presentation of collateral circulation through retroperitoneal veins



Slika 3 – Digitalna splenoportografija: portalna hipertenzija. Prohodna paraumbilikalna vena

Fig. 3 – Digital splenoportography: Portal hypertension, passing the paraumbilical vein

literaturi (2). U tim studijama se nije vršila komparacija sa konvencionalnom splenoportografijom. Kod nekih naših pacijenata smo pokušali aplicirati kontrastno sredstvo preko takve igle, ali nismo mogli postići adekvatan protok prilikom manuelne aplikacije. Smatramo da se kod ove procedure kontrastno sredstvo mora aplicirati ručno. Kod naših pacijenata nismo imali komplikacija nakon procedure. Kod digitalnog načina prikaza mogu se javiti problemi sa slikom usljed respiratornih i peristaltičkih pokreta. Davanjem instrukcija pacijentima, kao i parenteralnom primjenom antikolinergičkih lijekova neposredno prije procedure, ovakvi problemi se mogu prevazići kod većine slučajeva. U radu smo prvenstveno željeli prikazati prednosti tehnike digitalne subtrakcione angiografije kod prikaza kolateralnog krvotoka u portalnoj hipertenziji.

Zaključak – Metoda digitalne subtrakcione splenoportografije nam je pružila više podataka kod pacijenata sa portalnom hipertenzijom u poređenju sa konvencionalnom splenoportografijom. Zahvaljujući odličnoj kontrastnoj rezoluciji minimalne količine razblaženog kontrastnog sredstva su bile dovoljne za dobar prikaz sistema vene porte.

Sažetak

Cilj rada je da se evaluiraju prednosti digitalne splenoportografije kod pacijenata sa portalnom hipertenzijom.

Kod 23 pacijenta sa kliničkom indikacijom izvedena je digitalna splenoportografija, a nakon nje u nastavku pretrage, konvencionalna splenoportografija. Nakon izvršene komparacije nalaza došli smo do zaključka da smo pomoću digitalne tehnike snimanja dobili iste podatke iako su se koristile manje količine razblaženog kontrastnog sredstva (30% kontrastnog sredstva koncentracije joda od 300 mg/ml.). Obzirom da se kod digitalne tehnike koristi punkciona igla manjeg kalibra, metoda se pokazala praktičnijom i sa manje potencijalnih rizika.

Literatura

1. Probst P, Rusavy JA, Ampatz K. Improved Safety of Splenoportography by Plugging of the Needle Tract. AJR 1978; 131:445-9.
2. Braun SD, Newman GE, Dunnick NR. Digital Splenoportography. AJR 1985; 144:1003-4.
3. Gmelin E. Digitale subtraktionsangiographitz. Thieme 1987.
4. Bergstrand I. Splenoportography in: Abrams HL, Cook HP. eds. Angiography. Boston: Little Brown and Co., 1971: 1029-72.
5. Bergstrand I. The localization of portal obstruction by splenoportography. AJR; 85:121.
6. Gvozdanović V, Hauptmann E. Further experience with percutaneous lieno-portal venography. Acta Radiol 1955; 43:177.

7. Futugawa S, Fukazawa M, Horisawa M, Muska H, Ito T, Suziura M, Kameda H, Okuda K. Portographic liver changes in idiopathic noncirrnotic portal hypertenzion. AJR 1980; 134:1917-23.

8. Burchart F, Nielbo N, Andersen B. Percutaneous transhepatic portography. II. Comparsion with splenoportography in portal hypertension. AJR 1979; 132:183-5.

9. L'Hermine C. Radiology of liver circulation. Boston, Dordrecht, Lancaster: Martinus Nijhoff Publishers, 1985:1-174.

10. Lincender L, Bošković S, Lovrinčević A, Alihodžić H, Izgled splenoportograma kod promjene hemodinamike jetre. Radiol Iugosl 1977; 11:411-13.

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FACULTY OF MEDICINE AND CLINICAL HOSPITAL CENTRE, RIJEKA
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ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY IN THE DIAGNOSTICS OF CHOLEDOCHAL CYST

Rubinić M,[1] Ivaniš N,[1] Peršić M,[1] Banić D.[2]

Abstract – The importance of endoscopic retrograde cholangiopancreatography (ERCP) in the diagnostic of cystic dilatations of the choledochal duct is reviewed. The method is very effective in scanning the size, form, position and content of the cyst, a fact of great importance when planning surgical intervention as the only possible cure. An analysis is presented of the results of 2672 ERCP-s carried out during the past ten years, during which period three choledochal cysts had been found in female patients of various age groups.

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Key words: common bile duct diseases, cysts, cholongiopancreatography endoscopic retrograde

Profess paper

Radiol Iugosl 1990; 24:323-6

Introduction – The choledochal cyst is a rare development anomaly, in the majority of cases congenital, of the biliary tract. The anomaly was for the first time described in 1723 by Vater. Later on, in 1852, Douglas delineated its patho-anatomical characteristics, and in 1894 Swain described the first surgical intervention in these patients in the form of choledochojejunostomy (1). Up to 1980, 1375 cases of this impairment had been described, one third of them coming from Japan. So far in our country a number of interesting congenital choledochal cysts have also been described (2,3). ERCP has helped a great deal towards making these diagnoses. By 1975 only some 955 cases had been described (69,3%), and after the introduction of ERCP into routine practice another 382 (30,7%) cases were described in only five years, i.e. up to 1980 (1). Hence this review of diagnosing this rare disease in our material of ten years is made to point out the importance of ERCP.

Materials and methods – An analysis is presented of 2672 endoscopic retrograde cholangiopancreatography made in the period of ten years from 1980 to 1990.

The technique to carry out ERCP was that described and acepted by numerous authors (4, 5, 6). In cases of this kind it is important to have an exact representation of the ampular region, as well as the localization and size of the cyst in order to eliminate dilatation of ducts and other etiologies (7).

Results – In the period of ten years from 1980 to 1990 only three choledochal cysts, or 0,1 pro mille of the examined patients, has been diagnosed. The leading indication in conducting this examination in a patient of eight years of age was acute pancreatitis of unknown etiology (Fig. 1). With the other two cases the indication for ERCP was obstructive jaundice, with one of the patients having pain, while the other felt no pain in spite of stones in the cyst (Fig. 2 and 3). The first patient was 19 years old, and the other 36.

Discussion – Choledochal duct cyst is a rare congenital disease of the biliary tract occurring on the average in 0,1 to 1,6 pro mille cases. In our ten-year ERCP material it occurred in 0,1 pro mille cases. It occurs more often in female that in male patients, the female to male ratio being 4:1 (3,8). The three patinets presented in this survey were females. To this day there is a great deal of discussion going on as to the etiology of

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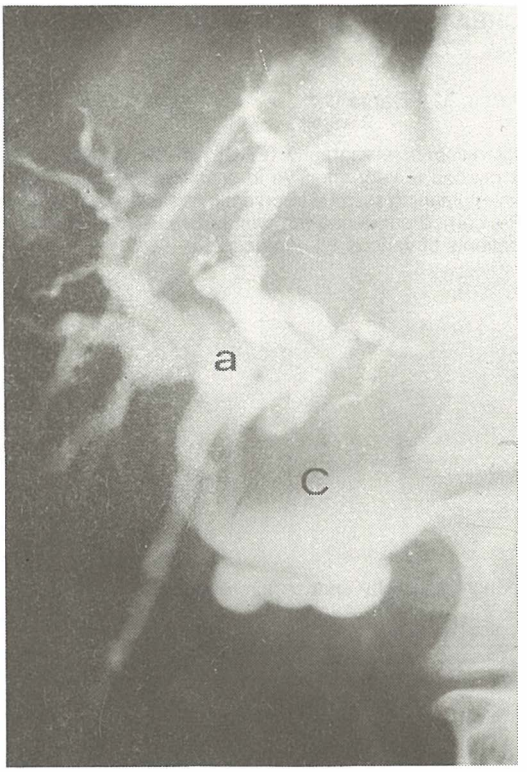


Fig. 1 – Choledochal cyst (c) intrahepatal ducts (a).

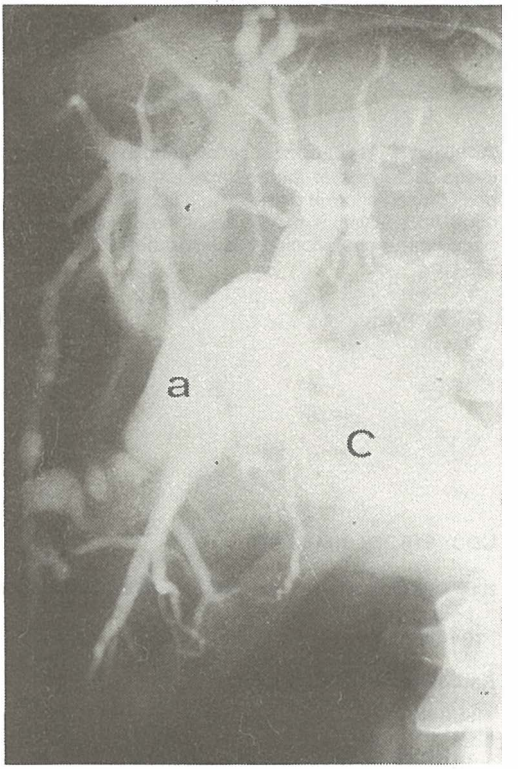
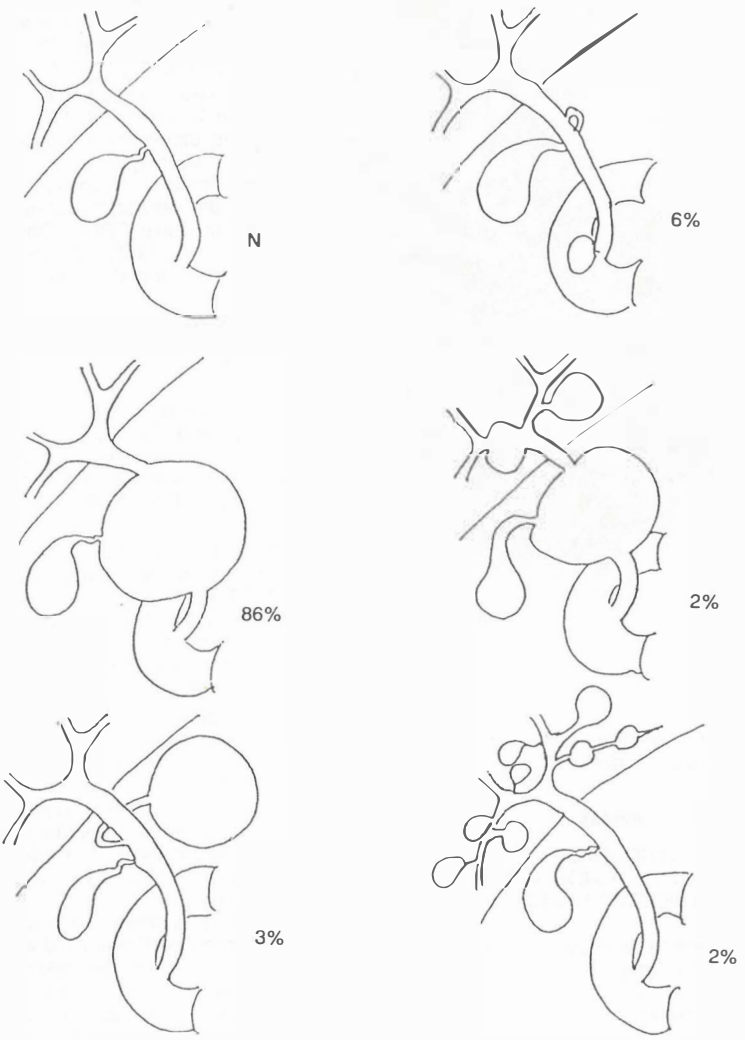


Fig. 2 – Choledochal cyst (c) dilated intrahepatical ducts (a).

this disorder. It is belived that the most frequent causes of this aberation are: segmental fibromuscular displasia or hypoplasia of the choledochal duct, functional changes of Oddi's sphincter, stenosis or abnormal development of the distal part of the choledochal duct (1,7,8). The symptomatology is usually or most often in the form of palpable tumour under the dextral costal arch, and obstructive jaundice which is, in any case, the most frequent indication for ERCP (4,5,6). In the diagnostics of these dieseases we first use convetional radiologic methods with little sucess and nonivasive diagnostics procedures such as radio isotope hepatobiliary images and ultrasound imaging with a 75 per cent success. (8, 9). Here it is important to point out the fact that when deciding on the method of precise diagnostics of diseases of the biliary tract, and especially cystic dilatations, ERCP yeields a 94 percent success. In exceptional cases we use in diagnosties percutaneous trans hepatic cholangiography (4,5,6,10,11).

Today ERCP is practicable without difficulty even in children whom these anomalies primarily occur (9, 12). This method permits determination of the size, form and position of the cyst. Thanks to this metohod it was also possible to accept the classification of the choledochal cyst into three types, or five types of biliary dilatation (Scheme 1) (14, 15).

Another advantage of this method is the detailed analysis of the content of the cyst, particulary of minute stones often contained in the cyst, as was the case with one of our three patients (8). In the therapy of the said cystic dilatations surgical intervention is a method of choice. Small cysts in the centre of the choledochus are completely removed by termino-terminal anastomosis. Large cysts require biliodigestive anastomosis with resection of the cyst if possible. This is important in view of any possible malignant alteration of the remainder of the sac (1, 8, 13, 14).



Scheme 1 – From the bibliography (N = 760) schematic presentation of the incidence of cystic dilatation of biliary tract (N-normal).

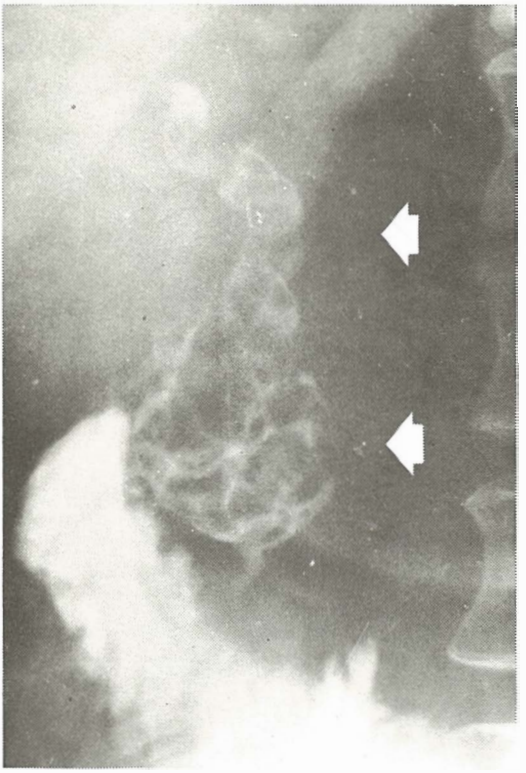


Fig. 3 – Choledochal cyst filled with numberless stones varying size-arrows.

Sažetak

ENDOSKOPSKA RETROGRADNA HOLANGIOPANKREATOGRAFIJA U DIJAGNOSTICI CISTIČNIH DILATACIJA DUCTUS HOLEDOKUSA

U radu je prikazana važnost endoskopske retrogradne holangiopankreatografije (ERHP) u dijagnostici cističnih dilatacija duktus holedokusa. Metoda s vrlo velikim uspjehom prikazuje veličinu, formu, položaj i sadržaj ciste a što je pak neobično važno za planiranje operativnoga zahvata kao jedinoga načina liječenja. Analiziraju se vlastiti rezultati 2672 ERHP u zadnjih 10 godina gdje su nađene tri ciste duktus holedokusa i sve u ženskih bolesnica različite starosti.

References

1. Hess W. Konnatale erkrankungen der Gallenwege und des Pankreas. In: Hess W and Rohner A ed. Die erkrankungen der Gallenwege und des Pankreas. Padova: Piccin 1986; 494-512.

2. Bakran I, Knežević S. Kongenitalna cistična dilatacija koledokusa. Liječ Vjesn 1969; 91:757-62.

3. Peršić M, Leković A, Fučkar Ž, Rubinić M. Akutni pankreatitis uzrokovan kongenitalnom cistom duktus koledokusa. Liječ Vjesn 1988; 110:319-22.

4. Soehendra N. Technik, Schwerigkeiten und Ergebnisse der endoskopisch-retrograden Cholangio-Pankreatikographie (ERCP). Chirurg 1977; 48:98-104.

5. Križman I, Tavčar B. Endoskopska retrogradna holangiopankreatografija. Liječ Vijesn 1980; 102:725-19.

6. Rubinić M, Švalba B. Endoskopska retrogradna holangiopankreatografija (ERHP). Radiol Iugosl 1984; 18 (2):95-8.

7. Lee SS, Min PC, Kim GS, Hong PW. Choledochal cyst. A report of nine cases and revuew of the literature. Arch Surg 1969; 99:19-28.

8. Grill W. Anomalien der Gallenblase und der Gallengänge. In: Demling L ed. Klinische Gastroenterologie Stuttgart-New York: Georg Thieme Verlag, 1984:322-8.

9. Klotz D, Cohn BD, Kottmeier PK. Choledochal cysts: diagnostic and therapeutic problems. J Pediatr Surg 1973; 8:271-83.

10. Nüesch HJ, Hahnloser P, Fumagalli I, Deyhle P. Endoskopisch-retrograde Cholangiographie: Methode der Wahl zur Diagnose der Choledochuszyste. Dtsch med Wschr 1973; 98:2069-70.

11. Huchzermeyer H, Otto P, Seifert E. Wertigkeit verschidener diagnostischer Methoden bei kongenitalen Dilatationem der Gallenwege. Leber Magen Darm 1976; 6:350-7.

12. Urakami Y, Seki H, Kishi S. Endoscopic retrograde cholangiopancreatography (ERCP) performed in children. Endoscopy 1978; 9:86-91.

13. Franke F. Die Gallengangszyste. Chir Praxis 1980; 26:61-7.

14. Gall FP, Franke F. Chirurgische Möglichkeiten und Grenzen der Cholangiodrainage. In: Demling L and Riemann JF ed. Endoskopische Prothetik. Nürnberg: Heumann, 1982; 59-66.

15. Kobayashi A, Ohne Y. Choledochal cyst in infancy and childhood. Arch Dis Child 1977; 52:121-28.

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IZ PRAKSE ZA PRAKSO

KVIZ št. 3

PRIKAZ PRIMERA

Bolnik star 71 let, po poklicu pravnik.

Prihaja na diagnostično obdelavo zaradi težav z želodcem.

V anamnezi poda naslednje:

Pred 22 leti operiran po metodi Biltorh II zaradi rane visoko v korpusu želodca. Navaja, da so se težave (bolečine in tiščanje v predelu želodca, zaspanost, utrujenost, po zaužitju hrane) pričele približno osem let po operaciji želodca. Trajajo od 20 minut do ene ure. Zadnja leta se težave stopnjujejo.

Pred enajstimi leti je bil zdravljen zaradi raka na grlu. Ugotovili so mu rak desne glasilke. Histološko je bil potrjen kot ploščatocelični rak s poroženevanjem. Zdravljen z radikalnim obsevanjem na kobaltu. Sedaj nima težav s strani grla. Navaja jutranji kašelj. Krvi v sputumu ni opazil. Alkohol uživa zmerno. Od alkoholnih pijač uživa občasno vino, žganih pijač ne konsumira. V družini ni duševnih ali rakastih obolenj. Kaditi je pričel že v zgodnji mladosti. Kadi stalno, čeprav so mu kajenje zaradi raka grla prepovedali, se kajenju ne more odreči.

Status: astenične konstitucije, nekoliko podhranjen. Orjentiran v času in prostoru. V statusu ne najdemo odstopanj od normalnega, le koža desno na vratu nekoliko atrofična in hiperpigmentirana. Na abdomnu v mediani črti tipična brazgotina po zgornji laparotomiji. Srce kompenzirano. Srčni toni tihi, akcija ritmična. Dihanje emfizematozno. Povečanih bezgavk ni tipati.

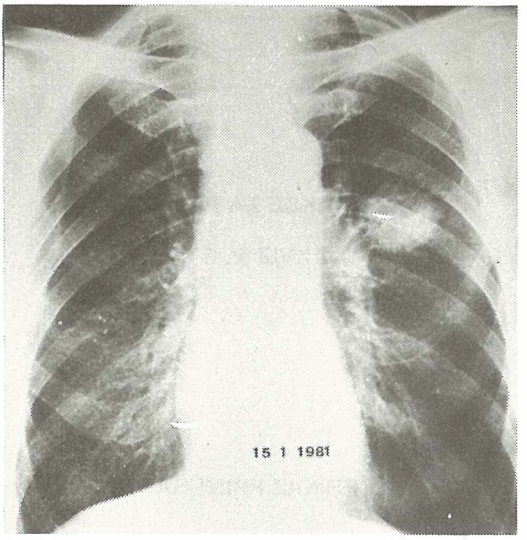
Planirane preiskave: rtg torakalnih organov, rtg pregled želodca, gastroskopija, proktološki pregled. Kompletna krvna slika, biokemične preiskave.

Laboratorijski izvidi: SR 40 mm, eritrociti 4.07, Hb 136 g/L, L 7,56, DKS: nevtro. seg. 0,71, limfo 0,23, mono 0,05, pl 0,01, urin brez posebnosti.

Na 141 mmol/L, K 4.2 mmol/L, kloridi 101 mmol/L, kreatinin 88 mmol/L, urat 267, μmol/L.

Alkalna fosfataza 2,30 u kotkat/L, gama GT 0,53 μmol/L, bilirub. cel. 7 μmol/L, bilirubin dir. 2 μmol/L, AST (GOT) 0,30 μkat/L, ALT (GPT) 0,30 μkat/L, holesteroli 3,9 μmol/L, kisla fosfataza 20 nkat/L, železo 10,4 μmol/L, amilaza 1,45 μkat/L, UIBC 39 μmol/L.

Rentgen torakalnih organov (PA): Glej sliko 1 na strani 328!



Slika 1 – RTG torakalnih organov

Naloga :

Opiši sliko

Navedi diferencialno diagnozo!

Navedi nadaljne potrebne preiskave!

Postavi diagnozo!

Terapija?

Odgovor : glej stran 359!

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UNIVERSITY MEDICAL SCHOOL, NUCLEAR MEDICINE, ULM, WEST GERMANY[2]

CARDIAC SESTAMIBI SPECT: INTER- AND INTRAOBSERVER REPRODUCIBILITY

Milčinski M[1], Henze E[2], Weller R[2], Clausen M[2], Adam WE[2], Porenta M[1]

Abstract – Repeated quantified studies are used for evaluation of medical or interventional treatment in coronary artery disease. Inter- and intraobserver reproducibility of tomographic Sestamibi studies processing in patients with stable coronary artery disease using semiautomatic quantification program was analyzed. Our results gave very good correlation (r = 0.94) for bigger perfusion defects (19% of normalized standard perfusion area), for smaller defects (8% of predicted supply area) the variability in study processing was bigger. There-fore we can advise careful interpretation of small differences in results of comparative studies as they can result from more than one observer processing individual studies.

UDC: 616.24-005.7:539.163

Key words: Tc-99m Sestamibi – quantitative SPECT – reproducibility – coronary artery disease – MIBI

Orig sci paper

Radiol Iugosl 1990; 24:329-32

Introduction – Quantitation in nuclear medicine helps to objectify results of separate studies and allows direct comparison of results of repeated studies. New technetium radiopharmaceiticals are currently used for coronary blood flow investigations (1, 2, 3) and as repeated studies are not always processed by the same observer, the possible error using quantitation program remains unknown and can influence the results of such studies. The aim of present study is the evaluation of inter- and intraobserver variability in processing of cardiac Sestamibi (Tc-99m-Methoxy Isobutyl Isonitrile) tomographic studies using semiautomatic quantitation program.

Patients and Methods – Ten patients with stable coronary artery disease, mean age 58.8 years (range 41 to 72), eight men and two women, were included in double blind pharmacological trial with one rest and three stress Sestamibi tomographic studies on two separate days. Therefore four studies of each patient were available and they served for reproducibility analysis. The study protocol is described elsewhere (4). In short, the patients had stable one or two vessel coronary artery diesease, proven with coronary angiography without known previous myocardial infarction. No ischemic event between both study days was allowed. Rest study with 370 MBq Tc-99m Sestamibi, followed by first stress study with 740 MBq Tc-99m Sestamibi six hours later was performed on the first study day. Two repeated stress tests were accomplished on the second study day, the second one after placebo or pharmacological substance application with equal doses of Sestamibi as on the first study day.

Data acquisition and processing – Tomographic acquisition began one hour after Sestamibi application on Siemens Orbiter 3700 (using a 180 degree arc from LPO to RAO, 32 angles in 16 minutes, matrix 64 X 64) and Max-Delta.

Data were processed using modified quantification protocol, described in detail by Clausen (5). Operator-depending steps are: axis determination, inner and outer myocardial wall delineation and short-axis circular profile outlining. Com-

The work was performed at Nuclear Medicine Department in Ulm and presented at Yugoslav Nuclear Medicine Congress in Sarajevo 1990

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puter transversal reconstruction uses Butterworth- filter of 5th order and cut- off frequency of 0.4 during the back projection of individual slices. Rearrangement into short and long axis slices and circumferential profiles is performed with compression into polar coordinates. Color-coded results are expressed in percents of significantly reduced tracer uptake compared to the Cedars original data- base for standardized perfusion areas, namely LAD, RCA, LCX and TOTAL perfusion defect.

Data analysis – 40 studies were available for interobserver analysis and 28 of them present the interobserver analysis group. Data were statistically evaluated using commercial statistical program (Statgraphic). Correlation analysis was used to compare the results of repeated studies. Average defect size is presented with modal and median values.

Results – are shown graphically on figure 1 and in table 1. The size of significantly reduced tracer uptake for separate perfusion regions is expressed in percentage of normalized supply area and the average defects are presented for both observers. The biggest defects were found for the LAD perfusion area, namely average 18.9% and the smallest for the LCX region, the average size of hypoperfused myocardium for all 68 studies measuring 8.4% of normalized standard perfusion area. Range, mode and median values for every observer and separate regions are presented in table 1 as well. The results of correlation analysis are presented in table 2. The best correlation was found for LAD perfusion area, namely 0.94, the poorest for the LCX region and a good overall correlation is demonstrated for total perfusion abnormalities.

Table 1 – Summarized results of quantitative SPECT Tc-99m Sestamibi myocardial perfusion evaluation for standard perfusion areas from interobserver (40 studies) and intraobserver (28 studies) reproducibility analysis

Region	Number of studies	Average defect (%)	Range	Median	Mode
LAD	40	19.8	0-87.2	11.4	0
	40	19. 5	0-81.9	8.0	0
	28	17.3	0.81.9	7.3	0
	28	19.2	0-73.8	9.4	0
RCA	40	8.9	0.64.1	0	0
	40	10.1	0-79.5	0	0
	28	11.6	0.79.5	0	0
	28	9.5	0-60.4	0	0
LCX	40	5.1	0-46.4	0	0
	40	9.1	09.60.2	3.6	0
	28	7.0	0-38.8	4.1	0
	28	9.6	0-30.2	5.9	0
Total defect	40	13.8	0-57.9	9.2	0
	40	14.9	0.4-60.5	9.3	9.2
	28	13.7	0.4-60.5	9.1	8.0
	28	14.2	0-53.0	10.6	10.0

Table 2 – Correlation coefficients (r) for separate standard perfusion areas

	LAD	RCA	LCX	Total defect
Two observers	0.94	0.88	0.76	0.90
One observer	0.94	0.79	0.27	0.87
Average perfusion defect (%)	18.9	10.4	8.4	14.1

Table 2 – 1 – Correlation coefficients and correlation equations for two observers and standard perfusion areas

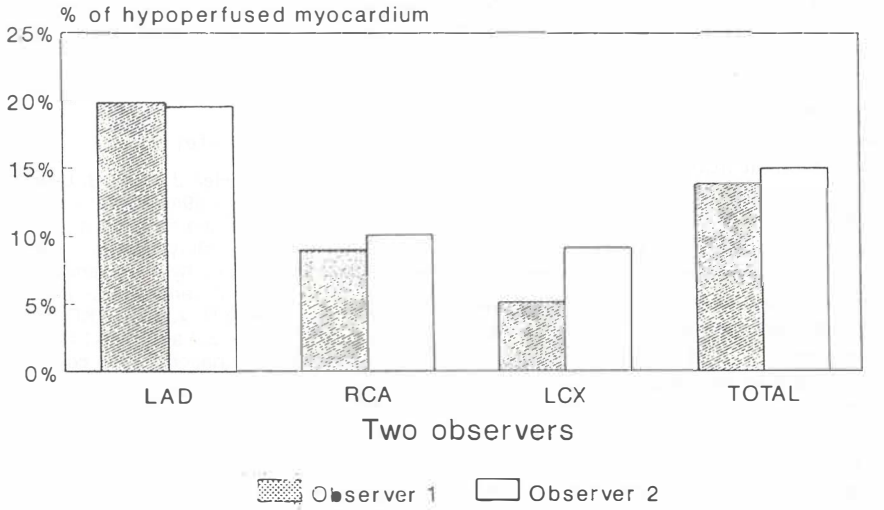
	Two observers 40 studies	
LAD	$r = 0.94$	$y = 0.91x + 2.31$
RCA	$r = 0.88$	$y = 0.78x + 0.76$
LCX	$r = 0.75$	$y = 0.64x - 0.55$
Total	$r = 0.90$	$y = 0.80\,x + 1.91$

Table 2 – 2 – Correlation coefficients and correlation equations for standard perfusion areas for repeated processings of one observer

	Single observer 28 studies	
LAD	$r = 0.94$	$y = 1.06\,x - 3.11$
RCA	$r = 0.79$	$y = 1.03x + 1.79$
LCX	$r = 0.27$	$y = 0.25x + 4.54$
Total	$r = 0.87$	$y = 1.15x - 2.64$

Discussion – Quantitation of myocardial perfusion defects has special clinical importance as it serves for objective evaluation of results of medical or interventional treatment on myocardial perfusion. Newer technetium tracers have advantages over standard thallium 201 because of better imaging characteristics. The sensitivities and specificities of planar imaging with thallium or technetium are comparable for high grade stenoses and Tc- 99m-Sestamibi has superior sensitivity in detection of moderate stenoses (6).

INTEROBSERVER PROCESSING ANALYSIS



INTRAOBSERVER PROCESSING ANALYSIS

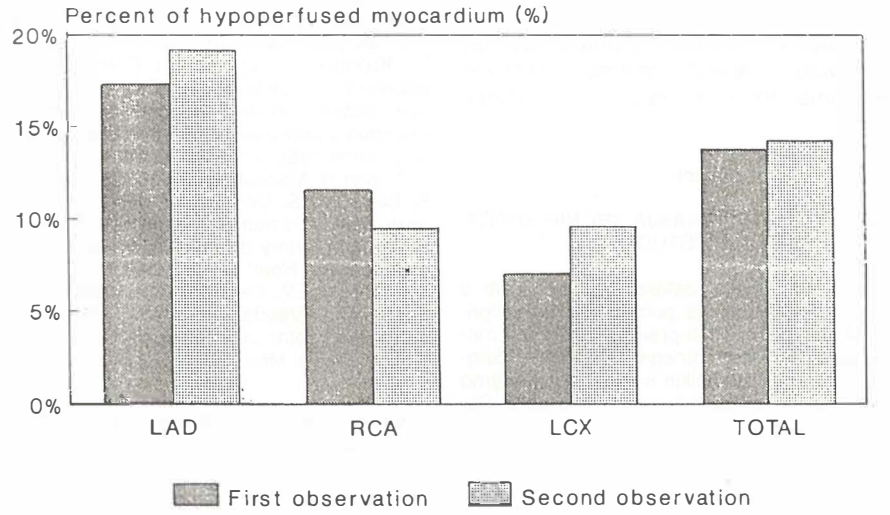


Fig 1 a, b – Graphic presentation of variability in results for standard perfusion areas for both observers (40 studies, above) and reprocessing for one observer (28 studies, below). LAD- left anterior descending artery, RCA-right coronary artery, LCX-left circumflex artery, TOTAL – total left ventricular perfusion defect.

Tomographic techniques are superior over planar ones (7). The aim of our study was the evaluation of possible technical errors resulting from repeated processing using semiautomatic quantification program (8), widely used in most cardiac nuclear medicine centers. As the repeated studies are often processed by different observers and the quantified results are used for direct comparison, a possible mistake in treatment evaluation can result from variability in processing.

Our analysis shows good reproducibility of comparative studies for bigger perfusion defects, both for inter- or intraobserver reprocessing. Smaller defects have statistically higher variability in our study, resulting partly from the magnitude of the defects and partly from smaller number of all studies that had perfusion abnormalities in those regions. Normal perfusion was found in 14% of studies for LAD region, in 59% for RCA region and in 34% for LCX perfusion area. Part of the variability is attributed to operator depending steps in the processing, most of this resulting from axis determination. The shift in axis can result in borderline areas being attributed to one or another of the defined perfusion regions resulting in varying results as well.

However, the overall results show good reproducibility especially for bigger perfusion defects found with tomographic Sestamibi evaluation of myocardial perfusion. We can suggest careful interpretation of smaller differences in results of repeated studies for treatment evaluation as they can be attributed to variability in processing even when the same observer processes repeated studies.

Povzetek

PONOVLJIVOST PROCESIRANJA SRČNIH SPECT SESTAMIBI ŠTUDIJ

Kvantifikacija perfuzijskih defektov, ugotovljenih s tomografskimi preiskavami, je pomembna zaradi primerjave rezultatov ponovljenih preiskav ter ocene medikamentoznega ali interventnega zdravljenja koronarne srčne bolezni. Pri bolnikih s stabilno koronarno boleznijo smo ocenjevali ponovljivost tomografskih Sestamibi študij, če je študije računalniško obdeloval isti opazovalec dvakrat ali pa če sta jih procesirala dva različna opazovalca. Ugotovili smo zelo dobro korelacijo med rezultati ponovljenih preiskav v obeh primerih, če je bil perfuzijski defekt velik (poprečna velikost defekta 19% normaliziranega perfuzijskega področja, r=0.94), večja odstopanja pa smo našli pri manjših defektih (velikost defekta 8%, r=0.75). Zato svetujemo previdno oceno uspeha zdravljenja, če so tomografski defekti manjši, saj so razlike med rezultati ponovljenih študij lahko posledica večkratnega procesiranja.

References

1. Iskandrian SA, Heo J, Kong B, Lyons E, Marsch S. Use of technetium- 99m isonitrile in assessing left ventricular perfusion and function at rest and during exercise in coronary artery disease, and comparison with coronary arteriography and exercise thallium- 201 SPECT imaging. Am J Cardiol 1989; 64:270-5.

2. Maddahi J, Merz R, Van Train KF, Roy C, Berman DS. Tc-99m MIBI (RP-30) and Tl-201 myocardial perfusion scintigraphy in patients with coronary disease: quantitative comparison of planar and tomographic techniques for perfusion intensity and defect reversibility. J Nucl med 1987; 28:654 (abstr).

3. Taillefer R, Lambert R, Dupras g, Gregoire J, Leveille J, Essiambre R, Phaneuf DC. Clinical comparison between thallium-201 and Tc-99m- methoxy isobutyl isonitrile (hexamibi) myocardial perfusion imaging for detection of coronary artery disease. Eur J Nucl Med 1989; 15:280-286.

4. Milčinski M, Henze E, Lietzenmayer R, Clausen M, Weller R, Hombach V, Adam WE, Porenta M. Reproducibility of cardiac Sestamibi SPECT. Eur J Nucl Med; in press.

5. Clausen M, Weller R, Henze E, Bitter F, Adam WE. Differenzierende Darstellung and Quantifizierung der Myokardnarbe und der Belastungsischamie in Polarkloordinaten fur die Myokard-ETC. Klinische und Technische Aspekte. NucCompact 1988; 19:50-52.

6. JK Kahn, McGhie I, Akers MS, Sills MN, Faber TL, Kulkarni PV, Willerson JT, Corbett JR. Quantitative rotational tomography with Tl-201 and Tc-99m methoxy-isobutyl-isonitrile. A direct comparison in normal individuals and patients with coronary artery disease. Circulation 1989; 79:1282-1289.

7. Kiat H, Maddahi J, Train KV, Friedman J, Resser K, Berman DS. Comparison of technetium 99m methoxy isobutyl isonitrile and thallium 201 for evaluation of coronary artery disease by planar and tomographic methods. Am Heart J 1989; 117:1-11.

8. Garcia EV, Van Train KF, Maddahi J, Prigent F, Friedman J, Areeda J, Waxman A, Berman DS. Quantification of rotational Thallium-201 myocardial tomography. J Nucl Med 1985; 26:17-26.

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SCINTIGRAFIJA S 131–J MIBG PRI FEOKROMOCITOMU

131–J MIBG SCINTIGRAPHY IN PHEOCHROMOCYTOMA

Grmek M[1], Budihna N[1], Porenta M[1] Gantar-Rott U[2], Pfeifer M[2], Preželj J[2]

Abstract – The aim of the study was retrospective evaluation of 131-J MIBG scintigraphy (SC) in patients with suspected pheochromocytoma. Results of SC, ultrasound (US) and computerized tomography (CT) were compared with histological diagnosis in 18 patients. Four hypertensive patients where pheochromocytoma was practicaly excluded on the basis of endocrinological tests and clinical course served as normals.
Sensitivity of SC to detect intraadrenal tumors was 80%, CT 100% and US 92%. Overal sensitivity including 2 cases with extraadrenal tumors and 1 patient with adrenomedullary hyperplasia was for SC 83%, US 73% and CT 94%. The main advantage of SC over CT and US is in its ability to identify functional chromaffine tissue localized in intraadrenal and extraadrenal areas or metastatic spread.

UKC: 616-008.488-073:539.163

Key words: pheochromocytoma-radiomuclide imaging, iodine radioisotopes

Orig sci paper

Radiol Iugosl 1990; 24:333-6

Uvod – V začetku 80. let je bila uvedena scintigrafija z meta-jodobenzilgvanidinom (MIBG), fiziološkim analogom noradrenalina, ki se kopiči v granulah kromafinega tkiva (1, 2, 3). Sredica nadledvičnih žlez se pri scintigrafiji s 131-J MIBG običajno ne prikaže, občasno pa se šibko nakaže (1). Kopičenje pa je dovolj intenzivno v hipertrofični sredici nadledvične žleze, ki postanejo tako scintigrafsko vidni. Feokromocitom, ki je dokaj redek tumor, je v približno 90% lokaliziran v nadledvični žlezi, v 10% pa izven nje v poteku verige simpatičnih ganglijev. Običajno je benigen, v 10% pa maligen (1).

Bolniki in metode – V študijo smo vključili 22 bolnikov, pri katerih je bil na osnovi tipične anamneze in statusa ali patoloških hormonskih testov postavljen sum na feokromocitom.

Metode: Vsem bolnikom smo določili vrednosti kateholaminov, VMA in metanefrinov v urinu (hormonski testi) ter opravili scintigrafijo s 131-J MIBG. Večina bolnikov je imela opravljeno še ultrazvočno preiskavo trebuha ter računalniško tomografijo (tabela 1). Diagnozo smo postavili na osnovi histološkega izvida in postoperativne normalizacije hormonskih testov, oziroma smo feokromocitom na podlagi normalnih endokrinoloških testov izključili.

Scintigrafska metoda: Bolnikom z blokirano ščitnico (s perkloratom ali lugolom) smo počasi i. v. vbrizgalil 20 do 35 MBq 131-J MIBG. 48 in 72 ur po aplikaciji radioindikatorja smo opravili scintigrafijo vratu, prsnega koša in ledvenega predela v posteriorni projekciji, medenice pa v anteriorni projekciji. Zaradi natančnejše lokalizacije tumorjev smo v nekaterih primerih posneli še dodatne projekcije. Ob sumu na metastaze smo naredili scintigrafijo vsega telesa. Uporabljali smo kamero gama s kolimatorjem za visoke energije. Vsako projekcijo smo snemali 10 do 15 minut.

Rezultati – 17 bolnikov je imelo histološko dokazan feokromocitom, v 1 primeru pa je bila dokazana bilateralna hiperplazija sredice nadledvičnih žlez. Pri 4 bolnikih s sumom na feokromocitom, ki so imeli normalne rezultate hormonskih testov in negativen SC izvid smo z nadaljno diagnostiko prenehali. Rezultati so zbrani v tabeli 1. Senzitivnost pri odkrivanju vseh oblik feokromocitoma je pri scintigrafiji znašala 83%, pri ultrazvoku 73% ter pri računalniški tomografiji 94%. Senzitivnost pri lokalizaciji feokromocitoma v nadledvičnih žlezah pa je znašala pri scintigrafiji 80%, pri ultrazvoku 92% ter pri računalniški

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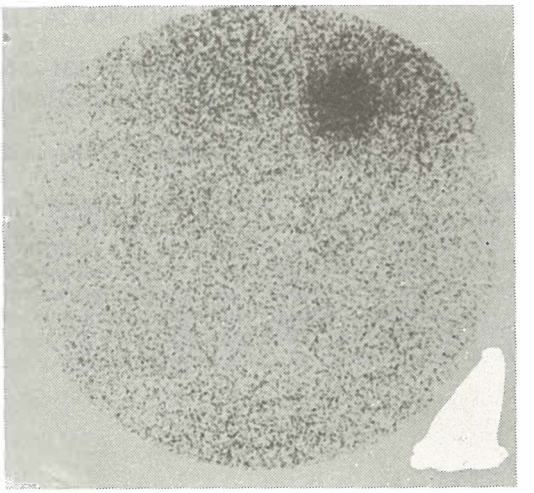
Tabela 1 – Primerjalni rezultati hormonskih testov (HT), scintigrafije 131-J MIBG (SC), ultrazvoka (UZ) in računalniške tomografije (CT) z dokončno diagnozo (DG)

Table 1 – comperative results of hormonal tests (HT), 131-J MIBG scintigraphy (SC), ultrasound (US) and computerised tomography (CT) with confirmed diagnosis (DG)

DG	št No.	HT	UZ	CT	SC
IF	15	15+	11+ 1– 3*	15+	12+ 3–
EF	2	2+	2–	1+ 1–	2+
HSS	1	1+	1–	1*	1+
AH 4	4	4–	4*	4–	4–
Skupaj Total	22	22	22	22	22

IF – intraadrenalni feokromocitom intraadrenal pheochromocytoma
EF – ekstraadrenalni feokromocitom extraadrenal pheochromocytoma
HSS – hiperplazija sredice nadledv. adrenomedullary hyperplasia
AH – arterijska hipertenzija arterial hypertension
št – število bolnikov No. of patients

\+ pozitiven izvid positive result
– negativen izvid negative result
* preiskava ni opravljena without study



Slika 1 – Scintigram, opravljen v posteriorni projekciji 48 ur po aplikaciji 131-J MIBG, prikaže feokromocitom v desni nadledvični žlezi

Fig 1 – 131-J MIBG image acquired 48 hours after tracer aplication in posterior projection. The right adrenal pheochromocytoma is visualised

tomografiji 100%. Lažno pozitivnih rezultatov preiskav nismo zasledili.

Pri 2 bolnikih s histološko potrjenim malignim feokromocitomom smo preiskavo ponovili. V prvem primeru, kjer je bil na predoperativnem scintigramu viden le primarni tumor v nadledvični žlezi, smo na kontroli nekaj tednov po operaciji našli številne metastaze v kosteh in mehkih tkivih. V drugem primeru ektopičnega malignega feokromocitoma se patološka žarišča na kontrolnem scintigramu, opravljenem slab mesec po operaciji tumorja, niso prikazala, biokemično in klinično niso bili prisotni znaki metastaz.

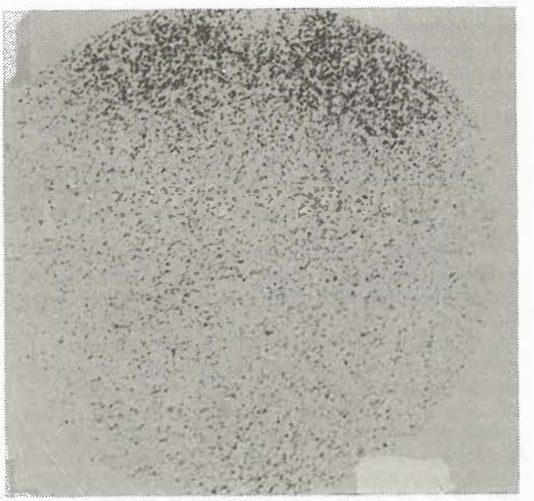
Diskusija – 131-J MIBG se kot fiziološki analog noradrenalina kopiči v granulah kromafinega tkiva in tako omogoči prikaz feokromocitoma oziroma hiperplastične sredice nadledvične žleze. Intraadrenalni feokromocitom smo prikazali z različno intenzivnostjo v 12 primerih (slika 1). V 3 primerih histološko dokazanega foekromocitoma pa kopičenja v tumorjih nismo opazili.

Kromafini tumorji se lahko na scintigramih prikazujejo z različno intenziteto zaradi različne gostote granul, kar je posledica njihove različne diferenciacije (3). Tako poskušamo pojasniti 2 primera lažno negativnega scintigrafskega izvida. V enem izmed teh dveh primerov smo ob reevalvaciji scintigrama ugotovili kopičenje, ki pa je bilo komaj zaznavno višje kot v kontralateralni zdravi nadlevični žlezi (slika 2a, b).

V tretjem primeru pa je bil histološko ugotovljen cistično degeneriran tumor. Da se tumor ni prikazal, si v tem primeru razlagamo z majhno maso tumorskih celic na volumsko enoto tumorja in s tem manjšo kontrastnostjo na scintigramu. Računalniška tomografija je v vseh treh primerih prikazala tumor, vendar nam ni posredovala podatka o vrsti tumorja.

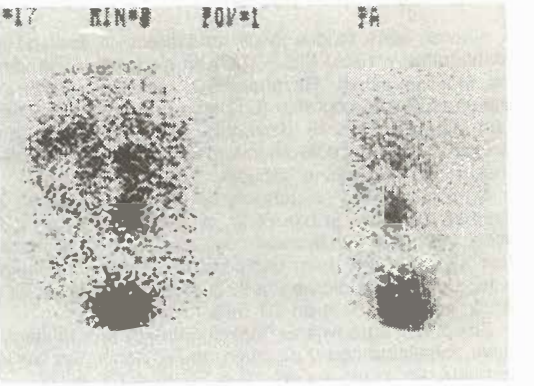
Problem lokalizacije in vrste tumorja pa je še večji v primeru ekstraadrenalnih feokromocitomov. Tako lokalizirane feokromocitome smo s scintigrafijo prikazali pri 2 pacientih (slika 3ab). Zaradi enostavnosti preiskave vsega telesa, vidimo prednost scintigrafije pred morfološkimi preiskavami še v primeru iskanja metastaz (4, 5).

Z ozirom na naše rezultate menimo, da je poleg hormonskih testov v detekciji feokromocitoma primerna kombilnacija scintigrafije in računalniške tomografije (6). Ker je ultrazvok manj senzitiven kot računalniška tomografija, je primeren predvsem kot presejalni test.



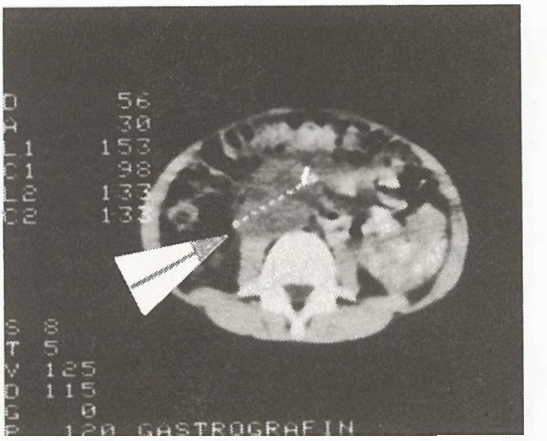
Slika 2a – Scintigram opravljen v posteriorni projekciji 72 ur po aplikaciji 131-J MIBG z minimalno asimetričnostjo kopičenja radioindikatorja v predelu nadledvičnih žlez. Prvotno smo to interpretirali kot normalen izvid.

Fig 2a – 131-J MIBG study acquired 72 hours after tracer aplication in posterior projection. Slight asymmetry in adrenal uptake of 131-J MIBG on the right side is noted. On first reading the scan was interpreted as normal.



Slika 3a – Posteriorni (levo) in anteriorni (desno) scintigram s 131-J MIBG opravljen 96 ur po aplikaciji z vidnimi normalnimi nadledvičnimi žlezami in nenormalnim žariščem pod desno nadledvično žlezo.

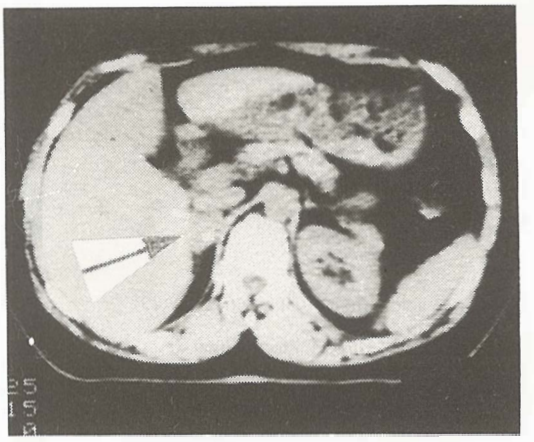
Fig 3a – 131-J MIBG study acquired 96 hours after injection in posterior (left) and anterior (right) projection with visible normal adrenal glands, and abnormal tracer accomulation below the right adrenal gland.



Slika 3b – CT je na tem mestu dokazal tumor

Fig 3b – CT scan proved this as tumor

Zaključek – V retrospektivni študiji, ki je obsegala 22 primerov, ugotavljamo 83% senzitivnost scintigrafije s 131-J MIBG glede na diagnozo ob odpustu iz bolnišnice. Rezultati zaradi majhnega števila primerov niso reprezentativni, so pa skladni s podatki iz literature (7). Ugotavljamo, da je senzitivnost scintigrafije pri detekciji feokromocitoma v predelu nadlevičnih žlez slabša kot pri morfoloških preiskavah. Bistvena prednost scintigrafije pa je vizualizacija kromafinih tumorjev, kar je pomembno predvsem v primeru lokalizacije teh tumorjev izven nadledvičnih žlez ter pri iskanju metastaz.



Slika 2b – CT prikaže tumor v desni nadledvični žlezi

Fig 2b – CT scan shows tumor in the right adrenal gland

Povzetek

Namen naše študije je bil retrospektivna evalvacija scintigrafije z 131-J MIBG (SC) pri pacientih s sumom na feokromocitom. Rezultate SC, ultrazvoka (UZ) in računalniške tomografije (CT) smo primerjali s histološko diagnozo pri 18 pacientih. Pri 4 hipertenzivnih pacientih pa smo feokromocitom na podlagi endokrinoloških testov praktično izključili.

Senzitivnost SC pri detekciji tumorjev, lokaliziranih v nadledvični žlezi, je bila 80%, pri CT 100% in pri UZ 92%. Skupna senzitivnost, vključujoč še 2 primera tumorja ležečega izven nadledvičnih žlez ter 1 bolnika z hiperplazijo sredice nadledvičnih žlez, je bila pri SC 83%, pri UZ 73% in pri CT 94%.

Zmožnost ugotavljanja funkcionalnega kromafinega tkiva, lokaliziranega v ali izven nadledvičnih žlez ter v metastazah, je glavna prednost SC pred CT in UZ.

Literatura

1. Mc Ewan AJ, Shapiro B, Sisson JC, Beierwaltes WH, Ackery DM. Radio-iodobenzylguanidine for the scintigraphic locatin and therapy of adrenergic tumors. Semin Nucl Med 1985; 2:132-53.

2. Ackery DM, Tippett PA, Condon BR, Sutton HE, Wyeth P. New approach to the localization of phaeochromocytoma: imagining with iodine-131-meta-iodobenzylguanidine. Brit Med J 1984; 288:1587-91.

3. Bomanji J, Levison DA, Flatman WD, Horne T, Bouloux PG-M, Ross G, Britton KE, Besser GM. Uptake of iodine-123 MIBG by pheochromocytomas, paragangliomas and neuroblastomas: a histological comparison. J Nucl Med 1987; 28:973-8.

4. Francis IR, Glazar GM, Shapiro B, Sisson JC, Gross BH. Complementary roles of CT and 131-J MIBG scintigraphy in diagnosing pheochromocytoma. AJR 1983; 141:719-25.

5. Fischer M, Vetter W, Witerberg B, Hengstmann J, Zedek W, Friemann J, Vetter H. Scintigraphic localization of phaeochromocytomas. Clin Endocrinol 1984; 20:1-6.

6. Gough IR, Thompson NW, Shapiro B, Sisson JC. Limitations of 131-J MIBG scintigraphy in locating pheochromocytomas. Surgery 1885; 98:115-20.

7. Shapiro B, Copp JE, Sisson JC, Eyre PL, Wallis J, Beierwaltes WH. Iodine-131 metaiodobenzylguanidine for the locasing of suspected pheochromocytoma: experience in 400 cases. J Nucl Med 1985; 26:576-85.

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INTERAKCIJA BUBREŽNOG I TUMORSKOG ^{99m}Tc–DMS KOMPLEKSA SA PROTEINIMA HUMANOG SERUMA

INTERACTION OF THE RENAL AND THE TUMOROTROPIC COMPLEX OF Tc–99m–DMS WITH HUMAN SERUM PROTEINS

Vanlić-Razumenić N[1], Petrović J[2], Tomić M[2], Ajdinović B[3], Rastovac M[3]

Abstract – Interaction of two different complexes of ^{99m}Tc-DMS (renal and tumorotropic) with human serum proteins was studied from two aspects: total protein binding (determined by precipitation and dialysis methods) and selective binding for different protein classes (determined by agarose gel electrophoresis). The renal complex ^{99m}TC (III) – DMS was highly bound to total proteins: 75,8 ± 3.5% whereas tumorotropic ^{99m}Tc(V)–DMS was bound in a small percent: 4,15 ± 1,4%. The difference in main transport proteins was also found: the main transporting protein for Tc(V) – DMS was albumin, while for Tc (III) –DMS α_2 – macroglobulins and α_1 – globulins. So, different chemical and physico-chemical characteristics of the two radiopharmaceuticals resulted in different biochemical behaviour, related to different organo-specificity.

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Key words: technetium, Tc-99m-radiopharmaceuticals, protein binding

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Uvod – Poznato je da kemijska struktura tehnecijumskih kompleksa, valentno stanje tehnecijuma, električni naboj i druga fizičko-hemijska svojstva odlučujuće utiču, odn. ustvari određuju ciljni organ ili tkivo u kome će se radiofarmaceutik lokalizovati. Na primeru niza derivata imino-disirćetne kiseline (IDA) vidi se kako sama struktura liganda – organskog molekula utiče na stepen lokalizacije u ciljnom organu, kao i na izlučivanje iz organizma. Takođe je karakterističan primer tehnecijumskih kompleksa dimerkaptoćilibarne kiseline (DMS) gdje se stvara nekoliko kompleksa sa istim ligandom, a različitim valentnim stanjem Tc, tako da su do sada nađena tri kompleksa Tc–DMS: renalni (1, 2), osteotropni (3), i tumorotropni (4). Za sada se dva koriste u nuklearno-medicinskoj dijagnostici: renalni kompleks Tc (III) – DMS koji se gradi u kiseloj sredini (pH~ 3) i tumorotropni kompleks koji se gradi u alkalnoj sredini (ph 7,8 – 8,4), pri čemu su takođe drukčiji i molski odnosi stano-jona i liganda.

Osim poznatih svojstava lokalizacije u različitim organima za koje pokazuju afinitet i osim različitih fizičko-kemijskih osobina, bilo je pitanje od značaja da se ustanovi postoji li razlika u njihovoj interakciji sa transportnim proteinima krvi kod ova dva kompleksa.

Budući da je mehanizam lokalizacije kod radiofarmaceutika još nerasvetljen, da je on povezan sa mehanizmom transporta i da se ovo sve odražava na farmako-kinetiku, cilj ovog rada bio je ispitivanje interakcije Tc-DMS kompleksa sa proteinima humanog seruma.

Pomenuta interakcija je ispitana sa dva aspekta: određeno je vezivanje za ukupne proteine seruma, a ispitano je selektivno vezivanje sa pojedinim klasama proteina primenom metode Johanssona (5). Ovakva istraživanja su i ranije vršena u našoj laboratoriji u vezi ^{99m}Tc-DMS za scintigrafiju bubrega (6).

Materijali i metode – U ovom radu korišteni su radiofarmaceutski kompleti za obilježavanje Tc-99m, kao i eluat ^{99m}Tc-generatora proizvodnje Instituta za radioizotope IBK Vinča.

Vezivanje za ukupne proteine je određeno pomoću tri postupka:

1) taloženjem proteina pomoću 10%-ne trihlorsirćetne kiseline i obračunavanjem procenta vezane radioaktivnosti u odnosu na unetu;

2) taloženjem proteina iz obeleženog seruma na isti način, dodatkom perhlorne kiseline 0,8 mol/L;

3) dijalizom kroz membranu koja propušta molekule do 12000 daltona u toku 24 časa u

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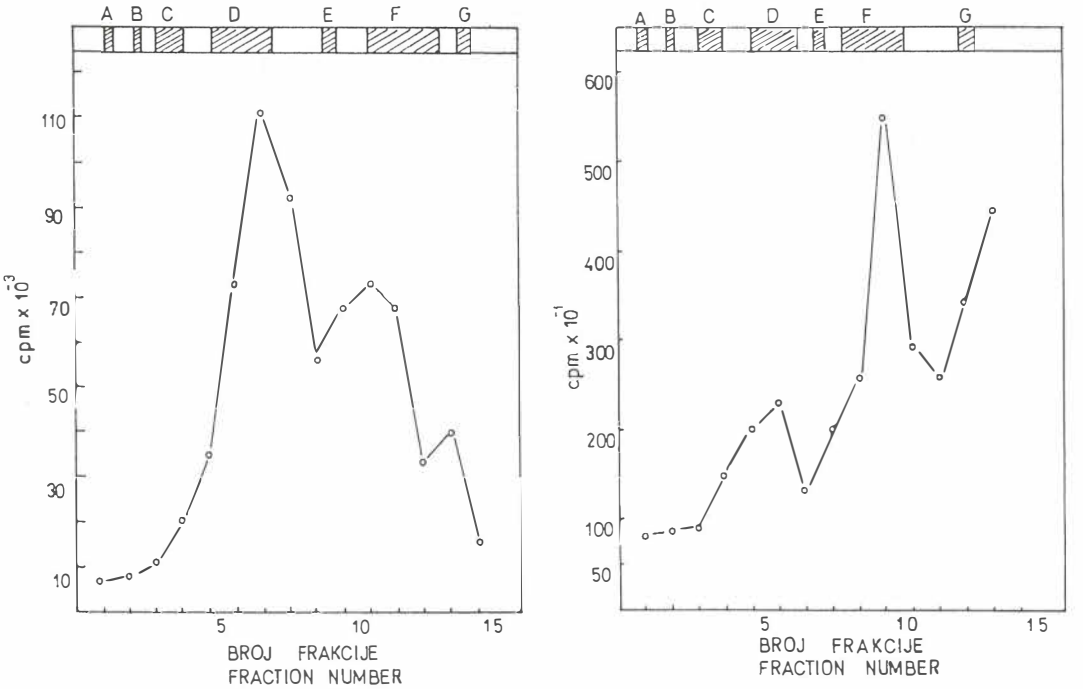


Slika 1 – Elektroforetogrami humanih seruma obeleženih »in vitro« (a) renalnim kompleksom ^{99m}Tc (III) – DMS; (b) tumorskim ^{99m}Tc (V) – DMS kompleksom

Fig. 1 – Fractionation patterns of sera labelled »in vitro« (a) with the renal complex, ^{99m}Tc(III)–DMS; (b) with the the tumorotropic complex ^{99m}Tc(V)–DMS

hladnom fiziološkom rastvoru (+4°C). Zatim je obračunat procenat vezane radioaktivnosti (ostatak u vrećici za dijalizu) u odnosu na ukupnu.

U ovim eksperimentima korišćeni su humani serumi sakupljeni od više pacijenata (»pulovani«) prethodno obeleženi ^{99m}Tc-preparatom u odnosu 0,4 ml (0,3-1 mCi) preparata +4,6 ml seruma u toku 20 minuta na sobnoj temperaturi.

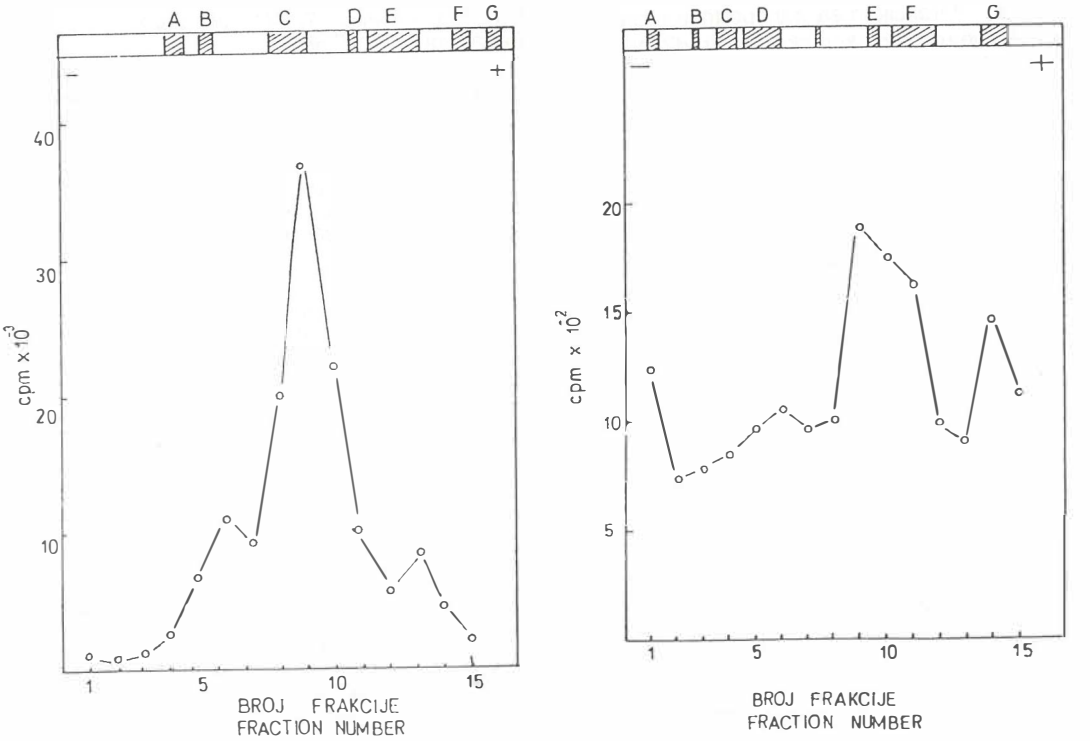
Selektivno vezivanje za proteine je ispitivano posle obeležavanja seruma in vitro na gore opisani način, a za određivanje in vivo, uzimani su uzorci po 5 ml krvi od pacijenata koji su prethodno primili preparat radi scintigrafske pretrage. Vezivanje za pojedine klase proteina je analizirano pomoću elektroforeze na gelu agaroze na sledeći način. Uzorci seruma u količini

Tabela 1 – Vezivanje za ukupne proteine krvi
Table 1 – Total protein binding

KOMPLEKS COMPLEX	TALOŽNA METODA PRECIPITATION METHODS		DIJALIZA DIALYSIS	SREDNJE VREDNOSTI MEAN VALUES
	PCA		TCA	
^{99m}Tc-DMS (RENALNI) (RENAL)	71,85 ± 3,5%	72,9 ± 4,1%	82,71 ± 3,0%	75,8 ± 3,5%
^{99m}Tc-DMS (TUMORSKI) (TUMOROTROPIC)	3,17 ± 1,2%	4,50 ± 1,9	4,77 ± 1,0%	4,15 ± 1,4%

Skraćenice: PCA – perhlorna kiselina; TCA – trihlorsirćetna kiselina

Abbreviations: PCA – perchloric acid; TCA – trichloroacetic acid



Slika 2 – Elektroforetogrami humanih seruma pacijenata kojima je prethodno dat radiofarmaceutik radi scintigrafske pretrage (a) renalni kompleks ^{99m}Tc(III)–DMS; (b) tumorski kompleks ^{99m}(Tc(V)–DMS

Fig. 2 – Fractionation patterns of human sera labelled »in vivo« (a) after i.v. administration of the renal complex ^{99m}Tc(III)–DMS; (b) after i.v. administration of the tumorotropic ^{99m}Tc(V)–DMS

LEGENDA – LEGENDE

A β_1 – globulini; B liopoproteini; C transferin; D α_2 – globulini
E β_1 – antitripsin; F albumin; G prealbuminska frakcija

A β_1 – globulins; B lipoproteins; C transferrin; D α_2 – globulins;
E α_1 – antitrypsin; F albumin; G prealbumin fraction

po 10 μ l su nanošeni u 15 proreza na startu gela, pa je vršena elektro-foreza u veronalnom puferu pH 8,4 uz potencijalni gradijent 20V/cm, jačinu struje 160 mA u toku 60-70 minuta. Po završenoj elektroforezi po 12 traka isecano je poprečno na pravac u kome je obavljena elektroforeza radi merenja na brojaču, dok su preostale trake bojene amidoblack-om radi identifikacije proteinskih klasa.

Rezultati – Srednje vrednosti određenih procenata vezivanja prikazane su u tabeli 1, dok su elektroforetogrami prikazani na slikama 1 i 2.

Diskusija – Iako su ovde u pitanju kompleksi istoga metala (Tc) i liganda (DMS), vidi se da njihov različit sastav i fizičko-hemijska svojstva, uslovljeni različitim valentnim stanjem tehnecijuma, utiču na njihovo biohemijsko ponašanje, tj. kako na lokaciju, tako i na interakciju sa transport nim proteinima krvi.

Kompleks Tc (III) – DMS koji ima veliki afinitet prema bubrežnom tkivu (lokalizuje se u korteksu u iznosu od preko 50%), ima visoko proteinsko vezivanje, za razliku od Tc (V) – DMS (lokalizuje se u medularnom karcinomu štitnjače kao i u još nekim tumorima) koji se u vrlo maloj meri vezuje za proteine.

Elektroforetska analiza na 0,8% gelu agaroze pokazuje da renalni kompleks preferencijalno interaguje sa α_2 – makroglobulinom i α_1 – globulinom, dok tumorotropni ^{99m}Tc-DMS ispoljava izrazit afinitet za albumin. Stoga se može zaključiti da je različita lokalizacija radiofarmaceutika u

vezi sa interakcijom sa transportnim proteinima, kao što je uočeno i kod skeletnih radiofarmaceutika (7,8).

Tako je interesantno da se renalni ^{99m}Tc-DMS pretežno vezuje za globulinske frakcije iako su globulini u mnogo manjoj količini zastupljeni u serumu u odnosu na albumin.

Ovde postignuti zaključci kada se uvrste u pregled ovakvih interakcija čitavog niza ^{99m}Tc-kompleksa (a ova istraživanja su u toku), moći će da dovedu do relacije između fizičko-hemijskih svojstava kompleksa, njihovog biohemijskog ponašanja i biološke lokalizacije.

Sažetak

Ispitana je interakcija dva ^{99m}Tc-DMS kompleksa (renalnog i tumorotropnog) sa proteinima humanog seruma sa dva aspekta: vezivanje sa ukupnim proteinima seruma i selektivno vezivanje za pojedine klase proteina. Nađena je velika razlika u ukupnom vezivanju: procenat je iznosio za renalni kompleks 75,8 ± 3,5, dok za tumorski 4,15 ± 1.4. Takođe su različiti transportni proteini za ove komplekse: renalni kompleks pretežno interaguje sa globulinima, dok tumorski biva transportovan uglavnom albuminskom frakcijom.

Različite strukture i fizičko-hemijska svojstva ovih kompleksa su uzrok njihovog različitog biološkog ponašanja (organospecifičnosti), a takođe i različitog biohemijskog ponašanja odn. afiniteta prema proteinima krvi.

Literatura

1. Ikeda I, Inoue o, Kurata K. Chemical and biological studies on ^{99m}Tc-DMS–II: Effect on Sn/II on the formation of various Tc-DMS complexes. Int J Appl Radiat isot 1976; 27:681-8.

2. Garcia R, Galvez J, Moreno J: Stoichiometric and kinetic study of the ^{99m}Tc-DMSA complex: A possible model for the physico-chemical behaviour of the radiopharmaceutical ^{99m}Tc-DMSA. Inst J Appl Radiat Isot 1982; 33:521-4.

3. Johannsen B, Syhre R, Spies H. Untersuchungen zum Zusammenhang zwischen chemischer Struktur und pharmako-kinetischen Eigenschaften von Tc-Thiolato-Komplexen. Nuc Compact 1980; 11:42-5.

4. Ohta H, Yamamoto K, Endo K, More T, Hamanak D, Shimazu A, et al. A new imaging agent for medullary carcinoma of the thyroid. J Nucl Med 1984; 25:323-5.

5. Johansson BG. Agarose gel electrophoresis. Scand J Clin Lab Invest 1972; 29: suppl 124, 7-19.

6. Vanlić-Razumenić N, Petrović J, Gorkić D. Biochemical studies of the renal radiopharmaceutical compound Dimercaptosuccinate. IV. Interaction of ^{99m}Tc-DMS and ^{99}Tc-DMS complexes with blood serum proteins. Eur J Nucl Med 1984; 9:370-3.

7. Schümichen C, Koch K, Kraus A, Kuhliske G, Weiler K, Wenn A, Hoffman G. Binding of Tc-99m to plasma proteins: Influence on the distribution of Tc-99m phosphate agents J Nucl Med 1980; 21:1080-5.

8. Vanlić-Razumenić N, Petrović J, Tomić M, Ajdinović B, Rastovac M. Uporedno proučavanje vezivanja skeletnih Tc-99m radiofarmaceutika za proteine humanog seruma. Radiol Iugosl In Press.

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INTERVENTIONAL SONOGRAPHY FOR DIAGNOSIS AND THERAPY

Otto R Ch

Abstract – Ultrasound guided procedures for diagnosis (biopsies) and therapy (drainages) are today considered routine procedures and are, because of small percentage of risks, performed more and more often.
We have studied the results of ultrasound guided punctures performed on a larger group of patinets. In 87%-92% of cases the material from the region of interest was obtained, e.g. the liver, the pancreas and retroperitoneal space. In 78%-93% of cases malignant cells or suspected mallignant cells were obtained.
Simple percutaneous drainage procedures have been proved successful in abscess drainages of hydronephroses and pseudocysts. We discuss the results, risks and contraindications.

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Key words: ultrasonic diagnosis, biopsy, drainage, puncturrs

Orig sci paper

Radiol Iugosl 90; 24:341-5

Introduction – Sonography and Computed Tomography show various organs in the body, particularly in the abdomen and demonstrate generalized or circumscribed areas of transformation and tissue changes. Increased experience in sonography has shown that macromorpholocal information is often not sufficient to provide a definitive assessment of focal alterations in parenchymal organs. The picture of a circumscribed change in an organ by itself does not enable a definite diagnosis to be made. On the other hand, unimportant findings, such as hepatic hemangiomas, may be difficult to distinguish with certainty from serious lesions, such as metastases, as they may have similar appearance (1). For this reason biopsy methods have been developed using fine needles under sonographic control with continuous visualisation to obtain tissue specimens from the suspected areas in the body. A cytologist can make a better definite assessment of the tissue specimen obtained when the sonographer or radiologist.

In a very high percentage of cases the nature of a lesion may be determined by such a biopsy. The mean success rate is more than 90%. Ultrasound control of fine needle puncture has become a recognized method of biopsy, though the success rate can be improved by biopsy controlled by computed tomography.

Material and methods – In our institute we use a centrally perforated transducer for precise needle application (2), which was brought to function in co-operation with Japanese engineers in Zurich in 1977 (Fig. 1). This transducer can be used to introduce a cannula under continuous visual control, and indicates with the dark line in the middle of the screen where the needle passes through the tissues. The described instrument has been used in more than 10 000 patients to get biopsy probes for histological or cytological evaluation.

The illustration shows the findings in a case of liver metastasis, which is seen as a better sound conducting zone in the normal structure of liver tissue (Fig. 2).

Sonographically controlled needle puncture procedures may be divided into two main groups, diagnostic and therapeutic (3). It is possible to

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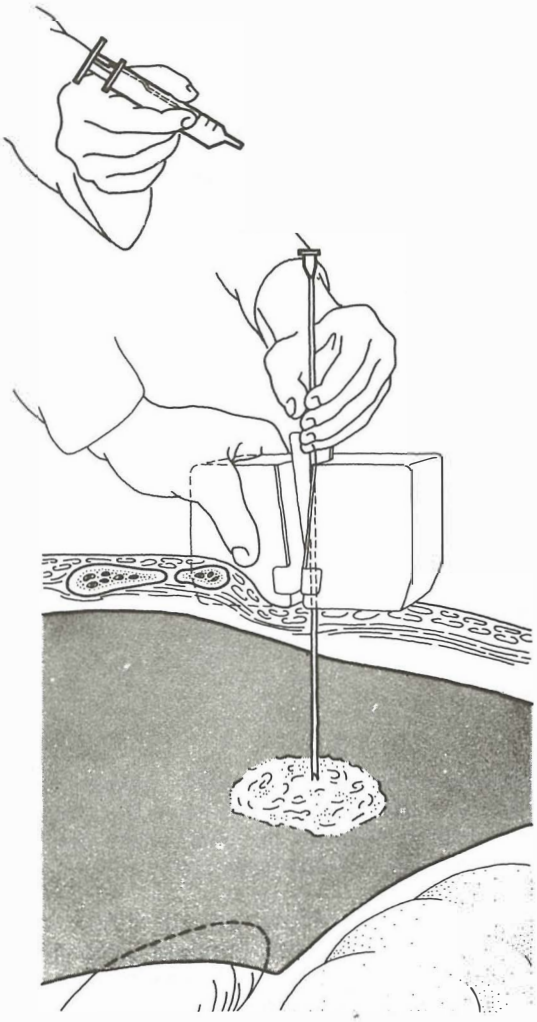

Fig. 1 – Centraly perforated transducer for precise focal punctures

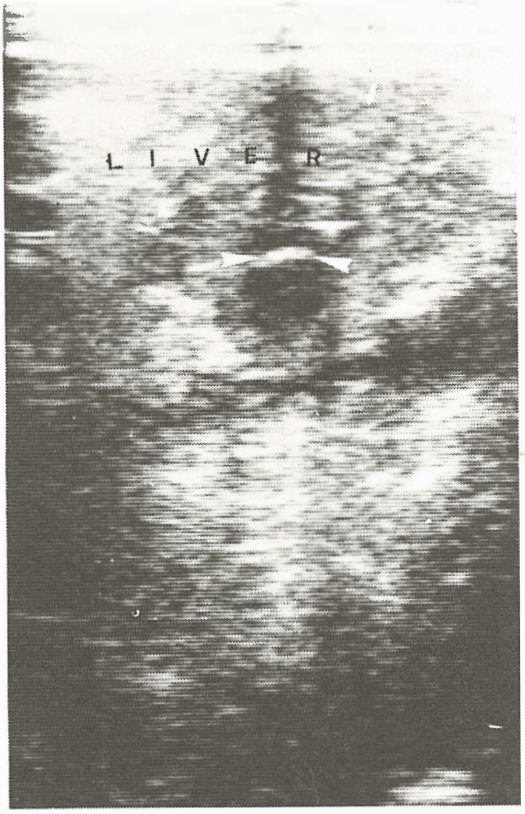

Fig. 2 – Liver metastasis during fine needle puncture. Bright echo of needle tip (arrows) in tumor center

Table 1 – Biopsy needles for use under ultrasound guidance

Typ	∅ in mm
* Chiba	0.7
* Cutting Edge (SBK)	0.8 – 1.2
Westcott	1.0
(Tru-Cut)	2.2
Menghini	1.4

introduce larger punch biopsy needles percutaneously this apparatus into the cutting biopsy canulae (table 1) and drainage tubes. The tip of the needle may be more or less visible in the tissue depending on its structure. It's reflection is affected by the relationship of the Bevel to the tomographic plane of the transducer. This phenomenen is important for controlling its position, especially as the fine, higly flexible needle may easily be displaced in more dense fibrotic tissue.

In our experience it is mainly not necessary to require a local anesthetic before using the fine Chiba needle for cytological investigation. However, local anesthetic is always required for larger biopsy needles used to remove tissue for histological examination. In the past three years the only needles used for this purpose were the cutting biopsy cannulae Angiomed GmbH, Karlsruhe/FRG which hardly produced any trauma and was very efficient.

Results and discussion – Diagnostic biopsy: over the past 8 years, more than 10 000 patients have undergone fine needle biopsy and in the past 4 years a therapeutic procedure has been done in more than 550 patients. Of all patients who undergo sonographic investigation in our hospital about 10% have diagnostic biopsy as a further examination to undergo. Liver biopsy was the commonest site as seen in table 2 (8).

The table shows the high diagnostic success rate of ultrasound-directed fine needle biopsy, which reached the specific site in the tissue in 73.6 to 96.2% of cases. Malignancy could be proven or suggested in about 4/5 of all successful biopsies. Taking into account all patients who had undergone biopsy, a malignant tumor was proven in 72.8% of cases or suspicious tissue was found. About 1/4 of all patients who had a biopsy were known definitely not to have a malignant tumor, or it could not be reached by fine needle biopsy without further procedures.

A hypernephroma, however, can be difficult to prove cytologically as it is highly vascular, on aspiration blood may be collected and only few tumor cells. More than hundred patients who underwent an ultrasound examination had biopsy for clinical suspicion of an abscess. Pus was obtained in 126 cases with no evidence of tumor cells.

Even tumors affecting the skeleton sometimes may be biopsied under sonographic control. They often produce simultaneous juxtaosseons tumor infiltration, which may well be visible by sonography and so can be punctured under visual control. Lesions in the ribs, which require some care if they are to be biopsied under x-ray control, may be simply and rapidly punctured as well.

A special procedure is used to obtain histological tissue samples from the liver. A cutting-edge biopsy cannula Angiomed GmbH, Karlsruhe/FRG which causes very little tissue trauma and provides high tissue yield has become established in various centers as the best needle and displaced other material like Menghini nod Trucut needles (4). It allows investigations to be done on outpatients and makes hospitalization unnecessary.

Material suitable for histological examination was obtained from all patients and optimal histological assessment was possible in more than 95% of cases. In addition, electron microscopy and immunological investigations were undertaken. Surprisingly, liver biopsies adequate for histological examination were obtained with this type of needle with the smallest external diameter of only 0.78 mm, corresponding to the caliber of a cytological fine needle.

Combined investigation using sonography and x-rays: In some cases neither ultrasound nor CT are able to confirm the suspec-

Table 2 – Results of ultrasound-guided fine needle biopsy (8) (n = 1658)

Organ	n	%	Biopsy producing assessable site specific material		Suspicious or confirmed malignancy	
			n	%	n	%
Liver	498	30.0	447	89.8	357	79.9
Pancreas	211	12.7	199	94.3	177	88.9
Retroperitoneum	152	9.2	131	86.2	105	80.2
Kidney	187	11.3	175	93.6	168	96.0
Spleen	19	1.1	14	73.7	11	78.6
Intestinal tract	52	3.1	50	96.2	38	76.0
Ascites	65	3.9	65	100.0	41	63.1
Intrathoracic Space accupying lesion and/or localised pleural effusion	157	9.5	141	93.4	99	70.2
Other sites (e.g. thyroid etc)	317	19.1	281	88.7	211	75.1
	1658	100.0	1503	(90.7)	1207	(80.3
Abscess (thorax and abdomen)	129	126	97.7			
Number drained	–	59	–			

ted tumor. Then, a combination between contrast medium injection in the hollow structure and ultrasound may be of help to find the right diagnosis for example obstructive jaundice and or obstruction of the ureter.

The operation of anterograde pyelography has the adventage that infection of the draining urinary pathways may be avoided. It is always possible and can be performed rapidly as soon as the renal pelvic calyceal system becomes dilated.

Results of ultrasound guided drainage : Ultrasound-guided therapeutical operations have become established as a solution to many problems (5). Liver abscesses can be drained with high certainty and a good rate of success without any further operative procedures. In contrast, nephrostomy serves as a preparation for subsequent surgery and is required for exmple in order to rapidly relieve renal infection due to stasis (Fig. 3). Similar procedures are required when an abscess in the liver or some other part of the body is drained. A newly developed pigtail drainage system is employed which is very easy to introduce. It consists of a puncture needle with a stylet through which the stretched drainage tube is introduced into the necrotic focus (Fig. 4). After withdrawal of the needle it returns spontaneously to its original shape and becomes visible as an echogenic double line (Fig. 5).

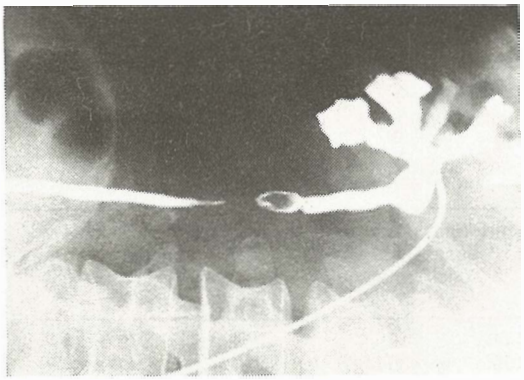

Fig. 3 – Hydronephrosis due to ureteral stone. Pigtail drainage tube in renal pelvis

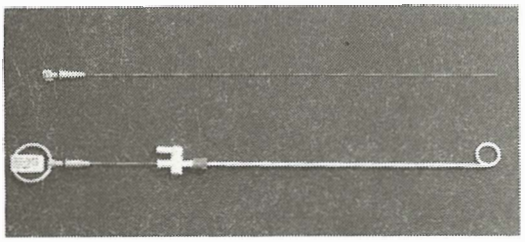

Fig. 4 – Pigtail drainage tube for application under sonographic guidance

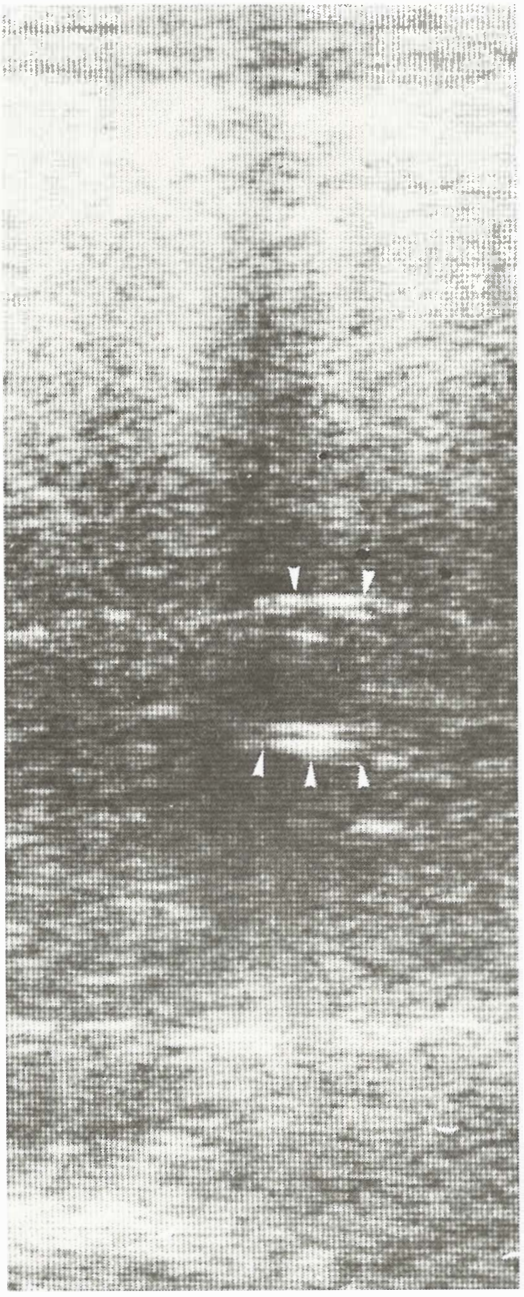

Fig. 5 – Liver abscess, partially drained. Echogenic double line of pigtail tube (arrows)

Assessment of fine needle biopsy: Whereas sonography or CT alone may raise the suspicion of a malignant growth in more than 4/5 of patients, a malignant lesion could be confirmed in only 3/4 of them. Guided biopsy with a fine needle allows to a void overcome certain weaknesses of the diagnostic tomographic technic.

Complications have been very unusual in the more than 10 000 fine needle biopsies undertaken in our institute. But puncture of the bile duct for example filled with contrast medium may be a problem. This led to transient bradycardia and hypotension probably due to vagal stimulation in three patients and is well-known in the literature (6, 7).

A biopsy in principle is an invasive measure, even when a small caliber cutting cannula is used. Metastasis of a tumor due to fine needle puncture has never been observed in our series and should not affect the prognosis in affected individuals. Serious complications, reported particularly as the result of renal biopsy have hardly ever occurred (8, 9). So surgery has not been necessary.

Assesment of ultrasound guided drainage: It is easy to drain dilated hollow systems, such as the kidney and the bile ducts under sonographic control. This used to be done using x-rays. Certain types of abscesses can be also dealt in this way. Use of the newly modified fistulation set for percutaneous drainage of the kidney of abscesses markedly reduces the time required and the risks of the procedure.

When the simplicity and safety of this technique of fistulation of the kidney are taken into consideration, in the future there will be more indications for the method. In addition it will more often be necessary as an adjuvant method. Last not least interventional sonography, in adition to find definitive diagnosis and to fulfill certain therapeutical measures will also help to make significant cuts in the costs of many procedures.

Sažetak

INTERVENCIJSKA SONOGRAFIJA U DIJAGNOSTICI I TERAPIJI

Ultrazvučno vođene dijagnostičke zahvate (biopsije), kao i terapijske zahvate (drenaže) danas smatramo rutinskim, i zbog niskog postotka rizika ih izvodimo sve češće.

Proučavali smo rezultate ultrazvučno vođenih punkcija izvedenih na većem broju pacijenata. U 87%-92% slučajeva dobiven je materijal iz područja regije interesa, tj. jetre, pankreasa i retroperitonealnog prostora. U 78%-93% slučajeva dobivene su maligne stanice ili stanice za koje se sumnjalo da su maligne.

Jednostavni perkutani drenažni postupci su se pokazali uspješnima u drenažama abscesa hidronefroza i pseudocista. Raspravljamo o rezultatima, rizicima i kontraindikacijama.

References

1. Otto R Ch, Wellauer J. Ultraschallgeführte Biopsie. Springer-Verlag, Berlin-Heidelberg-New York (1985)

2. Otto, R., P. Deyhle Guided puncture under real-time sonographic control. Radiology 1980; 134:784-5.

3. Largiadèr F, Otto R. Wertigkeit der ultraschallgeleiteten Punktion in Diagnostik und Therapie. Chirurg 1987; 58:199-206.

4. Antonucci F, Stuckmann G, Burger HR, Otto R Ch. Ultraschallgeleitete Schneidbiopsie bei generalisierten und fokalen Erkankungen der Leber. Ultraschall 1986; 7:203-8.

5. Gebel M. ultraschallgezielte transkutane Drainage pathologischer Flüssigkeitsansammlungen im Bauchraum. In: Sonographie in der Gastroenterologie Diagnostik-Therapie-Neue Methoden Hrgg: M. Gebel, A. Majewski, R. Brunkhorst Springer-Verlag Berlin-Heidelberg-New York-London-Paris-Tokyo (1988) 115-22.

6. Barrett, G. M. Hypotension after percutaneous liver biopsy. Lancet I: 1974; 624.

7. Berg, J. W., Robbinson, G. F. A late look at the safety of aspiration biopsy. Cancer 1962; 15:826.

8. In: New Developments in Imaging. Eds: R. Ch. Otto and Ch. B. Higgins Georg Thieme Publishers, Inc., New York 1986: 87-106.

9. Stuckman, G., H. R. Burger, G. Keusch, U. Binswanger, R. Otto Die ultraschallgeführte Nierenbiopsie mit der Schneidebiopsiekanüle. Ultraschall Klin Praxis 1987; 2:205-15.

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A COMPARISON OF SINUSOSCOPIC, RADIOGRAPHIC AND ULTRASONOGRAPHIC FINDINGS IN THE DIAGNOSIS OF MAXILLARY SINUS DISEASES

Rišavi R, Mladina R, Subarić M, Markov D, Pisl Z

Abstract – This paper presents a comparison of sinusoscopic, radiographic and ultrasonic findings in the diagnosis of maxillary sinus diseases. It was found that the three methods provide a high percentage of agreement in negative findings. The agreement between these methods in pathological states was somewhat lower. The usefulness of comparing these findings is commented upon, as are the differences in the findings of these three methods.

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Key words: maxillany sinus diseases-radiography, ultrasonic diagnosis, dosendoscopy

Orig sci paper

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Introduction – The clinical examination of suspected disease of the paranasal sinuses is not reliable, as mentioned by Axalsson et al (1, 2). Radiographic examination is much more reliable, but requires the use of several projections and a repeat of the process when treatment is finished. Sinus lavage and sinusoscopy are highly reliable, but they are invasive methods which involve a certain discomfort for the patient. Ultrasonography of the paranasal sinuses is a non-invasive method which can be frequently repeated to correct the diagnosis and monitor the state of the disease, and so it is frequently used in ENT clinical practice.

The use of ultrasound for examining paranasal sinuses was first mentioned by Keidel (3). The first study of the use of ultrasonographic examination of the maxillary sinuses is mentioned by Kitamura and Kaneka (4). Kitamura et al (5) introduced the use of B-mode presentation in the diagnosis of paranasal sinus diseases. This was later used in the research by Mann (6, 7) and Revonte (8, 9).

The aim of the research is: (a) to compare radiographic, ultrasonographic and sinusoscopic findings in acute and chronic inflammation of the maxillary sinuses, and (b) to compare sinusoscopy findings, which give the most reliable data, with radiographic and ultrasonographic findings.

Material and metods – 140 maxillary sinuses in 75 subjects (42 men and 33 women; average age 32,6 years) were examined. The subjects suffered from acute and chronic inflammation of the maxillary sinuses. The material for comparative study was selected after detailed anamnesis and ENT examination. This was followed by radiographic, ultrasonographic and sinusoscopic examination. Occipitofrontal and occipitomental projections were used in the radiographic examination. The ultrasonographic examination was carried out primarily in the A-mode, with a transducer frequency of 3.5 KHz, and, in unclear cases, in the B-mode, with a transducer frequency of 5.0 KHz. Sinusoscopy was carried out under local anaesthesia with 2% Xylocaine solution or 2% Cystocaine solution, through the front

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wall of the sinus in the fossa canina. Optics of 0°, 25° and 70° were used.

Statistical analysis was carried out with McNemar's Test For Paired Data Measurements; it was assumed that sinusoscopy provides the most reliable data. The state of the disease was classified after sinusoscopic, radiographic and ultrasonographic examination as: true positive (TP), false positive (FP), false negative (FN) and true negative (TN). Ultrasonographic findings and radiographic maxillary sinus findings were tested in series, and the sensitivity and specificity of both tests were compared with the sinusoscopic findings. Sensitivity and specificity were calculated according to the formulae:

$$\text{Sensitivity} = \frac{TP}{TP + FN}$$

$$\text{Specificity} = \frac{TP}{TN + FP}$$

In the tests in series, the finding resulting from comparing the radiographic and ultrasonographic tests was considered positive only if both tests were positive; it was considered negative if one of the tests was negative (10, 11).

The radiographic findings were classified as 1. negative, 2. mucosal thickening, 3. complete filling, and 4. polyp or cyst.

The ultrasonographic findings were classified as 1. normal echogram – front wall echo < 1.5 cm; 2. mucosal thickening – front wall echo 1.5 to 3.0 cm; 3. Sinus fluid – back wall echo 4 to 6 cm from the maxillary sinus front wall; and 4. polyp or cyst – double echo 4 to 6 cm from the maxillary sinus front wall (Jensen and Sydow).

Results – Table 1 presents the comparison between the radiographic and ultrasonographic findings in 140 maxillary sinuses. When the radiographic findings were negative, the ultrasonographic findings were in agreement in 91,6% (33/36); when the radiographic findings were positive (mucosal thickening, complete filling and polyp or cyst), the ultrasonographic findings were in agreement in 82.7% (86/104).

Table 2 presents the comparison between the ultrasonographic and sinuscopic findings in 140 maxillary sinuses. When the ultrasonographic findings were negative, the sinusoscopic findings were in agreement in 92.1% (35/38); when the ultrasonographic findings were positive, the sinusoscopic findings were in agreement in 84.3% (86/104).

Table 3 presents the comparison between the radiographic and sinusoscopic findings. When the radiographic findings were negative, the sinusoscopic findings were in agreement in 88.9% (32/36); when the radiographic findings were positive, the sinusoscopic findings were in agreement in 82.7% (86/104).

Table 4 shows TP, FP, FN and TN values after sinusoscopy and radiography. McNemar's Test shows no significant difference between the radiographic and sinusoscopic findings ($p < 0.19$) Sensitivity = 0.74 and specificity = 0.91.

Table 5 presents the comparison between the ultrasonographic and sinusoscopic findings for TP, FP, FN and TN values. McNemar's Test shows no significant difference between the ultrasonographic and sinusoscopic findings ($p < 0.12$). Sensitivity = 0.91 and specificity = 0.92.

Table 6 presents the comparison between utrasonography and radiography as tests in series and sinusoscopy. McNemar's test shows no statistically singificant difference between the tests in series and sinusoscopy ($p < 0.21$). Sensitivity = 0.97 and specificity = 0.90.

Table 1 – Comparison between radiographic maxillary sinus findings and ultrasonographic findings

Radiography	No. of Sinuses (n=140)	ULTRASONOGRAPHY			
		Negative	Mucosal thickening	Fluid	Polyp or cyst
Negative	36 (22.7%)	33 (91.6%)	2 (5.5%)	–	1 (2.9%)
Mucosal thickening	34 (24.3%)	3 (8.8)	27 (79.4%)	3 (8.8%)	1 (3.0%)
Complete filling	42 (24.3%)	–	3 (7.1%)	36 (85.8%)	3 (7.1%)
Polyp or cyst	28 (20.0%)	2 (7.1%)	2 (7.1%)	1 (3.6%)	23 (82.2%)
Total	140 (100%)	38	34	40	28

Table 2 – Comparison between ultrasonographic maxillary sinus findings and sinusoscopic findings

Ultrasonography	No. of Sinuses (n=140)	SINUSOSCOPY			
		Negative	Mucosal thickening	Fluid	Polyp or cyst
Negative	38 (27.1%)	35 (92.1%)	2 (5.3%)	–	1 (2.6%)
Mucosal thickening	34 (24.3%)	3 (8.8)	28 (82.4%)	–	3 (8.8%)
Fluid	40 (28.6%)	–	3 (7.5%)	35 (87.5%)	2 (5.0%)
Polyp or cyst	28 (20.0%)	2 (3.5%)	4 (14,3%)	–	23 (82.2%)
Total	140 (100%)	39	37	35	29

Table 3 – Comparison between radiographic maxillary sinus findings and sinusoscopic findings

Radiography	No. of Sinuses (n=140)	SINUSOSCOPY			
		Negative	Mucosal thickening	Fluid	Polyp or cyst
Negative	36 (25.7%)	32 (88.9%)	3 (8.3%)	–	1 (2.8%)
Mucosal thickening	34 (24.3%)	3 (8.8)	28 (82.4%)	–	3 (8.8%)
Complete filling	42 (20.0%)	–	3 (7.2%)	36 (85.6%)	3 (7.2%)
Polyp or cyst	28 (20.0%)	2 (7.1%)	2 (7.1%)	2 (7,1%)	22 (78.7%)
Total	140 (100%)	39	36	38	29

Table 4 – Mc Nemar's for paired data measurements between radiographic maxillary sinus findings and sinusoscopic findings

SINUSOSCOPY

RADIOGRAPHY		
+	TRUE POSITIVE (TP) 32	FALSE POSITIVE (FP) 9
–	FALSE NEGATIVE (FN) 11	TRUE NEGATIVE (TN) 88

$p < 0.19$

SENSITIVITY = 0.74

SPECIFICITY = 0.91

Table 5 – Mc Nemar's for paired data measurements between ultrasonographic maxillary sinus findings and sinusoscopic findings

SINUSOSCOPY

ULTRASONOGRAPHY		
+	TRUE POSITIVE (TP) 32	FALSE POSITIVE (FP) 7
–	FALSE NEGATIVE (FN) 3	TRUE NEGATIVE (TN) 78

$p < 0.12$

SENSITIVITY = 0.91

SPECIFICITY = 0.92

Table 6 – Comparison between ultrasonographic and radiographic maxillary sinus findings and sinusoscopic findings with Mc Nemar's test in series

ULTRASONOGRAPHY / RADIOGRAPHY	SINUSOSCOPY +	SINUSOSCOPY –
+	TRUE POSITIVE (TP) 98	FALSE POSITIVE (FP) 4
–	FALSE NEGATIVE (FN) 3	TRUE NEGATIVE (TN) 35

$p < 0.21$

SENSITIVITY = 0.97

SPECIFICITY = 0.90

Comments – Comparison between the radiographic and ultrasonographic findings (Table 1) shows agreement in 91.6% (33/36) of negative ultrasonographic findings and in 82.7% (86/104) of positive ultrasonographic findings. This shows a high agreement in negative findings. The agreement in positive findings is somewhat lower, for the small amount of liquid in the sinuses which does not reach the back wall of the sinus cannot be registered; in addition, owing to various thicknesses of the sinus mucosa, the utrasonic beam can give a false positive result in the cases of mucosal thickening, polyp or cyst (12, 13).

Analysis of the ultrasonographic and sinusoscopic findings (Table 2) shows a high agreement of negative sinusoscopic findings (92.1%), and a lower agreement of positive findings (84.3%). There were 8.8% false positive findings in cases of mucosal thickening, 12.5% false positive findings in cases of complete filling, and 3.5% false negative and 14.3% false positive findings in cases of polyp or cyst (14).

Table 3 shows that the agreement of negative sinusoscopic findings in relation to the radiographic findings (88.9%) was lower than the agreement between the radiographic and ultrasonographic findings and the agreement between the ultrasonographic and sinusoscopic findings; this is due to the fact that radiography is not always able to give precise information about the state of the sinus mucosa; as a result, there is a somewhat higher percentage of false negative and false positive findings, particularly in cases of complete filling, polyp or cyst (15, 16). The agreement between the sinusoscopic and radiographic positive findings is practically the same as the agreement between the radiographic and ultrasonographic findings. The agreement between sinusoscopic and radiographic false negative findings ranges from 7.1% to 8.8%, and that of false positive findings from 8.8% to 14.4%.

McNemar's Test for Paired Data Measurements shows no significant difference between the findings of radiography and sinusoscopy and between ultrasonography and sinusoscopy. It also shows that ultrasonography is more reliable in terms of specificity and sensitivity. With a combination of tests in series (Table 6) the sensitivity index is 0.97, which is an optimal result. This indicates that it advisable to perform radiographic and ultrasonic examination prior to sinusoscopy and to perform ultrasonography during follow-up (17, 18).

The results show that comparing ultrasonographic and radiographic findings with sinusoscopic findings provides a higher percentage of accurate findings and radiographic examination during diagnosis. Ultrasongraphy in the A-or B-mode is useful in the follow-up period with patients after conservative or surgical treatment, and also with pregnant women since radiation during check-ups is thus significantly reduced.

Sažetak

USPOREDBA SINUSOSKOPSKIH, RADIOGRAFSKIH I ULTRAZVUČNIH NALAZA U DIJAGNOSTICI OBOLJENJA MAKSILARNIH SINUSA

Ovaj rad predstavlja usporedbu sinusoskopskih, radiografskih i ultrazvučnih nalaza u dijagnostici oboljenja maksilarnih sinusa. utvrđeno je da se te tri metode u velikom postotku slažu u negativnim nalazima, dok je postotak podudarnosti u patološkim stanjima nešto niži. Raspravlja se o koristi usporedbi tih nalaza, kao i njihovim razmimoilaženjima.

References

1. Axelsson A, Grebelius N, Chidekel N, Jensen C. The correlation between the radiological examination and irrigation findings in maxillary sinuses. Acta Otolaryngol (Stockh) 1970; 69:302.

2. Axelsson A, Brorson J, Jensen C. Akut sinuit. Astra lakemedel. Bröderna Ekstrand tryckeri, Lund, 1978.

3. Keidel W. Über die Verwendung des Ultraschalls in der klinischen Diagnostik. Artzliche Forschung 1947; 1:349.
4. Kitamura T, and Keneko T. Le diagnostic des affections du sinus maxillaire par ultrasons impulsifs. Ann Otolaryngol (Paris) 1965; 82:711.
5. Kitamura T, Keneko T, Asano H, Muira T. Ultrasonic diagnosis in otolaryngology. Eye Ear Nose Throat Mon 1969; 48:329.
6. Mann W. Die Ultraschalldiagnostik der Nasennebenhölen und ihre Anwendung in der Freiburger HNO-Klinik. Arch Otorhinolaryngol 1975; 211:145.
7. Mann W. Die Ultraschalldiagnostik der NNH-Erkrankungen mit A und B-acan. Laryngol Rhinol Otol 1976; 55:48-53.
8. Revonta M. Ultrasound in the diagnosis of maxillary and frontal sinusitis. Acta Otolaryngol (Stockh), Suppl 370.
9. Revonta M, Suonpaa J: Diagnosis of subacute maxillary sinusitis in children. J. Laryngol Otol 1981; 95:133.
10. Stanton A, Glank. Primer of Biostatistics. McGraw-Hill Inc. Second edition, 1987; 195-7.
11. Mausner J S, Bahn A K. Epidemiology Phyladelphia: W. B. Sauders Company, 1974; 227.
12. Jannert M, Andreasson L, Holmer N G, Lörinc P. Ultrasonic Examination of the Paranasal Sinuses. Acta Otolaryngol (Stockh) Suppl. 389.
13. Mang L W, Bauer J W. Ultraschalldiagnostik der Nasennebenhöhlen: Ein Fortschritt in der HNO-Praxis? Laryng. Rhinol. Otol. 1984; 63:601-3.
14. Bauer J W, Bockmeyer M, Mang L W. Endoskopisch kontrollierte Ultraschalldiagnostik der Kieferhöhlen, Laryng. Rhinol. Otol. 1983; 62:443-5.
15. Mann W, Beck C, Apostolidis T. Liability of Ultrasound in Maxillary Sinus Disease. Arch. Oto-Rhino-Laryngol 1977; 215:75-9.
16. Mann W. Ultraschalldiagnostik im A-und B-Bild bei Erkrankumgen der Nebenhöhlen und der fazialen Weichteile. Radiologe 1986; 26:427-32.
17. Fouad H, Khalifa C M, Labib T et al. Diagnostic Ultrasonography in maxillary sinus disease. The Journal of Laryngol and Otol 1984; 98:887-94.
18. Jensen C, Sydow C. Radiography and Ultrasonography in Paranasal Sinuses, Acta Radiologica 1987; 28:31-5.

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IS ULTRASONICALLY GUIDED BREAST PUNCTURE A REASONABLE APPROACH TO THE TREATMENT OF NONPALPABLE CYSTS?

Vlaisavljević V

Abstract – A comparison between the efficacy of echography and cytologic analysis of breast cysts was made with the intention of comparing the ability of each method to indicate the intracystic growth (ICG).
1708 breast cyst aspirates were certified cytological. In this group three (0.17%) intracystic cancers and four (0.23%) intracystic papillomas were diagnosed. All cancers had positive cytological and clinical findings.
In the group of 283 patients examined by ultrasound and mammography and/or pneumocystography there were 5 patients with ICG and none were missed by ultrasound. We recorded one (0.3%) false positive echographic sign for the presence of ICG and no false negative result.
The author concludes that the accuracy of echographic verification of the cystic nature of breast lesions for the presence of ICG is so high that there is no diagnostical reason for cytologic verification of ultrasonographically confirmed simple cysts.

UDC: 618.19-006.6-73:534-8

Key words: breast neoplasms, ultrasonic diagnosis, punctures, mammography

Orig sci paper

Radiol Iugosl 1990; 24:353-5

Introduction – At present, it is generally accepted that native mammography is the only method suitable for the detection of breast cancer. Echomammography is not so accurate that it could be used as an independent method of detection. But that does not mean that tumors revealed by detective mammography can also be visualized by echomammography. If the solid tumor is 5 – 10 mm in diameter, it can frequently be visualized by ultrasound even though it is not clinically manifest. Unfortunately, neither of the two methods can always determine the nature of tumors, not even when they can be visualized by these methods. Nevertheless, in this case echomammography has a certain advantage in the differentiation of cysts from solid tumors. The differentiation of malignant from benign solid breast tumors is not successful to such an extent that we could conclude on the nature of the tumor merely on the basis of the echographic findings (1). It is necessary to verify the tumor by aspiration cytology. We applied interventional ultrasound in cases where nonpalpable circumscribed lesions were found on the native mammogram and the doubt about their nature was present (2). Our fist experiences were limited to the use of static compound scanning biopsy probe (3) and later to the real time biopsy probe (4).

Methods – All the laws that are ordinarily valid for interventional echography are also valid for this kind of investigation. They mean above all sterile equipment and contact medium for the investigation. The skin is desinfected by an application of betadine iodine solution. Because of its viscosity, it is usually not necessary to apply a contact medium to the skin. The probes are desinfected by cetavlone or alcohol. Usually the following three puncture techniques are used:

1. The technique of marking the puncture site followed by blind puncture.

This technique is merely used for marking of the puncture site. A linear probe is used. An injection needle is positioned under it. The needle is moved under the probe until the shadow of the needle covers the lesion to be punctured. The point of intersection of needle and probe denotes the puncture site. The puncture is carried out

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perpendicularly to the determined site of the puncture. This technique is only adequate for larger cysts.

2. The technique of puncture »by free hand«.

A linear probe is used which is placed so that the tumor lies closer to one of its edges. The needle is inserted under the skin and its progress toward the desired site is followed on the monitor. Corrections of its path can be made during the entire course of the intervention.

3. The technique of puncture using a probe adjusted for puncture.

Today probes designed for puncture usually enable a continued following of the needle on the monitor. The needle can be easily and quickly inserted at the marked place and in the direction of the lesion. This technique is simple and safe even in small lesions.

At the Breast diagnostic Center Maribor, the influence of echographic diagnostics of cystic breast lesions was evaluated in a ten year period. For this purpouse we analysed cytologic manifestation of breast cyst aspirates and changes in diagnostic procedures related to breast cyst diagnosis induced by interventional ultrasound.

Results – A total of 1708 breast cyst aspirates were analysed in our center. Among all of these aspirates, there were only 3 (0.17%) positive findings. Although we had more positive samples (n=8) they were aspirated from the same malignant tumor. These findings which were positive too are not counted in calculation of the incidence of positive aspirates. In all cases, the reason for positive cytologic findings was an intracystic malignant tumor. We had not registered any false positive findings. In all of these intracystic cancers were clinically manifest after intracystic fluid was evacuated.

In 31 (1.8%) cases the results of cytologic evaluation were classified as suspect. In one of these cases, an intracystic tumor was confirmed by ultrasound and histologically certified as malignant. In 5 patients the benign intracystic papillomas were certified by open biopsy. All were visualized by ultrasound. In 6 patients with suspicious citology, no ultrasonographic and histologic reasons for such a result were certified. In 20 cases cytologic findings were classified as indistinct cases (Papanicolaou 2-3). Observation and follow up was recomanded. No malignant tumor was diagnosed in this group during the 10 years follow up period.

In the whole group, 324 (18.9%) aspirates were not adequate for cytologic analysis.

In this period a total of 283 breast cysts were evaluated by echography. There were 5 benign intracystic papillomas and 2 false positive findings on ultrasound. In one of these cases, a galactocele with large intracystic particle was found by open biopsy. In a second case, there was no histologic substrate for ultrasonogram which was suspicious on intracystic growth. There were no false negative results for the presence of malignant intracystic growth.

A comparison of the number of pneumocystograms (PCG) and echomammograms of breast cysts in the period of ten years showed us that the accuracy of echomammography in breast cyst evaluation is so high that pneumocystography was recently nearly completely abandoned. Pneumocystography was a frequently used procedure in the period before we introduce ultrasound in breast diagnostics. In the period between 1974 and 1978, a total of 149 PCG were made in 392 clinically manifest breast cysts. After that, a total of 97 PCG were indicated although a larger number of breast cysts were aspirated (1316 cases) and many of them were not palpable. In the last three years only 8 PCG were done.

The analysis of the last 190 pneumocystograms showed us that we had 8 (4.1%) indistinct or inadequate pneumocastograms which need histologic verification. In all of these cases, open biopsy was overtreatment because no patology was find.

There were no intracystic malignancies detected by ultrasonographic visualization or ultrasonographically guided puncture of unpalpable breast cysts in the period of 9 years.

Discussion – Although echomammography is extremely precise in diagnosing of the cystic nature of lesions, it has no great value in palpable tumors. They would in any case have to be punctured because of cytologic verification, so this would prove the cystic nature of the lesion. Its role in verification of unpalpable cysts is far more important (2, 5).

Often small cysts detected on the x-ray mammogram cannot be correctly determinated as fluid filled lesions on the basis of these findings. Echomammography can make the decision for biopsy of solid lesions easier and more precise with correct interpretation of cystic lesions (5, 6).

The next problem is the verification of unpalpable lesions in the radiographically dense, opaque

breast in which such changes can usually be visualized without difficulty by ultrasound. Because of overlapping of typical signs of solid and cystic lesions on the mammogram, aspiration can quite simply confirm the diagnosis (4). This is of special importance in cases when a breast with multiple cysts must also be investigated by mammography because of the possible simultaneous presence of cancer. Aspiration of cyst before mammography eases mammographic interpretation of the breast.

Generally, because of the high accuracy of echomammography cytologic analysis of breast cyst aspirates had no such value as in the period before the introduction of ultrasound in diagnostic procedure.

The reason for aspiration of nonpalpable breast cysts by ultrasonically guided puncture is at this moment more the need for verification of echographic finding than the need for analysis of aspirates. The risk for positive cytologic finding of cyst aspirates is very low. If the echographic diagnosis is clear, and there are no clinical reasons for aspiration, we can omit the procedure.

This means that ultrasound complitely eliminates the need for puncture in fluid filled lesions. The value of ultrasound guided puncture in breast pathology seems to lie in the evaluation of solid tumors. But in this field of application, the value of each negative cytologic finding must be discussed in the same way as in ordinary puncture of palpable breast lesions althought the tip of the needle was visualized during the aspiration.

Sažetak

DA LI JE ULTRAZVUKOM VOĐENA PUNKCIJA DOJKE PRIMJERNA ZA LIJEČENJE NEPALPABILNIH CISTA?

S namjerom da se usporedi uspješnost citologije i ehomamografije u pronalaženju intracističnih proliferativnih procesa u dojci (ICP), analizirano je 1708 citoloških nalaza aspirata cista dojke. U analiziranoj grupi bila su tri (0,17%) intracistična karcinoma i četiri (0,23%) intracistična papiloma. U svih karcinoma bili su pozitivni citološki i klinički nalazi.

U grupi 283 pacijentica pregledanih ultrazvukom i nativnom mamografijom te/ili pneumocistografijom bilo je i pet pacijentica s ICP. U svih je bio nalaz ehomamografije pozitivan. U jedne pacijentice analizirane grupe našli smo jedan (0,3%) lažno pozitivan nalaz ICP.

Autor zaključuje, da je točnost ehografske verifikacije cističnih lezija dojke tako visoka, da je citološka verifikacija aspirata ehografski potvrđenih jednostavnih cista postala nepotrebna.

References:

1. Vlaisavljević V. Differentiation of solid breast tumors on basis of their primary echographic characteristics as revealed by real time scanning of uncompressed breast. Ultrasound Med Biol 1988; 14 (supl 1):75-80.

2. Vlaisavljević V. Interventional ultrasound in breast diseases. Excerpta medica ICS 1986; 701:85-93.

3. Vlaisavljević V. Dijagnostika raka dojke ehomamografijom. Libri oncol 1981; 10:239-41.

4. Vlaisavljević V. Sonographically guided needle biopsy of breast lesions. Excerpta medica ICS 1984; 640:49-52.

5. Harper P. Fine needle aspiration biopsy of breast using ultrasound techniques – superficial localization and direct visualization. Ultrasound Med Biol 1988; 14 (supl 1):5-11.

6. Hogg J, Harris K, Skolnick L. The role of ultrasound guided needle aspiration of breast masses. Ultrasound Med Biol 1988; 14 (supl 1):13-21.

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ULTRASOUND GUIDED FINE NEEDLE ASPIRATION BIOPSY IN THE DIAGNOSTICS OF PANCREATIC CANCER

Drinković I, Kos N, Odak D, Kardum-Skelin I, Vidaković Z

Abstract – Despite of numerous diagnostic possibilities, pancreatic cancer still presents a problem for diagnostics, esp. in its early stage, i. e. when surgery could still be of help. We present our results of aspirated biopsy of the pancreas obtained in the last 8 years. It has been performed on 126 patients. With this method the diagnosis of pancreatic cancer, was confirmed in 41 pathents, while in foum patients the material obtained was insufficient and in two patients it was false negative. The accuracy of the ultrasonographical examinations was 90%. This method has proved itself as a simple, quick, cheap and accurate one, but of no considerable value in especially important early diagnosing of the disease.

UDC: 616.37-006.6-07:534-8

Key words: pancreatic neoplasms, biopsy needle, ultrasonic diagnosis

Profess paper

Radiol Iugosl 1990; 24:357-9

Introduction – Although today there is a large number of diagnostic posibilities for diagnosing pancreatic cancer, such as computerised tomography, magnetic resonance, ultrasound, retrograde pancratography, humorous tumoral markers, the diagnosis of pancreatic cancer is still reached in a late stage of the disease. Very often an aspirated biopsy of the change is needed, in order to verify the diagnosis preoperatively, which is very important as the forecast and guidance for the surgical procedure. In our practice we use aspirated biopsy of the pancreas for discovering and shortening the diagnostic treatment of the pancreatic cancer.

Material and methods – Aspirated biopsy of the pancreas has been performed on 126 patients in whom there were doubts on a malignant pancreatic process. The indications for aspirated biopsy were loss of weight, abdominal pain, and ultrasonographicaly enlarged echogenic structures. As an indication we also considered changed computerised tomography findings, or an unclear finding of retrograde pancreatography. The procedure was performed on hospitalised patients only, using the Sonel 303 with a lateral puncture guider. The material was taken by means of a fine needle (22 G), through one initiative puncture with several inner punctures of the pancreas, with help of the negative pressure inside the lesion. During the puncture a cytologist-pathologist was always present to judge the validity of the material. In case of the insufficient material the puncture was repeated.

Results – By puncturing the malignant process on the suspected pancreas, the diagnosis of pancreatic cancer was confirmed in 41 patient. In 66 patients degenerative cells of pancreas were found, with suspicions on chronic changes due to inflammations. In five patients cytologic findings indicated acute inflammations. In three patients normal pancreatic cells were obtained, while in four patients the punctures of the surrounding lymphatic nodules and two duodenum diverticulluses were performed. In four patients the material obtained was insufficient, while in two patients it was false negative. The accuracy of the ultrasonographical examinations was 90% (Table 1).

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Table 1 – Results of ultrasound guided fine needle aspiration biopsy in diagnosing pancreatic cancer

DIAGNOSIS	No. of patients	%
Carcinoma	41	33
Benignant cells	66	53
Acute pancreatitis	5	5
Surrounding structures	4	3
Pancreatic cells (normal)	3	2
Insufficient material	4	3
False negative	2	1,5
Total	126	100

Discussion – Ultrasound guided aspirated biopsy of the pancreas is an additional diagnostic method completing the field of diagnostic possibilities in discovering pancreatic cancer. As distinguished from the other imaging techniques, ultrasound and aspirated biopsy can directly confirm and solve etiology of the pancreatic changes, which very often remains unclear, even after all the other examination techniques have been applied (1, 2, 3). Aspirated biopsy of the pancreas was false negative in only 1.5% of patients of this group. The material was false negative due to the fact that it was taken from a central necrosis of tumor. So it is of great importance at every biopsy, that the samples be taken from the borderlines of tumorous masses, too (Fig. 1, 2). The number of false negative and false positive findings can be considerably reduced in this way. In case of insuficient material or an indefinite diagnosis, aspirated biopsy should be repeated, or sometimes even a histologic biopsy of the pancreas should be made. In our practice aspirated biopsy proved as a quick, accurate and cheap method. The diagnostic period has been considerably shortened, although the analysis of the surgical results did not show any betterment in the life expectancy of the patients operated. Aspirated biopsy enables quick verification of tumorous proceses, but its genesis is such that the patient comes to the examination having the symptoms already.

Conclusion – Aspirated biopsy of the pancreas is a quick, cheap but an agressive method of diagnosing of tumorous change of the pancreas. It shortens the diagnostic procedure and makes the decision for operation more simple and easier. However, retrospective analysis of the punctured carcinomas did not show a major shift in the diagnostic procedure regarding the succes of an operation.

Sažetak

ASPIRATIVNA BIOPSIJA U DIJAGNOZI RAKA PANKREASA

Usprkos brojnim dijagnostičkim mogućnostima, rak pankreasa je još uvijek problem dijagnosticirati, naročito u ranoj fazi, kad bi operativni zahvat bio od koristi. Iznosimo rezultate aspirativnih biopsija pankreasa dobivene u našoj praksi u zadnjih 8 godina. Rađena je bila kod 126 bolestika, na ovaj način smo rak pankreasa potvrdili kod 41 bolesnika, samo kod četiri bolesnika smo dobili nezadovoljavajući materijal i kod dva lažno negativan. Preciznost pretrage je bila 90%. Ova se metoda pokazala jednostavnom, jeftinom i točnom, ali bez veće vrijednosti u bitno ranijem dijagnosticiranju ove bolesti.

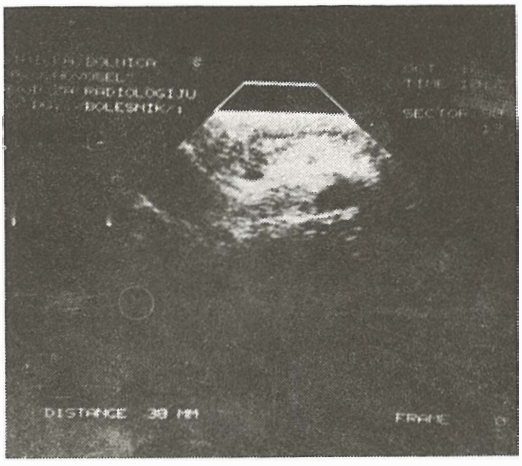

Fig. 1 – Head of the pansreas enlarged, with a needle in the tumorous mass

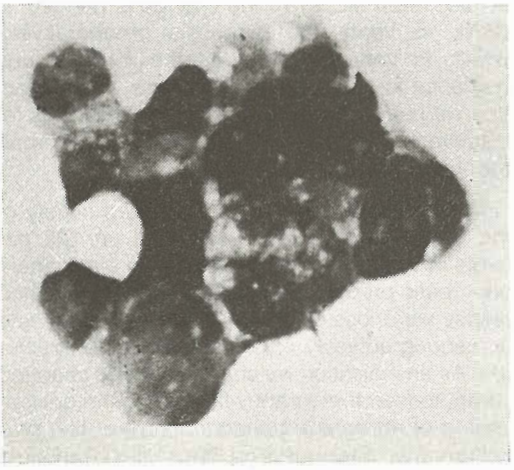

Fig. 2 – Cytologic material: malignant cells of the pancreas

References

1. Hancke S, Pederson J F. Percutaneous puncture of pancreatic cysts guided by ultrasound. Surg Gynaecol Obstetr 1976; 142:551-2.
2. Hancke S, Holm H H, Koch F. Ultrasonically guided percutaneous fine needle biopsy of the pancreas. Surg Gynaecol Obtetr 1975; 140:361-4.
3) Hovdenak N, Lees W R, Pereira J, Beilby Jow, Cotton Pb. Ultrasound guided percutaneous fine needle aspiration cytology in pancreatic cancer. Br Med J 1982; 285:1183-4.

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Odgovor :

V diferencialno diagnostičnem pogledu prihaja v poštev tako benigna kakor tudi maligna narava spremembe, tomografija primera definitivno ne pojasni. CT toraksa ni bil opravljen, čeprav bi dal zelo koristne podatke o obsegu lezije, v morfološkem pogledu ne omogoči verifikacije procesa. Verifikacija je možna le mikroskopsko. Z ozirom na anamnestični podatek, da je bila opravljena resekcija želodca pred 22 leti, bi morda diferencialno diagnostično prišel v poštev rak želodca z metastazo. Vendar so take metastaze pri raku želodca neobičajne. V diferencialni diagnozi pride v poštev metastaza neznanega raka. Metastazo raka grla po zdravljenju pred enajstimi leti izključuje drugačna morfološka slika novo odkritega raka.

Adenom bronhusa izključuje že starost bolnika. Da pa ne gre za tuberkulom je razvidno iz rentgenogramov izpred 3 let, kjer lezija ni bila vidna.

Verifikacija malignoma iz sputuma; bolnik je tri dni zaporedoma zbiral jutranji sputum, ki so ga citološko pregledali; ni uspela. Tomografija je pokazala 3,5 x 4,5 cm veliko dokaj ostro omejeno zgostje levo ob hilusu. Lezija je bila vidna že na nativnem posnetku toraksa.

Pri bolniku so z bronhoskopijo in transbronhialno punkcijo potrdili rak bronha zgornjega lobusa levega pljučnega krila.

Zaradi starosti in zaradi obsega bolezni je primer inoperabilen, zlasti še, ker je bil histološko potrjen mikrocelularni anaplastični rak. Indicirana je bila kemo-in radioterapija.

Komentar :

Okrogle lezije v pljučih nujno zahtevajo bronhološko obdelavo in mikropsko verifikacijo.

Vzrok nastanka raka grla, kakor tudi nastanka raka bronhusa je po vsej verjetnosti v dolgoletnem kajenju, ki ga bolnik navaja.

Dopustiti moramo možnost, da pri enem bolniku ugotovimo istočasno ali v presledku, obstoj dveh ali več primarnih malignih obolenj.

Naslov avtorja: prim. dr. Jurij Us, Onkološki inštitut Ljubljana, Zaloška 2, 61000 Ljubljana.

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INTRAOPERATIVE SONOGRAPHY IN THE SURGERY OF CHRONIC PANCREATITIS

Winternitz T, Flautner L, Tihanyi T

Abstract – Intraoperative echography (IOE) was performed in 72 patients with chronic pancreatitis. Seventy pseudocysts or necrotic cavities were found in 59 patients.
The IOE proved to be helpful in 73.1% of these operations. With the help of IOE, in patients who had small cysts in the head of the pancreas a new transparenchymal pseudocysto-duodenostomy was performed instead of resection. Our conclusion is, that IOE should be performed routinely in operations for chronic pancreatitis.

UDC: 616.37-002-089:534-8

Key words: pancreatitis-surgery, intraoperatic period, ultrasonic diagnosis

Orig sci paper

Radiol Iugosl 1990; 24:361-3

Introduction – The most frequent indication for pancreatic operations are the complications of pancreatitis, especially pancreatic pseudocysts. These generally become known on surgery, but often they are not palpable. On the other hand, small cysts in the head of the pancreas are often unidentifiable before surgery, and are very often unpalpable. We found that in more than 50% of 150 pancreato-duodenectomy cases the pathological examination of the removed specimen showed small cysts or necrotic cavities, not diagnosed bofore surgery.

IOE can be helpful in this field of surgery, but it is used mainly at the surgery of pancreatic malignancies and endocrine tumors (1, 2, 3, 4, 5, 6, 8). Little literature can be found on the intraoperative echography in chronic pancreatitis (7, 9, 10, 11). We wondered how useful IOE could be in this particular field of surgery.

Material and method – Since 1986 we have performed intraoperative echography at 98 pancreatic operations. The diagnoses are shown in table 1. We used TOSHIBA SAL 55 AS and PICKER LS 5000 ultrasound units with 5 MHz linear array intraoperative transducers. The transducers was sterilised in formaldehyd steam. Acoustic coupling material was not used.

The pancreas was first explored surgically. The head palpated after a Kocher's maneuver, and the body and the tail were explored after the dissection of the gastro-colic ligament. On examination, the mesenteric and the lienal veins were used as a landmark.

Results – Out of the examined 72 patients with chronic pancreatitis, we found pseudocysts in 59 patients. They had 70 pseudocysts; 20 cysts found in 18 patients were in the tail or in the body (Fig. 1), 7 of them were not known before operation, and 4 were not palpable.

According to our experiences, the most important are the cysts of the head of the pancreas, because they play a major role in maintaining symptoms caused by chronic pancreatitis. At 41 pancreatic operations we found 50 cysts in the head of the pancreas, 21 of these were not known before operation and 12 were not palpable on surgery (Fig 2, 3, 4), (Table 2).

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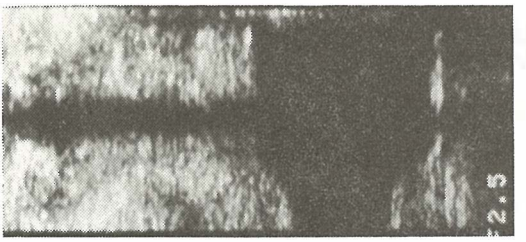

Fig 1 – Preoperatively localised, but in the enlarged, imflammed pancreas unpalpalpable cyst in the body.

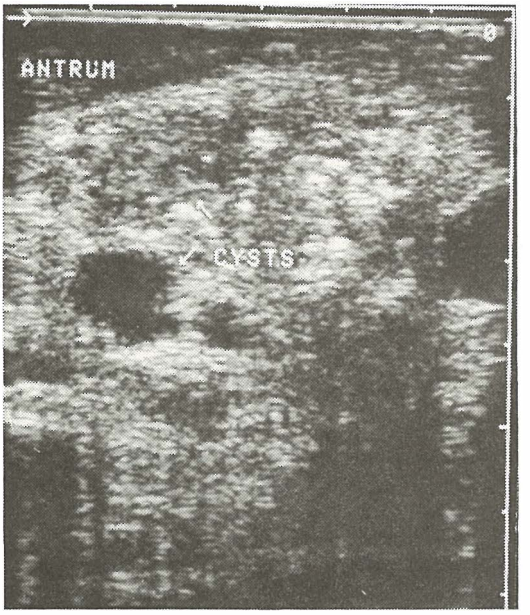

Fig 2 – Small, preoperatively unlocalised, unpalpable pseudocysts in the head of the pancreas.

In the patients with pancreatic head cysts we performed a transparenchymal, agressive pseudocysto-duodenostomy (Fig. 5). There was no postoperative mortality, and the early results of these patients looked good after 2 year follow-up period.

Conclusions – Intraoperative sonography is a very helpful imaging method during surgery for chronic pancreatitis. It is an excellent modality for discovering hollow spaces in parenchymal organs. It appears to be an ideal procedure for the localisation of pancreatic pseudocysts, abscesses.

The method can help the surgeon to reduce tissue dissection and operative time.

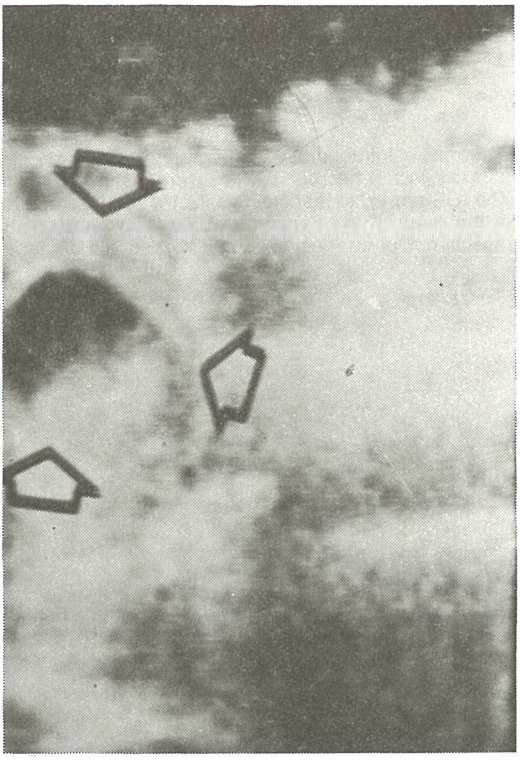

Fig 3 – Preoperatively localisated, but unpalpable pseudocyst at the neck of the pancreas

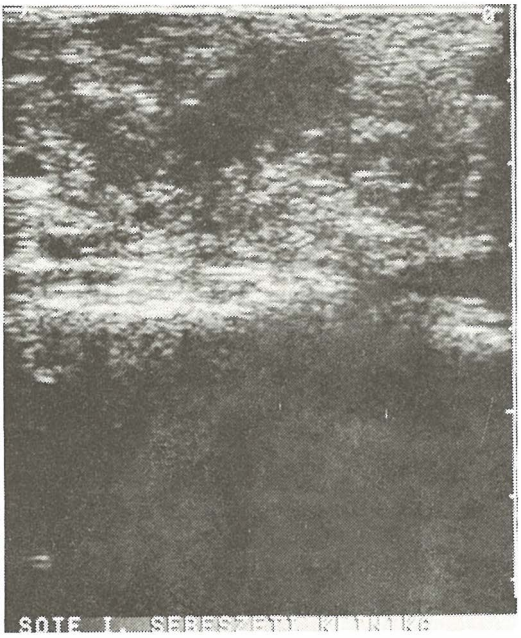

Fig 4 – Preoperatively unidentificated, palpable necrotic cysts in the the head of the pancreas.

Table 1 – Diagnoses in 98 patients in whom intraoperative sonography was performed during surgery for chronic pancreatitis

Diagnosis	Number of patients
Pseudocysts	59
Chronic pancreatitis w/o cysts	13
Carcinoma	20
Hyperinsulinism	6

Table 2 – Distribution of cysts according to the anatomic location found during surgery for chronic pancreatitis

	Head	Body/tail	All
No. of patients	41	18	59
No. of cysts	50	20	70
Were not known before op.	21	7	28 (40%)
Were not palpable	12	4	16 (22.8%)

IOE enables the surgeon to change the tacticts, and perform drainage operation instead of resection. This can reduce the morbidity and mortality of pancreatic surgery.

Sažetak

INTRAOPERATIVNA SONOGRAFIJA U KIRURGIJI KRONIČNOG PANKREATITISA

Intraoperativna sonografija (IOS) je izvršena na 22 pacijenta koji boluju od kroničnog pankreatitisa. Kod 59 nađeno je 70 pseudocista odnosno nekrotičnih šupljina. IOS se pokazala točnom u 73,1% navedenih operacija. Uz pomoć IOS, kod pacijenata koji su u glavi pankreasa imali manje ciste, umjesto resekcije izvršena je nova transparenhimska pseudocisto-duodenostomija. Naše je mišljenje da bi IOS trebalo rutinski primjenjivati u zahvatima na kroničnom pankreatitisu.

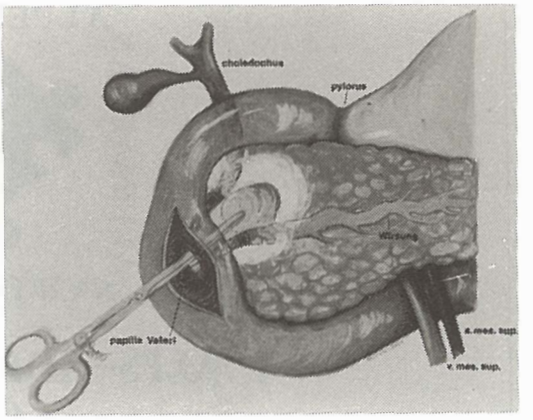

Fig 5 – The transparenchimal pseudocysto-duodenostomy with a closed, blunt peans forceps.

References

1. Angelini L, Bezzi M, Tucci G at al. The ultrasonic detection of insulinomas during surgical exploration of the pancreas. World J Surg 1987; 11:642-7.

2. Gorman B, Charboneau J W, James E M at al. Benign pancreatic insulinoma: Preoperative & intraoperative sonographic localisation. A J R 1986; 147:929-34.

3. Gozetti G, Mazziotti A, Bolondi L. Ecografia intraoperatoria in chirurgia epato-biliare e pancreatica. Milan: Masson Italia 1986.

4. Ito T, Harihara Y, Ohnishi H at al. Ultrasound during pancreatic surgery. In: WFUMB 85 Proceding 161.

5. Jakimowicz J J, Carol E J, Jürgens P T H. The peroperative use of real time B-mode ultrasound imaging in biliary and pancreatic surgery. Dig Surg 1984; 1:55-60.

6. Klotter H J, Rückert K, Kümmerle F at al. The use of intraoperative sonography in endocrine tumors of the pancreas. World J Surg 1987; 11:635-41.

7. Rifkin M D, Wiss S M. Intraoperative sonographic identification of nonpalpable pancreatic masses. J Ultrasound Med 1984; 3:409-11.

8. Sigel B, Coelho J C U, Nyhus L N at al. Detection of pancreatic tumors by ultrasound during surgery. Arch Surg 1982; 117:1058-61.

9. Sigel B, Machi J, Kikuchi T at al. The use of ultrasound during surgery for complications of pancreatitis. World J Surg 1987, 11:659-63.

10. Sigel B, Machi J, Ramos J R at al. The role of imaging ultrasound during pancreatic surgery. Annals of Surg 1984; 200:486-93.

11. Winternitz T, Flautner L, Tihanyi T. Intraoperative sonography in pancreatic surgery. In: Surgical Updating 1988 VII. Endocrin Surgery 1988; 197-200.

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APPLICATION OF INTRAOPERATIVE ULTRASOUND IN DISCOVERING CHOLEDOCHOLITHIASIS

Drinković I, Bezjak M, Desković E, Kos N, Odak D, Vidaković Z

Abstract – During the period from 1985, till today, we focused our attention on the renal cyst formations, their urologic indications for fine needle aspiration biopsy and alcohol sclerosation under ultrasonic guidance. We divided 40 patients with a single our multiple cysts into two main group in relation to the size and localization in the renal parenchyma. If the renal cyst was less than 3 cm in diameter, our attitude was to wait and control the cyst growth by ultrasound examination. Percutaneous cyst aspiration biopsy with cytological analysis of the obtained liquid and simultaneous alcohol sclerosation were performed in peripheraly located cysts of medium size, i. e. 3-10 cm in diameter. The operation was a method of choice in large cysts with a diameter over 10 cm.

UDC: 617-089:534-8

Key words: ultrasonic diagnosis, intraperatic period

Profess paper

Radiol Iugosl 1990; 24:365-7

Introduction – In surgical practice biliar tract diseases are quite common. A whole range of preoperative diganostic procedures has been devoloped in order to discover them: ultrasonography, cholangiography, retrograde cholangiography, CT and MR. But despite their high accuracy, obstructive icterus in many patients still remains of vague genesis. The most common cause are, by far, choledochus calculi, secondary findings in 25% of cases of cholelithiasys. Carcinomas, benign hiperplasya of choledochus, stenotic or sclerotic papilitis, as well as iatrogenic and traumatic lesions, chronic inflammations and pancreatic carcinoma may present difficulties in diagnostics of obstructive icterus. Preoperative suspicions or diagnosis should be confirmed or opposed by surgical intervention. During such diagnostic intervention, besides palpation and inspection, we use US, cholangiography with radiometry, choledoscopy and, in the cases of choledocholithiasis, choledochus rinsing or catheterisation by Fogarty baloon (1, 2, 3).

Employing standard examinations, choledochus calculi remain after bile surgery in 3.8% of patients, and in 4%-5% after choledochus surgery.

Introducing intraoperative US the range of diagnostic possibilities has been completed by a noninvasive technique, free of radiation and toxic solutions.

Endoluminous and extraluminous changes can be analysed without choledochus lesioning. Analysis of the size of tumors, depth of their penetration, as well as relation of tumors to blood vessels and surrounding structures is possible.

Material and methods – UIS was carried out on 19 patients on whom preoperative diagnosis was not final, or where there was a suspicion on choledochus calculi. In our practice the examinations are carried out by sectoral and linear 7.5 MHz transducers of Sonel 3000 and Scanel 300, after surgical preparation and exposure of choledochus and head of pancreas respectively. The transducers are sterilized by means of sterile ruber cover and sterile parafine oil which is applied to ensure contact between the transducer and the ruber cover. By applying greater quanti-

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ties of oil – oil bed up to 1 cm deep, it is possible to visualise abdominal structures and at the same time complications connected with the near field picture analyses are avoided. However, because of the compression of choledochus by transducer, we also apply a physiological solution into abdomen, i. e. choledochus is analysed with no physical contact with the transducer. The examination begins with the analysis of gallbladder, its wall and lumen. It is continued with the analyses of ductus cisticus and choledochhus to papilla. At this point, the analysis of the head of pancreas and haepatic parenchyma is performed routinely. By forced filling of the choledochus with a physiological solution, via dissected ductus cistucus or by puncture, we analyse its lumen and wall, passableness of the papilla and the wall of duodenum in the papilla region filled with water.

Results – US examination of choledochus was carried out on 19 patients. It was not possible to bring the examination to its end because of anatomic variations in one patient. In one patient the analysis found out choledochus carcinoma, while preoperative examination led to outer compression (Fig. 1).

In one patient the cause of obstruction was pancreatic cancer. In one it was chronic pancreatitis, producing stenosis. In two patients there

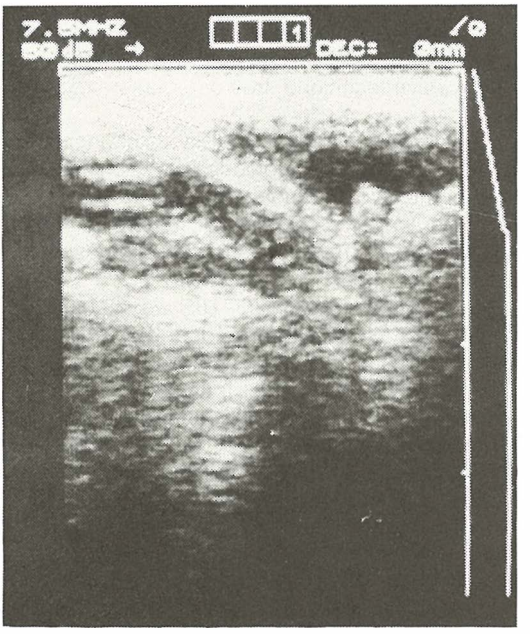

Fig. 1 – Three concrements in choledochus 5 mm large

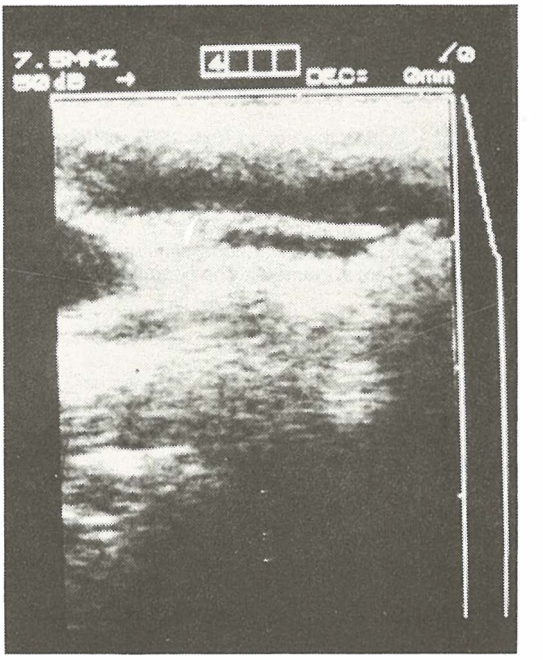

Fig. 2 – Terminal section of choledochus filled with concrements

were no caiculi choledochus found, and in one, a stone was skipped in papilla vateri. In all 11 patients cholelithiasis with choledoholithiasis or choledocholithiasis were found, while in two choledochus was completely filled with mud or small calculi. The accuracy of US was 95% and in gallbladder 100% (Fig 2).

Discussion – IUS is a new diagnostic method in biliar tract analysis. A very detailed analisyis of the region is possible due to the application of high resolution transducers, i. e. we are able to analyse choledochus wall and to find out inflamations, degenerative or tumorous changes. Even one mm calculi can be traced with a 100% accuracy in gallbladder which cannot be said for palpation and preoperative preparations. We are able to see and evaluate the kind of choledochus obstruction, and to make the analysis of tumor, its largness, structure and relation to, as well as its invasion, on other organs and blood vessels Finding out of hepatic metasthases and metasthases on surrounding lymphatic nodules doesnot present a problem. One should also stress high accuraccy in finding out of calculi and differentiation between mud, solitary, impacted and floating calculi, as well as micro calculi of up to two mm which in seven % of cases can be skipped by intraoperative cholangiography.

Exact analysis of choledochus wall can be done. Compared to other diagnostic methods, ultrasonography of biliar tract can be performed in completely physiological conditions, with no radiation, or surgical lesions of ductus choledochus, which as a consequence can, by developing scar changes, cause postcholecystomic impedi ments. Applying physiological solution by force we can also analyse passableness of papilla and the duodenum wall. Intraoperative sonography is, due to its price, simplicity for application and accuracy, first diagnostic method which in case of positive findings does not call for a further diagnostic intraoperative interventions, while in case of unclear findings this method should be complemented by intraoperative cholangiography, choledoscopy or other known intraoperative diagnostic possibilities.

Conclusion – IUS is a new diagnostic method which complements diagnostics of biliar tract. The method is a quick one, safe, free from radiation and use of toxic solutions. The price of the apparatus and its maintenance is acceptable for smaller hospitals, too. The analysis of biliar tract can be performed in physiological conditions, and finding of tumors and calculi, as well as the analysis of surounding structures, which can consequently lead to changes on biliar tract, can also be done.

Accuracy of gallbladder diagnostics is 100% and of choledochus calculi findings 95%.

Sažetak

UPOTREBA INTRAOPERATIVNE SONOGRAFIJE U OTKRIVANJU HOLEDOHOLITIJAZE

Intraoperativna holangiografija je široko raširen i prihvaćen način analize bilijarnog stabla. Intraoperativna ultrazvučna (UIS) analiza holedohusa otkriva bilijarne kamence, ali u fiziološkim uvjetima može također analizirati lumen i stijenku holedohusa, kao i okolne strukture. IUS pregled je izvršen na 19 pacijenata pod sumnjom na holedoholitijazu. Pregledi su izvršeni koristeći sondu od 7.5 MHz preko tankog vodenog jastuka ili tankog sloja parafina. U 14 pacijenata potvrđen je preoperativni nalaz. Kod jednog pacijenta analiza nije mogla biti izvršena zbog fizioloških varijacija. U dva slučaja nije bilo kamenaca u žučnim vodovima, a u jednom slučaju previđen je kamenac u papili vateri. Točnost ultrazvučnih nalaza bila je 90%. Ova metoda nam omogućuje analizu i manjih žučnih kamenaca, procjenu širine lumena i debljinu stijenke žučnih vodova, kao i otkrivanje tumoroznih tvorbi.

References

1. Knight R P, Newell J A. Operative use of ultrasonics in cholelithiasis. Lancet 1963; I:1023-5.
2. Lane R J, Coupland G A E. Ultrasonic indications to exploring the common bile duct. Surgery 1982; 91:268-74.
3. Makuuchi M, Hasegawa H, Yamazaki S. Intraoperative ultrasonic examinations for hepatectomy. Jpn Journal Clin Oncol 1981; 11:367-90.

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PERCUTANEOUS DIAGNOSIS AND THERAPY OF PYOGENIC LIVER ABSCESSES

Varga Gy, Varga P I

Abstract – This report summerizes the result of percutaneous aspiration of intraabdominal abscesses, mainly primer liver abscesses of unknown origin. The percutaneous aspiration is a very simple method and can be repeated several times. Diagnostic and technical considerations for successful aspiration of hepatic abscesses are disscussed. Percutaneous needle aspiration should be attempted as a first choise of treatment in all pyogenic hepatic abscesses. Unsatisfactory aspiration has to be followed by continous drainage technic.

UDC: 616.36-002.3-089.48

Key words: liver obscess, drainage-methods

Case report

Radiol Iugosl 1990; 24:369-72

Introduction – In most cases the pyogenic liver abscess is on unexpected finding and most of them – like other abdominal abscesses – are easily aspirated percutaneously and could be cured to complete recovery. The authors recommend this very simple method for both the diagnosis and the therapy of primer liver abscesses. Neither special instrumentation nor surgical isolation is necessary for such procedures.

Percutaneous drainage is the treatment of choise for most abdominal abscesses. The criteria for percutaneous management has been modified, particularly in the treatment of postoperative or critically ill patients, who are poor candidates of surgery. Most liver abscesses can be successfully treated by simple needle aspiration, supported by local and parenteral antibiotic therapy. This report describes two cases of the six liver abscesses. The most serious one has the largest fluid-containing cavity in the liver, while the other has the smallest.

Materials and methods – 460 interventional procedures were performed on 187 patients in the last two years in the Department of Radiology of the County Hospital of Zalaegerszeg. 48 intraabdominal abscesses were detected. 19 of the abscesses were postoperative ones. 29 of them were unsuspected, without characteristic anamnesis, clinical and radiological symptoms. Six primary liver abscesses were found (Table 1).

About half of the interventions were performed on the first occasion, after local desinfection and local anesthesia, without special transducer and steril isolation. The optimal – possibly a perpendicular – plane was determined and photographed after the standard localisation of the suspected abscess with the convex tranducer of the Picker LSC 7000 / Hitachi EUB 40 /. This served the optimal route for needle guidance. The penetration was controlled with acute-angle, directed US beam from beside the needle with the so-called »free hand« technic. The obtained purulent matter was to be sent to the laboratory for bacterial identification.

The material was presented on the First International Symposium on Interventional and Intraoperative Sonography, Zagreb, May 1989.

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Table 1 – Patients and results

Number of the patients:	
6 primary liver abscesses (women)	
2 infected, non-posttraumatic bilomas (men)	
Actual condition of the patients:	
5 patients in relatively good condition	
2 patients in poor condition	
1 patient inoperable	
Age of the patients: 56 – 78 year	
Therapic punctions: 5 patients (2-8 times, 1-3 places)	
Continuous drainage: 3 patients (including the 2 bilomas)	
Results:	
Complete cure:	5 liver abscesses 1 infect biloma
Surgery needed:	1 liver abscess 1 infect biloma

Case Reports

Patient I (Fig 1a, b, c)

A 59-year-old overweight female, with psychosis schizophreniformis and cholecystlithiasis in her anamnesis. She had a two weeks history of fever and antibiotic therapy was used because of suspected but not proved pneumonia. Present status: slight cholestasis and exsiccosis. Laboratory dates: We 7i3 mm/h and leucocytosis.

US: extensive, confluent fluid-containing cavities in the liver. There was a pseudocyst in the head of pancreas, that was responsible for the choledochal dilatation. Percutaneous aspiration of the pseudocyst resulted the ductus choledochus to return to normal. On the 6th day the patient became septic and was in an inoperable condition. Progression of the liver abscess was confirmed by US control. At puncture purulent content of the abscess had been evacuated (110 ml pus was gained). The process was repeated several

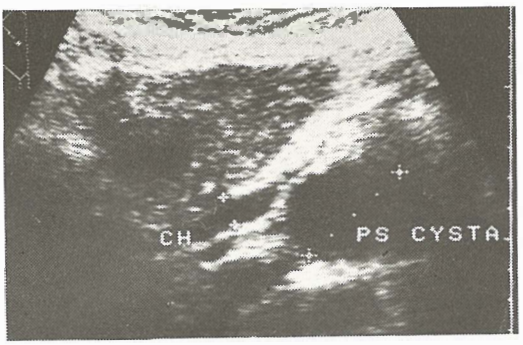

Fig 1a

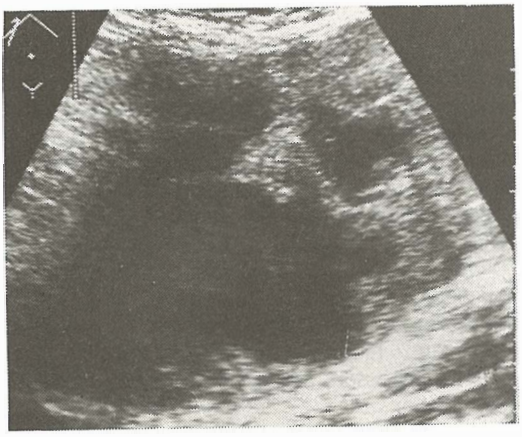

Fig 1b

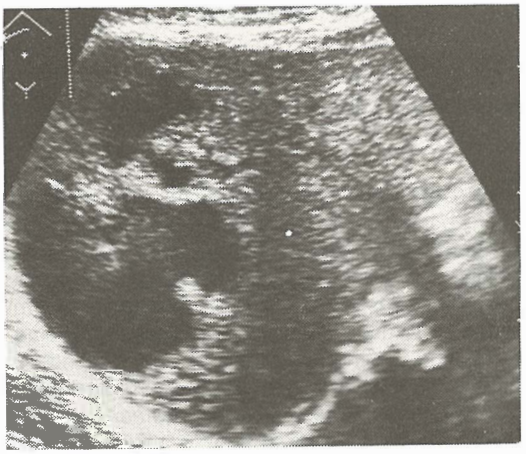

Fig 1c

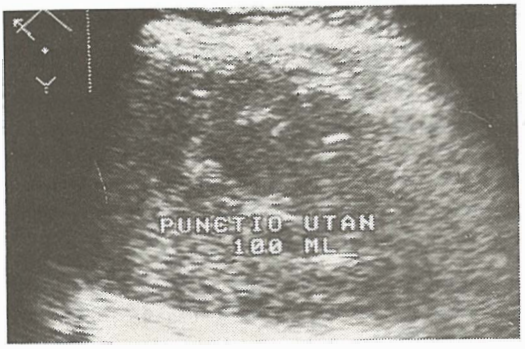

Fig 1d

Fig. 1 a, b, c, d – Ultrasound examinations of the patient I

Fig. 2a

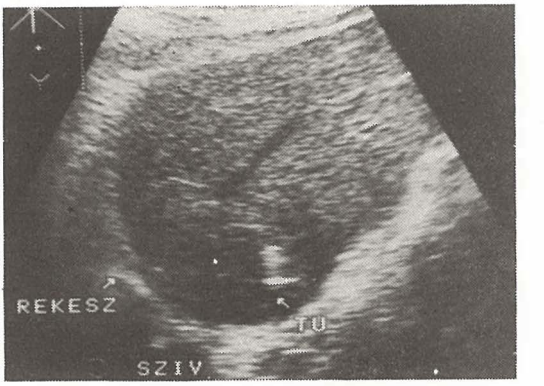

Fig. 2c

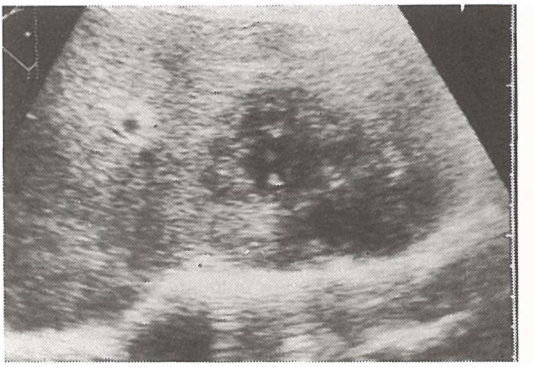

Fig. 2b

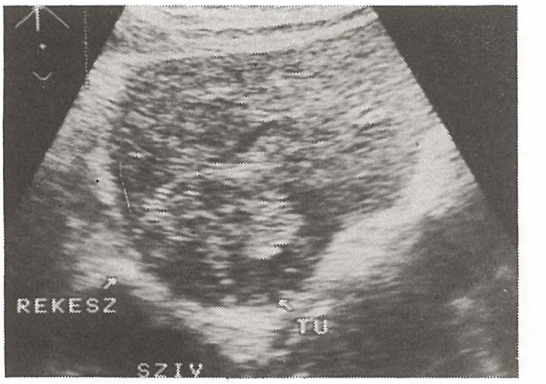

Fig. 2d

Fig. 2a, b, c, d – Ultrasound examinations of the patient II

times – about every third day – and altogether 380 ml pus was evacuated. Starting from the 8th day the patient's temperature became normal. On the 36th day when discharged, there was no abscess cavity, only a Cefobid reflexion remained. Two months later she was admitted for cholecystectomy, the result of examinations was complete recovery.

Patient II (Fig. 2a, b, c, d, e)

A 74-year-old female in bad general condition, with diabetes mellitus, relapsing fascitis necrotisans and immunodefficiency syndrom in her anamnesis.

Present status: clinical suspition of tumorosus process, subfebrile condition, elevated sedimentation rate and leucocytosis.

US: little doubble echopoor focus in the liver. Diagnostic punction: 8 ml thick pus-content. The x-ray sinogram proved to be confluent. On the 20th day the foci became cystic and 4+8 ml purulent content was aspirated. On the 44th day the echopoor lesions were punctured again, but no more pus was gained. After 4 months she was admitted again because of empyema thoracis. She was recovered by permanent thoracic drainage. There was no liver abscess on the controll US and CT examination.

Results and discussion – There is a growing rate of findings of unsuspected abdominal abscesses. Only some of the cases are evident in the postoperative period, most of them are unsuspected, with atypical clinical picture. Considering the fact that is suppurative content to be found in ultrasonography not only in the gas-forming and cystic process, therefore we do perform a percutaneous punction in every uncertain cases. Plain X-ray examination has lost its importance because none of our 8 cases has had gas content in the abscesses. Successful treatment can be achieved in most cases by nonsurgical percutaneous aspiration which can be combined with percutaneous catheter drainage and organism specific antibiotics.

In most of the cases special transducer, drainage set and surgical isolation is not necessary. 29 patients – with unexpected intraabdominal abscesses – were verified by US diagnostic intervention. 22 of them had been cured by percutaneous punction, 20 resulted complete abscess-free recovery.

Five of the hepatic abscesses had no characteristic symptoms at all, nor typical ultrasonographic appearence and the patients were observed in a relative good condition at the medical department. Two of them were outpatients when diagnostic puncture was performed. In three cases – 2 primer liver abscesses and 1 infected biloma – cholestasis with septical cholangitis was to be considered the ethiological factor. In 5 cases was the ethiological factor of unknown origin. The early diagnosis is very important, when the clinical symptoms and the US morphology are less typical. In the early stage the interventional diagnosis and therapy are the simplest and at the same time the most effective procedures. The early diagnostic percutaneous needle punction had differentiated from necrotic malignant tumor, haemangioma or other cystic lesions, resulted purulent content of the abscess for laboratory identification.

The liquid content of the abscess had been evacuated and the procedure was repeated several times in all the five patients. Only in three cases with bigger cavities was necessary to introduce catheter: one primary hepatic abscess and two infected bilomas. One liver abscess and one biloma couldn't be solved completly, in these cases surgary was needed.

Sažetak

PERKUTANA DIJAGNOSTIKA I TERAPIJA PIOGENIH ABSCESA JETRE

Najčešće se piogeni abscesi jetre otkrivaju slučajno, i većinu ih se – kao i druge abdominalne abscese – lako perkutano aspirira te su potpuno izlječivi. Autori ovu sasvim jednostavnu metodu preporučuju i za dijagnostiku i terapiju početnih abscesa jetre. Za takav zahvat nije potrebna posebna kirurška priprema niti posebni instrumenti.

Perkutana drenaža je metoda izbora u većine abdominalnih abscesa. Uvjeti za perkutanu obradu su pojednostavljeni, posebno kod obrade postoperativnih ili kritičnih pacijenata koji nisu podobni za operaciju. Većinu abscesa se može upsješno tretirati jednostavnom iglenom aspiracijom, uz podršku lokalne i parenteralne terapije antibioticima. Ovaj rad opisuje – pored rezultata perkutane aspiracije intraabdominalnih abcesa, naročito primarnih jetrenih abcesa – i dva slučaja sa šest abscesa jetre. Najozbiljniji ima veliku šupljinu u jetri ispunjenu tekućinom, dok drugi ima manju.

References

1. Gerzof SG, Johnson WC, Robbins AH, Nabseth DC. Intrahepatic pyogenic abscesses: treatment by percutaneous drainage. Am J Surg 1985; 149/4:487-94.
2. Greenwood LH, Collins TL, Yrizarry JM. Percutaneous management of multiple liver abscesses. AJR 1982; 139:390-2.
3. Gronvall S, Gammelgaard J, Haubek A, Holm HH. Drainage of abdominal abscesses guided by sonography. AJR 1982; 138:527-9.
4. Johnson RD, Mueller PR, Ferrucci JT Jr et al. Percutaneous drainage of pyogenic liver abscesses. AJR 1985; 144:463-7.
5. Kandel G, Marcon NF. Pyogenic liver abscess: new concepts in an old disease. Am J Gastroenterology 1984; 79/1/:65-71.
6. Kerlan R, Jeffrey RB Jr, Pogany AC, Ring EJ. Abdominal abscess with low output fistula: successful percutaneous drainage. Radiology 1985; 156:631-5.
7. Kuligowska E, Conners SK, Shapiro JN. Liver abscess: sonography in diagnosis and treatment. AJR 1982; 138-253-6.
8. Maklad NF, Doust BD, Baum JK. Ultrasonic diagnosis of postoperative intra-abdominal abscesses. Radiology 1974; 113:417-22.
9. Mueller PR, Ferrucci JT Jr, Simeone JF, et al. Detection and drainage of bilomas: special considerations. AJR 1983; 140:715-20.
10. Mueller PR, Van Sonnenberg E, Ferrucci JT Jr. Percutaneous drainage of abdominal abscesses and fluid collections in 250 cases. Part II: Current procedural concepts. Radiology 1984; 151:343-7.
11. Van Sonnenberg E, Mueller PR, Ferrucci JT Jr. Percutaneous drainage of abdominal abscesses and fluid collections in 250 cases. Part 1: Results, failures and complications. Radiology 1984; 151:337-41.
12. Vujić I, Brock JB. Biloma: aspiration for diagnosis and treatment. Gastrintest Radiol 1982; 7:251-4.

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CLINICAL HOSPITAL »DR. O. NOVOSEL«, CENTER FOR ULTRASOUND »ZAGREB« ZAGREB

FINE NEEDLE ASPIRATION BIOPSY OF FOCAL LIVER LESIONS: RESULTS AND COMPLICATIONS

Kos N, Drinković I, Odak D, Kardum I, Šuštaršić D, Vidaković Z

Abstract – As a parenchymal organ, the liver is very suitable for ultrasound diagnosis, as well as ultrasound guided aspiration biopsy. However, every interventional procedure brings along some complications. Here we describe our results and complications we came acros in 200 of performed cytological aspiration biopsies of focal liver lesions. Cytological examinations and evaluations showed following results: 98 patients had metastases, 46 had primary liver tumors, 16 cases were hemangiomas, 24 had normal liver cells (cyrhosys), four had melanomas, two cysts, four absceses, one hemangiopericitom, one hemangiosarcoma, four cases were false negative. Some procedures were accompanied with complications: 2.5% of cases suffered severe pain, 0.5% collapsed, and 0.5% had lethal result. Ultrasound guided fine needle aspiration biopsy is a good diagnostic method in cases with focal liver lesions, but it can be accompanied by grave complications.

UDC: 616.36-006.6-07:534-8

Key words: liver neoplasms, biopsy needle, ultrasonic diagnosis

Profess paper

Radiol Iugosl 1990; 24:373-4

Introduction – One can easily say that the liver is an organ most simple for approach for both noninvasive as well as interventional ultrasound diagnostics. It can be analysed by other methods too, but in case of focal lesions we do not get sufficient information on etiology of the lesion, while by using ultrasound system with a needle guider we can very quickly make a diagnosis thorugh a cytologic or histologic aspirated biopsy of the focal lesion (1, 4). In this paper we would like to present our experience and results together with complications we accosted on 200 cytologic aspirated biopsies of various focal liver lesions.

Material and methods – The patients were performed aspirated biopsy of the liver on, were either previously hospitalised in our institution or were out-patients. Previous to the biopsy, they were hospitalised too. A complete blood and coagulation tests were made before the intervention. Indications for the intervention were all types of focal liver lesions, including cystic ones. In such cases we had to exclude echinocock and cavernous hemangioma. The punctures were performed using 20 G and 22 G Chiba needles, on ultrasound system CGR, with mechanic sectoral 3 MHz transducer, with the lateral needle guider. The guider was sterilised by detergicide, and the transducer was sterilised by a rubber cover. As a contact medium we used Hibitan. To get higher subpressure we used the aspiration piston, while by combination of the subpressure and the needle manuver, we allways managed to get sufficient material. A cytologist was present at every puncture to give his oppinion and to manipulate the material onto the glass slides for immediate cytologic examination.

Results – On 200 punctures of focal liver lesions we got the following results (Table 1).

Complications were strong pain in five patients (2.5%), one patient collapsed (0.5%), and we had lethal result in one case (0.5%) (Table 2).

Discussion – Apart from echinocock cyst and hemangioma, any focal lesion is suitable for diagnostic cytologic aspirated biopsy. Using fine needles (20 G or 22 G) even if we enter a capilar

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Table 1 – Fine needle aspiration biopsy results

DIAGNOSE	no of patients	percentage (%)
metastase	98	49
primary CA	46	23
cyrhosis	24	12
hemangioma	16	8
melanoma	4	2
absces	4	2
cyst	2	1
hemangiopericitoma	1	0.5
hemangiosarcoma	1	0.5
false negative res.	4	2
TOTAL:	200	100

Table 2 – Complications we had in fine needle aspiration biopsy of the liver lesion

SMALLER	no of perc. patients %		HEAVIER	no of perc. patients %	
temporary pain	5	2.5%	massive hemorrhage with		
collaps	1	0.5%	lethal result	1	0.5%
TOTAL:	5	3.0%		1	0.5%

hemangioma or an echinocock cyst, there should be no complications. There are several cases of the echinocock cyst puncture described with no complications, as well as their treatment. If the lesion is near the surface of the liver it should be punctured from the side where there is more parenhim, which will act as a tampon.

In the patient with the lethal result of the puncture, the liver was diffusely changed, so there was no suspicions on hemangiosarcoma. The coagulation tests were normal, and the indications for the intervention were present. The patient was laparotomised the same day, but hemorrhagia could not been stopped. The surface of the liver was completely covered with small angiomatic changes. There was no explanation for transitory pain which was gone after the application of analgetics. The pain did not return any more. The collaps in one puncture was of short duration and with no consequences.

Conclusion – As a conclusion one can say that cytologic aspirated biopsy of the liver is worthy and easy to perform method Very quickly we get an accurate diagnosis. The intervention is often described as an intervention with no need for hospitalisation, but we believe, although complications happen very rarely, and having experienced one lethal result, that every patient should be hospitalised.

Sažetak

ASPIRACIJSKA BIOPSIJA FOKALNIH LEZIJA JETRE REZULTATI I KOMPLIKACIJE

Kao parenhimni organ jetra je vrlo pogodna za ultrazvučnu dijagnostiku i ultrazvučno vođenu aspiriranu biopsiju. Dakako, svaki intervencijski zahvat nosi i svoje komplikacije. Ovdje opisujemo rezultate i komplikacije na koje smo naišli u 200 izvedenih slučajeva citoloških aspiracionih biopsija fokalnih lezija jetre. Rezultati – citološka ispitivanja i ocjenjivanja pokazala su sljedeće rezultate: 98 pacijenata je imalo metastaze, 46 je imalo tumor jetre, 16 su bili hemangiome, 24 su imala normalne stanice jetre (cyrhosys), četiri su imali melanome, dvije ciste, četiri abscesa, jedan hemangiopericitom, jedan hemangiosarkom, četiri slučaja su bili lažno negativni. Neke su zahvate pratile komplikacije: u 2,5% smo imali jak bol, u 0,5% kolaps, a u 0,5% smrtni ishod. Ultrazvučno vođena fino iglena aspiraciona biopsija je dobra dijagnostička metoda u slučajevima fokalnih lezija jetre, ali može biti praćena i vrlo teškim komplikacijama.

References

1. Holm H H, Kristensen J K, Rosmusse S N, et al. Ultrasound as a Guide in Percutaneous Puncture Technique. Ultrasonics 1972; 10:83-6
2. Otto R Ch, Wellonre J. Ultraschallgeführte Biopsie. Springer Verlag, Berlin-Heidelberg-Tokyo; 1985
3. Smith E H. The Hasards In Fine Needle Aspiration Biopsy. Ultrasound Med Biol 1984; 10:629-34
4. Triller J.: Ultraschall gezielte abdominale Punktionen. Radiologie 1979; 19:173-7

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UNIVERSITY MEDICAL CENTER SARAJEVO
INSTITUTE OF RADIOLOGY AND ONCOLOGY

ULTRASOUND (US) GUIDED FINE NEEDLE ASPIRATION BIOPSY OF THE LIVER

Bučuk E, Čengić F, Mirić S

Abstract – 14 patients underwent ultrasonographic analysis of the liver and the diagnosis of the suspected malignant liver process was made. Then, the target aspiration biopsy of the suspected liver area was performed under real-time controle, using 22 gauge fine needle. Pathohistologic finding (PH) was positive in 11 cases (hyperhromatic and polymorphous nucleus, giant cells atypic mitosis). PH finding was negative in two cases and unrepresentative in one case.

UDC: 616.36-006.6-07:534-8

Key words: liver neoplasms, biopsy needle, ultrasonic diagnosis

Profess paper

Radiol Iugosl 1990; 24:357-7

Introduction – Real-time ultrasonography is the simplest method for guidance of percutaneous puncture (3). Real time ultrasonography can guide the needle during the course of liver puncture, following the top and the complete needle (3). Fine needle aspiration biopsy of the liver improves the diagnosing of liver malignoma (8).

Material and methods – During a period of 24 months, 14 patients (8 females and 6 males), with previously ultrasonographically confirmed localised, mostly solid, unclearly or clearly unregularly shaped lesion with 2-6 cm diameter, underwent the US guided punctures using 22 gauge fine needle (Fig. 1). The obtained microscopic preparations were analysed at the Pathologic Institute of the School of Medicine Sarajevo. US investigations were made at Toshiba unit Sonolayer – L SAL – 77 A with the sector probe PVE 393 M – 3,75 MHz (Fig. 2). US puncture was performed in the sterile conditions at the same unit with the probe Toshiba GCE – 406 M – 4 MHz. (in the sterile bag), fine needle (with the mandrin) 22 gauge (0,7 mm outer diameter, 0,4 mm inner diameter) 9,5 cm long, without local anaesthesy (Fig. 3). After extraction of the man-

Fig. 1 – Solid, clearly unregularly shaped lesion 5,2 cm in the liver

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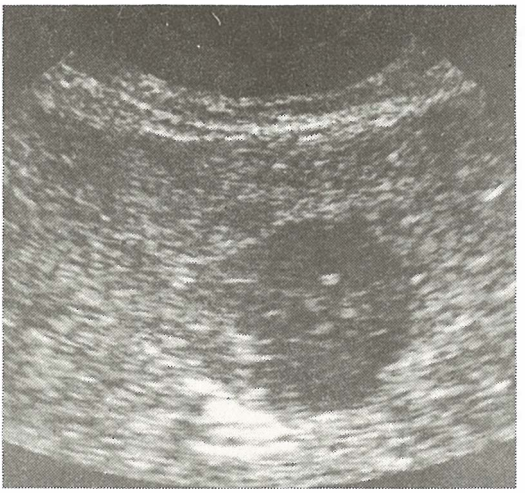

Fig. 2 – Solid hypoechogenic liver area with the fine needle into the lesion

drin, the authors used 20 ml syringe for aspiration of the material and making the microsopic preparations. The patients rested 24 hours after puncture. There were no complications after puncture. The patients underwent examination on in-patient and out-patient basis. In 8 cases the authors punctured twice (with two needles – one by one), in 6 cases once. In one case 4 microscopic preparations were made, in all others from 7 to 22. Chronologically, in the last 10 patients, the half of microscopic preparations were fixed by fixation according to Papanicolau (spray) prior to sending to cytopathologist.

Results – In 13 cases (92,8%) PH findings were representative. In 11 cases (78,6%) PH finding were positive (»tumorous cells with hyperchromatic nucleus, primary hepatocellular cancer, anaplastic cancer, metastatic changes«), in 2 cases (14,2%) PH findings were »normal liver-finding« and »without tumorous cells in liver preparations«, in one case (7,2%) PH finding was unrepresentative. In the last case, the puncture occured once, with only 4 microscopic preparations, not fixed according to Papanicolau.

Discussion – The authors have considered the smaller needles as better, which do not bend during the puncture. The fine 22 gauge puncture of the liver tumors guided by real-time US has been performed for the long time (1, 2, 3, 4, 5, 6, 7). A number of authors report the use of the thinner 23 gauge fine needle (1, 4, 5, 6).

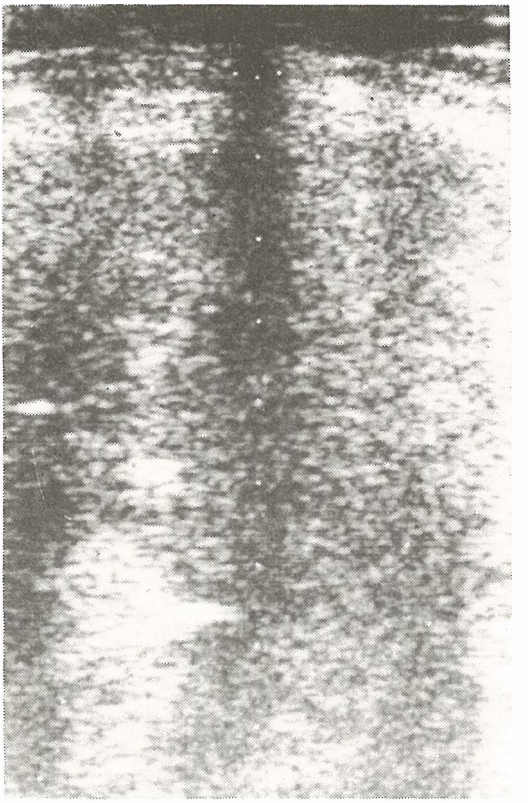

Fig. 3 – Linear array probe. Fine needle placed into the solid liver's lesion guided by linear array probe

Many authors suggest the fixation of microscopic preparations according to Papanicolau and May-Grunwald-Giemsa, after the puncture, with the aim to improve the presentation of cell material (3, 5, 6, 7, 8).

Zornoza et al (9) report the success of fine needle punctures guided by US in 86% out of 36 punctures.

Conclusion – Our initial results with 22 gauge fine needle punctures guided by US are encouraging although the series is small. The aspirated material, with such a quality and quantity, has been sufficient for PH citologic analysis.

Sažetak

FINO–IGLENA BIOPSIJA JETRE VOĐENA ULTRAZVUKOM

Ultrazvučnim pregledom jetre izvršenim na 14 pacijenata potvrđena je pretpostavljena dijagnoza malignih procesa. Koristeći finu iglu od 22 gauga izvršena je

ciljana aspirativna biopsija jetre pod kontrolom real time aparata. Patohistološki (PH) nalazi su bili pozitivni u 11 slučajeva (hiperhromatske i polimorfne jezgre, atipična mitoza gigantskih stanica).

PH nalazi su bili negativni u dva slučaja a nereprezentativni u jednom.

References

1. Brauner M et al. Apoort de la cytoponction et de la microbiopsie hepatique guidee par echographie dans les lesions focales du foie. J Radiol 1988; 69/10:567-9.

2. Bret PM et al. Une technique simple de guidage des punctions percutanees par echographie en temps reel. J Radiol 1982; 63:363-5.

3. Bret PM et al. Hepatocellular Carcinoma: Diagnosis by Percutaneous Fine Needle Biopsy. Gastrointest Radiol 1988; 13:253-5.

4. Montali G et al. Fine needle aspiration biopsy of liver focal lesions ultrasonically guided with real-time probe. Br J Rad 1982; 55:717-23.

5. Nosher LJ et al. Fine Needle aspiration of the Liver with Ultrasound Guidance. Radiology 1980; 136:177-80.

6. Otto ChR et al. Ultrasound – Guided Biopsy and Drainage. Berlin: Springer-Verlag, 1985.

7. Ricotier E et al. Ponction a 1 aiguille fine guidee par echotomographie dans le diagnostic des tumeurs hepatique. JEMU 1988; 8:232-6.

8. Tanaka S et al. Early Diagnosis of Hepatocellular Carcinoma: Usefulness of Ultrasonically Guided Fine Needle Aspiration Biopsy. J Clin Ultrasound 1986; 14:11-6.

9. Zornoza J et al. Fine-Needle Aspiration Biopsy of the Liver. AJR 1980; 134:331-4.

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GODIŠNJI STRUČNI SASTANAK RADIOLOGA SRBIJE

Vrnjačka Banja 17-19. april 91.

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   - Savremena angiografija
   - Interventna radiologija
2. SLOBODNE TEME

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KLINIČKA BOLNICA »DR. O. NOVOSEL«, ZAGREB
ODJEL ZA UROLOGIJU

UROLOGIC INDICATIONS FOR FINE NEEDLE ASPIRATION BIOPSY AND ALCOHOL SCLEROSATION OR RENAL CYST FORMATIONS

Hromadko M, Palčić I, Drinković I

Abstract – During the period from 1985, till today, we focused our attention on the renal cyst formations, their urologic indications for fine needle aspiration biopsy and alcohol sclerosation under ultrasonic guidance. We divided 40 patients with a single our multiple cysts into two main groups in relation to the size and localization in the renal parenchyma. If the renal cyst was less than 3 cm in diameter, our attitude was to wait and control the cyst growth by ultrasound examination. Percutaneous cyst aspiration biopsy with cytological analysis of the obtained liquid and simultaneous alcohol sclerosation were performed in peripheraly located cysts of medium size, i. e. 3-10 cm in diameter. The operation was a method of choice in large cysts with a diameter over 10 cm.

UDC: 616.61-006.2-07:534-8

Key words: kidney cystic, biopsy needle, ultrasonic diagnosis, sclerosation

Orig sci paper

Radiol Iugosl 1990; 24:379-81

Introduction – The frequently used, non-invasive ultrasound examination of the upper abdomen, reveals a surprisingly great number of incidentally detected renal tumors (1-3). The most common finding of such a tumor is a cyst formation (4). However, there is always a question whether this is a cyst or a solid tumor. Simple cysts do not represent a serious problem as long as no complications supervene (infected cysts, haemorrhagic cyst, a cyst compressing the pyelon and ureter) (5).

However, such simple cysts reduce the valuable renal tissue by compression, and can cause sepsis as a result of late suppuration. Extremly important is the mental state of the patient when he finds out that he is carrying a cyst which for him is actually a tumor. This fact often compels him to ask the doctor to eliminate the cyst. So, in many patients the psychological moment is one of the factors which leads us to perform evacuation of the cysts content by needle aspiration biopsy and alcohol sclerosation. This is a simple and elegant way of healing the patient patient (5, 6, 7).

Patients and methods – From 1985 till today, 40 patients with a single or multiple cysts have been treated on the Department of Urology, University Hospital »Dr O. Novosel«, and divided into two main groups in relation to size and localization in the renal parenchyma.

Ultrasonic technique with evacuation and alcohol sclerosation was sufficient in peripheral cysts, but in medially located cysts beside the ultrasonic examination the excretory urogram was used as well.

The excretory urogram was used in order to obtain the detailed relationship between the cyst, pyelon and ureter. In the case when the ultrasound examination raised doubts that it could be the question of the tumor, computerized tomography or angiography were performed too. Beside the location of the cyst, the size is very important so we divided them into three groups: small cysts less than 3 cm, medium cysts 3-10 cm, and large cysts over 10 cm in diameter.

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Table 1 – Distribution of simple cysts in relation to male – female

	PATIENTS NUMBER	%
MALE	24	60
FEMALE	16	40
ALL	40	100

cm in diameter. In those patients our altitude was to wait, observe, and control the growth of the cyst using the ultrasound examination every three to six months. In four patients we noticed that the cyst was growing, so needle aspiration biopsy and alcohol sclerosation were performed.

The biggest group (25 patients or 62%) was a group with medium size cystss, and that means

Table 2 – Localization and size – indication for treatment

TREATMENT	SIZE	LOCALIZATION PERIPHERAL CYST	MEDIAL CYST	ALL	%
OBSERVATION	SMALL CYST < 3 cm	9	2	11	27
BIOPSY AND OBLITERATION	MEDIUM CYST 3–10 cm	25	–	25	62
OPERATION	LARGE CYST > 10 cm	2	2	4	11

Table 3 – Incidence of localization of simple cysts

INCIDENCE / LOCALIZATION	MALE	FEMALE	ALL	%
RIGHT KIDNEY	12	6	18	45
LEFT KIDNEY	10	7	17	42
RIGHT AND LEFT KIDNEY	2	3	5	13
ALL	24	16	40	100

Table 4 – Indicence of relapses of the simple cyst

RELAPSES	NUMBER	%
FIRST	8	20
SECOND	2	5
THIRD	1	3
ALL	11	28

Results – Most of our patient were male (24 males, 16 females) (Table 1). In 90% of the patient the cysts were asymptomatic, while only four patients (10%) had symptoms such as flank pain, hypertension, and microscopic haematuria. Only one patient had signs of infection, characterized by fever and chills, and it was found that he had an infected cyst which was evacuated and drained percutaneously. There were 11 (27%) patients with small cysts, that means less than 3 3-10 cm in diameter. Percutaneous cyst aspiration biopsy with cytological analysis of the obtained liquid and simultaneous alcohol sclerosation were performed in most of the patients.

In four patients (10%) large cysts with a diameter over 10 cm, were detected. In those patients the operation was a method of choice (Table 2).

What regards localization, according to the left or right kidney, we find out that a somewhat bigger number of cysts was located in the right kidney. In five patients we detected bilateral, simple cysts. In one patient, who had a large cyst, we also found an angiolipoma in the perirenal area (Table 3).

If by needle aspiration biopsy a haemorrhagic liquid was obtained the operation was inavitable.

The observation and the follow-up of our patients in whom needle aspiration biopsy and alcohol sclerosation were performed, revealed that in 28% of the patients there was a relaps of the cyst. In eight patients (20%) there was only one relaps, and in two patients (5%) there were two relapses of the cyst. In one patient alcohol sclerosation had to be performed three times (Table 4).

Discussion – In this paper we wanted to point out, that the renal cyst formation could be treated in a simple way, by fine needle aspiration biopsy and alcohol sclerosation, what is already known (6, 7).

At the same time this is our contibution for the indications for such a method of treatment, since as far as we know, the indications when to operate, and when to perform alcohol sclerosation, have not yet been determined. In our opinion, these called cyst of a medium size, with a serous liquid, should be evacuated and obliterated. Large cysts over 10 cm in diameter can also be evacuated and obliterated, but we think that they should be operated, because a large quantity of alcohol used for sclerosation will cause perirenal changes, which will later be the cause of the patients trouble.

A malign process inside the cyst can rarely be seen (4, 8). We had three patients with such a malign process: therefore we consider that every cyst with a haemorrhagic content should absolutely be operated. In some patients we had relapses of the cyst, but these could be treated with repeated fine needle aspiration biopsy and alcohol sclerosation.

Sažetak

UROLOŠKE INDIKACIJE ZA FINO IGLENU ASPIRACIONU BIOPSIJU I ALKOHOLNU SKLEROZACIJU CISTIČNIH FORMACIJA BUBREGA

Često korišten, neinvazivan pregled gornjeg abdomena ultrazvukom, otkriva iznenađujuće velik broj slučajno nađenih tumora bubrega. Najčešći nalaz kod takvih tumora je cistična formacija. Dakako, uvijek postoji pitanje da li imamo cistu ili solidan tumor. Ciste, same za sebe ne predstavljaju problem sve dok se ne pojave komplikacije (infekcija, hemoragična cista, pielon i ureter).

Dakako, takve jednostavne ciste smanjuju vrijedno tkivo bubrega kompresijom, a mogu uzrokovati i sepsu kao rezultat kasnijom supuracijom. Veoma je važno i mentalno stanje pacijenta; kad sazna da nosi cistu ona za njega predstavlja tumor. Ta ga činjenica najčešće navodi da od liječnika zahtijeva njeno odstranjenje. U velikog broja pacijenata psihički momenat je jedan od faktora koji nas navodi na pristupanje evakuaciji cističnog sadržaja aspirativnom biopsijom finom iglom i alkoholnu sklerozaciju, kao jednostavnim i finim načinom ozdravljenja pacijenta.

References

1. Baltarowich OH. Sonographic evaluation of renal masses. Urol Radiol 1987; 9:79-7.
2. Di Paolo B. Role of ultrasonographic diagnosis in cystic neophropathies. Minerva Urol Nefrol 1985; 37:429-3.
3. Lang EK. Renal cyst puncture studies. Urol Clin North Am 1987; 14:91-2.
4. Natali A. Association of cysts and tumors in the same kidney. Minerva Urol Nefrol 1985; 37:69-4.
5. Campbell MF. Urology. 5th Edition. Philadelphia: WB Saunders 1987: 1778.
6. Koči K. Percutaneous treatment of renal cysts. Rozhl Chir. 1986; 65:730-3.
7. Kumanov KH. Treatment of solitary kidney cysts by percutaneous puncture under echographic control Khirurgiia (Sofiia) 1985; 38:95-8
8. Kawashima H. A report of three cases of renal cell carcinoma whith multilocular cystic changes. Rinsho Hoshasen 1986; 31:1473-6.

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XXIV JUGOSLOVENSKI SASTANAK NUKLEARNE MEDICINE

Prvo obaveštenje

Kopaonik
25 - 28
septembar 1991

ORGANIZATORI:

Sekcija za nuklearnu medicinu Srpskog lekarskog društva

Sekcija za nuklearnu medicinu Srpskog lekarskog društva – Društva lekara Vojvodine

Kliničko bolnički centar »Kragujevac«
Odeljenje nuklearne medicine, Kragujevac

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Teme sastanka mogu biti iz svih oblasti nuklearne medicine sa težištem ka funkcionim, metaboličkim i hemodinamskim ispitivanjima, kao i savremenoj dijagnostici i terapiji benignih i malignih tumora.

Istovremeno će se održati i XII Sastanak tehničara nuklearne medicine Jugoslavije, kao i izložba nuklearno – medicinske opreme i radiofarmaceutika.

PRIJAVA UČEŠĆA
do 28. februara 1991.

REZIME RADOVA DOSTAVITI
do 30. aprila 1991.

U drugom obaveštenju dobićete informacije o visini kotizacije, društvenom programu, rezervaciji smeštaja i mogućnostima prevoza do Kopaonika.

Sastanak se održava u Kongresnom centru hotela apartmanskog tipa »A« kategorije »Konaci« na Kopaoniku.

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UNIVERSITY HOSPITAL »DR O. NOVOSEL«, ZAGREB
CENTER FOR ULTRASOUND

INDICATIONS AND VALUES OF ULTRASOUND GUIDED ASPIRATION BIOPSY OF FOCAL KIDNEY LESIONS

Odak D, Drinković I, Kos N, Kardum-Skelin I, Vidaković Z

Abstract – Ultrasonography is an important method in diagnosis of focal kidney lesions. For a valuable diagnosis, findings of cystic lesions are sufficient. However, in cases with solid mases and atypical cystic lesions ultrasound guided aspirated biopsy in necessary. Ultrasound guided aspirated biopsy has been carried out on 179 previously hospitalised patients. Puncture has been carried out with 20 G and 22 G needles.
Ultrasound guided aspiration biopsy of renal cystic lesions has been performed as a procedure initial to embolisation with 95% alcohol. In 10% of patients the puncture has been carried out because of atypical picture of cystic lesions. Solid mases have been punctured in 29 patients (12 hypernephromas, five absceses, two feochromocytomas, two Mb. Hodgkin, two malignant lymphomas, four haemathomas and one false posiltive case). Despite the false positive finding ultrasound guided fine needle aspiration biopsy is a very good method in tne diagnosis of unclear changes.

UDC: 616.61-006.6-07:534-8

Key words: kidney neoplasms, biopsy needle, ultrasonic diagnoses

Profess paper

Radiol Iugosl 1990; 24:383-4

Introduction – Nephrosonography is an important method in the diagnostics of focal renal lesions. Besides standard methods of examinations, like those using contrast media, in our hospital nephrosonography is one of the techniques of finding out of localised pathologic changes. Ultrasound is a sufficient method in cases when cystic lesions are suspected. But in cases of focal lesions, like neoplastic proceses, angiography is a method of choice, as a proof of pathologic vascularisation. In cases of focal lesions, like absceses, inflammated cysts, limphomas and small angiographically unclear tumors, or unclear renal tumefactions, ultrasound guided cytologic puncture is applied (1-9).

Material and methods – From 1985 till 1989 cytologic puncture of localised renal lesions has been performed on 179 previously hospitalised patients, aged between 21 and 79 years. Cytologic punctures were performed in all cases of liquid and solid renal lesions, where the diagnosis could not have been reached by other methods. The punctures were performed using the Sonel 303 system, with a sectoral transducer, with a lateral needle guider, which enables us constant visualisation of the needle tip. We used Chiba needle 0.7 mm wide. The materials were sent for cythologic, biochemical and bacteriological analysis.

Results – The cythologic punctures were performed on all patients with previously localised liquid or solid tumorous mases, but have remained unclear after performing other diagnostic methods, i. e. intravenous urography or angiography, as well as on the patients with ultrasound clear findings of solitary cystic mases. Alcohol embolisation followed, and in only 10% of cases cytologic aspiration was performed as primary intervention. Out of 179 patients, 150 had clear findings of renal cysts. The evacuation of liquid contents, folowed by alcohol embolisation with 96% alcohol, has been performed on all 29 patients. The findings of localised renal lesions were not clear, so ultrasound guided cythologic

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puncture had to be performed. After cythologic analysis of the punctates the following was proved: 12 cases were renal tumors, six were absceses, two feochromocytoma, two limphoma, two primary Hodgkin, four haematomas, one false positive case.

There were no complications after the performed punctures.

Discussion – Localised focal expanded renal mases are, most often diagnosed with the first symptoms of diseases, or by chance if, during ultrasound examination of an organ or region, for example of upper region of abdomen, when the kidneys are examined routinely.

Today, modern methods like ultrasound or computerised tomography enable us to find focal lesions considerably earlier, while before, infusive urography was the only possibility to prove, indirectly, their existence. If during an examination, focal lesions are diagnosed, liquid or solid, and clinical treatment, including angiography does not provide an adequate result, aspirated puncture of the focal lesion is performed.

Conclusion – The techniques mentioned – infusion urography, which is the standard one, angiography, and ultrasound, sholud be sufficient for planing further medical treatment of focal renal lesions. However, for accurate verification of malignancy or benignity of a proces, or of an unclear case of liquid or solid lesion, ultrasound guided puncture should be done. If a solid focal renal proces is found out angiographically or by ultrasound, it should be sufficient for a surgical treatment. But if the contents found are liquid, they may be typical or atypical. In the cases of typical localised liquid renal cystic contents, they are evacuated by puncture and alcohol embolisation of the cyst. However, in case of atypical localised changes a puncture and cythologic examinations are indicated. As atypical liquid focal changes we consider liquid formations of unclear contours and thickened wall. Solid focal leasions are punctured for cythologic tests rarely, because of dangers of propagation of the proces, but also because angiography is, as a method of choice, very explicit (in 90% of patients). But angiography is not sufficient in cases of small solid tumors, so ultrasound cythologic puncture is used as a method of choice.

Saţetak

INDIKACIJE I VREDNOST ULTRAZVUČNO VOĐENIH ASPIRACIJSKIH BIOPSIJA FOKALNIH BUBREŽNIH LEZIJA

Ultrasonografija je važna metoda u dijagnostici fokalnih lezija bubrega. Za punovrijednu dijagnozu dovoljno je naći cistične lezije. Dakako, u slučajevima solidnih masa i atipičnih cističnih lezija, potrebna je ultrazvučno vođena aspirativna biopsija.

Ultrazvučno vođena biopsija je izvedena na 179 prethodno hospitaliziranih bolesnika. Punkcije su izvršene iglama od 20 G ili 22 G.

Ultrazvučno vođena aspirativna biopsija cističnih lezija bubrega je izvršena kao inicijalni zahvat embolizaciji 95% alkoholom. U 10% bolesnika punkcija je izvršena zbog atipične slike cističnih lezija. U 29 bolesnika punktirana je solidna masa (12 hypernephroma, pet abscesa, dva feochromocytoma, dva Mb. Hodkin, dva maligna limphoma, četiri haemathoma i jedan lažno pozitivni nalaz). Usprkos tog lažno pozitivnog nalaza, ultrazvučno vođena fino iglena aspirativna biopsija je vrlo dobra metoda za dijagnosticiranje nejasnih promjena.

References

1. Burstein J, Woodside Jr. Malignant haemorhagic renal cyst with occult neoplasm. Radiology 1977; 123:599-604.

2. Clarke B G, Gwade W J Jr, Rudy Hl, Rockwood L. Diferential diagnosis between cancer and solitary cyst of the kidney. J Urol 1965; 75:922-5.

3. Heckemann R. Finenadelbiopsie der Nieren. Radiologie 1988; 28:257-64.

4. Heckemann R, Heimann H, Meyer-Swickerath M, Paar D. Ultraschallgeführte Nierencystenpunktion – Biochemische und röntgenologisch Befunde. Fortsch. Röntgenstr.

5. Holmes J H. Early diagnostic ultrasonography. J Ultrasound 1983; 2933-43.

6. Lang E K. Röntgenographic assessment of asymptomatic renal lesions. Radiology 1973; 109:257-64.

7. Sherwood T, Trott P A. Needling renal cysts and tumors. Cytology and Radiology. Brit Med J. 1975; 3:755-61.

8. Wetanebe, Makuski M. Interventional real time ultrasound. Igaku – Shoin, Tokio – New York, 1985.

9. Woodroff J H, Chalek C C, Ottoman R E, Wilk S P. The Röntgen diagnosis of renal neoplasma. J Urol 1955; 75:615-621.

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ORL DEPARTMENT AND ULTRASOUND DEPARTMENT

ULTRASONOGRAPHY OF PARANASAL SINUSES IN ROUTINE CLINICAL INTERVENTIONS

Cvetnić V, Drinković I, Munitić A

Abstract – For four years now, ultrasonography of paranasal sinuses has been routinely used at our Department. The method is considered valuable for its rapid performance, high percentage of diagnostic accuracy and possibility of interventions under a direct ultrasound control. There is no ionizing radiation associated with the method, which is of particular importance in children and pregnant women. The examination does not require any preoperative procedures. By use of ultrasonography, the number of x-ray examinations of paranasal sinuses has been reduced by almost 40%. Prior to each intervention, ultrasonography is, as a rule, carried out in patients in whom x-ray of paranasal sinulses has already been done. In almost 90% of cases, this method will either confirm or rule out the sinus pathologic finding. The number of negative sinus interventions has thus been considerably reduced.

UDC: 616.216-002-073:534-8

Key words: paranasal sinus diseases, ultrasonic diagnoses

Orig sci paper

Radiol Iugosl 1990; 24:385-7

Introduction – In the diagnostics of the paranasal sinuses diseases a whole set of tests is used today: case history, rhinoscopy, sinus x-ray, tomography, test puncture, bacteriologic examination, cytologic examination, histologic examination, sinusoscopy, rhinomanometry, sinusomanometry, immunology, ciliary device function, ultrasonography, computerized tomography, nuclear magnetic resonance, scintigraphy, operating microscope (1). However, to make a diagnosis, only some of them are necessary, and the choice depends primarily on the clinician's experience. We have been using ultrasonography routinely for four years now at our department, and find it very important for several reasons: it provides visual presentation of changes, sometimes the method alone is sufficient for diagnosis, it provides targeted diagnosis, controls therapeutic effects, it is non-invasive, it does not produce ionizing radiation, it can be repeated when necessary, and is very suitable for children and pregnant women.

In everyday clinical practice some of patients come to ORL department for a consilium examination with a sinus X-ray, while some of them are sent because of suspicion on sinusitis.

In both cases we use ultrasonographical examination. In this way we complement sinus x-ray findings, confirm or exclude pathological findings of the sinuses, which is extremly important because of possible intervention – lavage of the sinuses, local application of antibiotics and corticosteroides. Sometimes a diagnosis can be made by ultrasonography solely, so the need for x-rays has been significantly decreased.

Material and methods – Between 1985 – 1988, 412 patients, age from 7 to 64 years (246 women and 166 men) were examined ultrasonographically. We use B-mod of ultrasonographical examinations because, using this technique, we get patomorphological picture of maxillar and frontal sinuses, as well as anterior etmoidal cells (2).

Results – On the basis of ultrasonographical examinations of this group of patients with chronic inflamation of paranasal sinuses, we were

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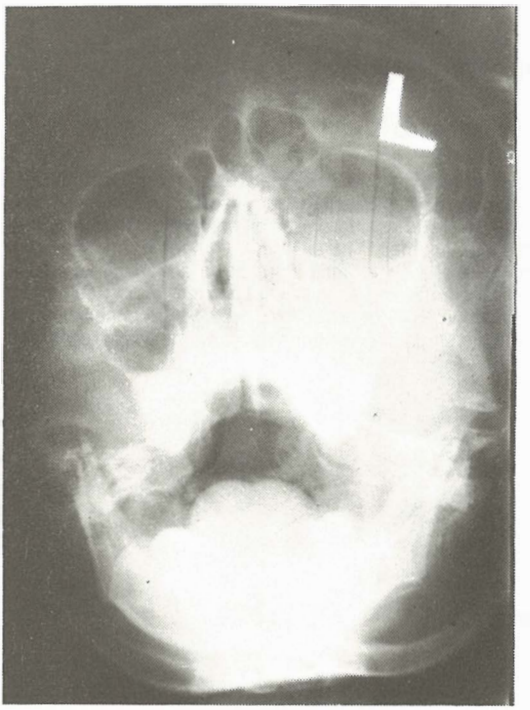

Fig. 1 – X-ray finding: diffusely shaded left maxillary sinus

able to establish compatibility between the x-ray and ultrasound findings in about 90% of cases (4). It is also of importance that exact diagnosis in a number of patients has been achieved by ultrasound solely (Fig. 1, 2, 3, 4).

Discussion and conclusion – By using mentioned B-mod of ultrasonography on this group of patients, we were able to establish a series of pathologic entities of paranasal sinuses: inflammation of mucosa with oedema, polipoid formations in the sinuses, and free contents in the sinuses, which is especially important. Because of its two-dimensional representation B-mod is a method of choice in the diagnostics of mucocele and piocele of maxillar sinuses. By this we do not want to lessen the validity of the A-mod. On the contrary, we believe that both moduses complement each other (3). In this way the number of negative interventions has been reduced to the smallest possible number. Using ultrasonography as the first laboratory method in the diagnostics of chronic inflammation of paranasal sinuses the number of x-ray examinations has been reduced for about 40%, which is not irrelevant. However, it should be stressed again that

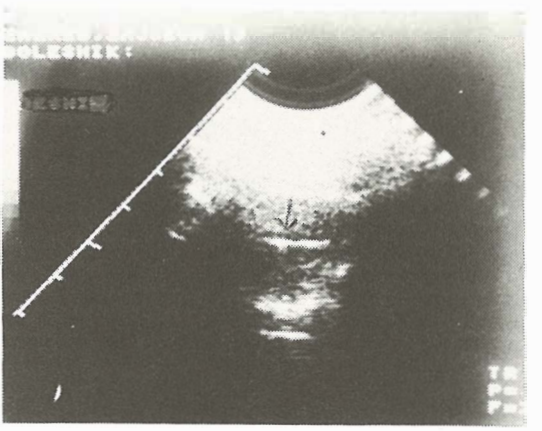

Fig. 2 – Ultrasound finding: maxillary sinus of the same patient, with fluid level

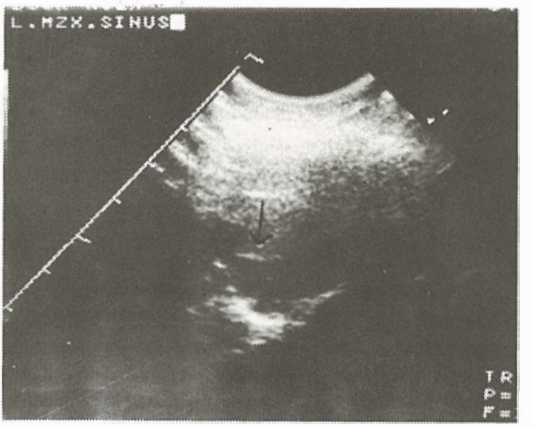

Fig. 3 – Ultrasound finding of the maxillary sinus, with fluid level

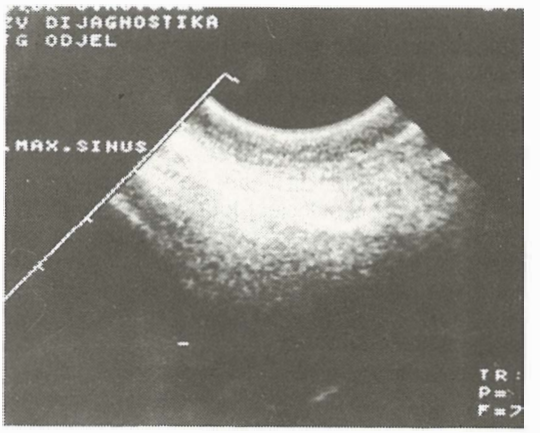

Fig. 4 – Ultrasound finding of the same patient after treatment. Finding clear.

ultrasonography of paranasal sinuses is only a complementary method (5).

Sažetak

ULTRASONOGRAFIJA PARANAZALNIH SINUSA KOD RUTINSKIH KLINIČKIH INTERVENCIJA

Na našem odjelu izvodimo ultrasonografiju paranazalnih sinusa rutinski već četiri godine. Metodu smatramo vrijednom zbog vizualizacije promjena, visokog postotka točnosti dijagnostike i mogućnosti intervencije pod direktnom kontrolom ultrazvuka. Primjenom ove metode izbjegnuto je ionizirajuće zračenje što je od naročite važnosti u djece i trudnica. Pregled ne zahtijeva nikakove preoperativne pripreme. Primjenom ultrasonografije broj rendgenskih pregleda paranazalnih sinusa je smanjen za skoro 40%. Prethodno svakom zahvatu, ultrasonografija se, u pravilu, izvodi i u pacijenata kod kojih je već izvršen rendgenski pregled paranazalnih sinusa. U skoro 90% slučajeva ova će metoda ili potvrditi ili isključiti patološki nalaz sinusa. Time je osjetno smanjen broj negativnih intervencija na sinusima.

References

1. Cvetnić V, Munitić A. Current Trends in the Diagnostics of Chronic Naso-Paranasal Sinusitis. Pluć bol 1987; 39:119-24.

2. Mann W J. Ultraschall in Kopf-Hals-Bereich. Springer Verlag, Berlin-Heidelberg-New York – Tokio, 1984.

3. Umezaki T, Shin T, Watanabe H. Effectiveness of A-mode Ultrasonography in Paranasal Sinus Disease. VIth ISIAN Symposium, Abstracts, p. 88, 1987.

4. Böckman P, Andreasson L, Holmer N G, Jannert M, Jannert P. Ultrasonic versus Radiologic Investigation of the Paranasal sinuses. Rhinology 1982; 20:111-9.

5. Cvetnić V, Drinković I, Munitić A, Kos N, Odak D, Nosso D, Boko H. Practical values of Ultrasonographical Diagnostics in Otorhynolaryngology and Cervicofacial Surgery. In press: Chirurgia Maxillofacialis & Plastica, 1989.

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THE PERCUTANEOUS NEPHROSTOMY–EXPERIENCES IN ABOUT 1000 CASES

Feiber H

Abstract – The sonographically guided percutaneous nephrostomy has meanwhile become an approved and mostly uncomplicated method of direct urinary derivation and has to be advised especially as a temporary measure. In case of a high risk of operation it has to be looked upon, as the method of choice. Referring to this in our clinic the open nephrostomy has lost its value. The special problems of permanent derivation and palliative measures with inoperable tumours will be discussed.

UDC: 616.61-089.86:534-8

Key words: nephrostomy precutaneous, ultrasonic diagnoses

Profess paper

Radiol Iugosl 1990; 24:389-91

Introduction – Thirty years ago Godwin et al., already reported about their experiences with the percutaneous nephro-pyelostomy. Whereas Godwin made the puncture of the renal pelvis by X-ray, in the recent times more and more an ultrasound-guided transrenal puncture is applied. According to the last development of ultrasound and the meanwhile better handling of the puncture systems, it is getting more and more important. In the following we are going to report our experiences with this method in a considerable number of patients.

Material and methods – Between January 1979 and May 1989 we made 930 percutaneous nephrostomies. Normaly, the puncture of the pyelon is made through lower calix. The patient is lying on his abdomen and we apply a local anaesthesia. At first we used the COOK puncture set, but now we exclusively use the PND set of ANGIOMED, including the new puncture needle with MS cut tip for ultrasound guided puncture, a guide wire, teflon bougies and a pigtail dranaige catheter.

Results and discussion – The first 117 percutaneous nephrostomies were made with a compound scanner with a 2.5 MHz transducer. The puncture needle was lead through a central boring to its transducer. Later on the punctures were made with a raeltime sector scanner (Combison 310/320 of KRETZ). It has a fixed puncture direction. Especially in cases of a slight or no dilatation of the pyelon the number of mispunctions could be lowered considerably, because the needle can be placed under sight with this system. The procedure accords to the Seldinger technique. Table 1 shows the indications. As we can see postrenal obstructions represent the main indications for nephrostomy. Sometimes a nephrostomy is made for the judgement of the recovery of the renal function after derivation or for drying out a urinary fistula.

I especially want to stress the importance of this method in the septical ureter stones. After all if the attempt of retrograde derivation by a ureter catheter or an inner splint fails, we have the opportunity to derivate the highly dangered patient with his infected pyelon briefly and without

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Table 1 – Indications for perc. nephrostomy

Gyn. carcinoma		178
Rectum-carcinoma		78
Prostate-carcinoma		99
Bladder-carcinoma		129
Ureter-carcinoma		15
Stenosis of the ureter	– M. Ormond	23
	– retroperit. lymphoma	27
	– unknown aetiology	15
	– retrocavale ureter	1
Urotuberkulosis		9
Stones of the ureter		248
Pyonephrosis		25
Stenosis of ureter after kidney – transplantation		6
Anomalia of the urinary tract		24
Iatrogenic fistula of the ureter		9
Diagnosis of renal function		40
Shrinkage of the bladder + reflux		4
Total		930

Tab. 2 – Percutaneous nephrostomy (N=930) – – complications

Hematuria (temporary)	168
Perirenal hematoma	12
Tamponade of the pyelon	6
Urosepsis (?)	1
Urinoma	–
Perinephritic abscess	–

any strain. To a later point of time the necessary causal intervention can take place under better conditions. In the course of the extracorporal shock waves the percutaneous nephrostomy is due to an important role as an auxiliary measure.

The percutaneous nephrostomy has to be thought of as an invasive method which naturally contains possible risks (Table 2). Occasionally it comes to temporary hematuria, only seldom we find a perirenal or subcapsular hematoma. We never had a massive hemorrhage, which forced us to an operative intervention. Among our patients we did not find an urinoma which sometimes is described in literature. We think that this can be prevented by avoiding a direct punction of the renal pelvis. Neither did we see a perinephritic abscess in an infected kidney as it is described in the literature as well. In one case the nephrostomy has to be discussed as a possible factor causing a urosepsis.

In every particular case percutaneous nephrostomy can be looked upon as a temporary, permanent or palliative urinary derivation. In cases of high operation risk, because of bad general state of health, uremia or septical status the *temporary* percutaneous nephrostomy can help to a considerable economy of time. Therefore a causal intervention can be made on easier terms.

There are more or less problems in using the catheter as a *permanent* urinary derivation concerning the incrustration of the catheter or tis total obstruction.

Concerning the *palliative* urinary derivation the indication can become problematical.

Thinking of patients with a stenosis of the ureter on both sides because of an inoperable tumor we can prevent uremia but this elongation of life can be full of anguish for him.

In a retrospective examination of 87 patients with tumors we found 51 who had died until then with a working urinary derivation, 1/3 still in our clinic or after a transfer to an outward clinic or sanatorium. The average survival was 1 1/2 months.

2/3 of the patients could be released at home temporarily. Here we had an average survival of 6 months.

In 19 of 51 patients after percutaneous nephrostomy a further antitumor therapy was applied. The average survival of these patients were 177,7 days in contrary to those who were not medically treated with an average survival of 115,6 days. The antitumor treated patients had survived the non treated ones in an average of 2 months.

This retrospective study also showed that nephrostomy had not been always the reasonable treatment concerning the prolongation of life. We sometimes heard of a painful progress of the disease. Concerning these cases we have to discuss the question if quality of life must not have priority to lengthening of life at any price, especially if we cannot apply an effective antitumor therapy. This is a question of ethics in general as well as a special one in the code of medical ethics. In such individual confines only an individual decision can be made, which demands courage to a matter of *conscience.*

Sažetak

ULTRAZVUČNO VOĐENA PERKUTANA NEFROSTOMIJA

Ultrazvučno vođena perkutana nefrostomija je postala provjerenom i potpuno jednostavnom metodom direktne urinarne derivacije, te ju, naročito kao privremenu mjeru, treba preporučiti. U slučaju operacije visokog rizika treba ju smatrati metodom izbora. S obzirom na to, otvorena nefrostomija je na našoj klinici izgubila svoju vrijednost. Raspravlja se o posebnim problemima permanentne derivacije i palijativnih mjera kod neoperabilnih tumora.

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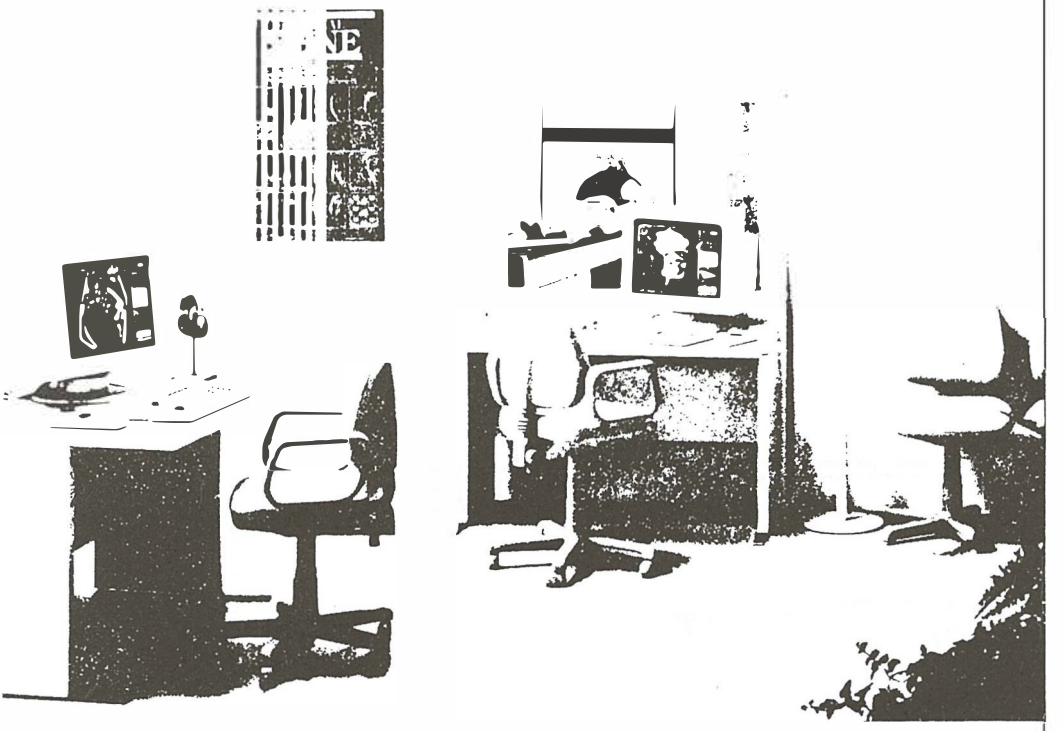

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ULTRASOUND GUIDED PERCUTANEOUS DRANAIGE OF ABDOMINAL ABSCESSES

Frölich E, Striegel K, Heller Th, Frank U, Mühr T, Eberle S, Seeger G

Abstract – In 37 patients 40 abscesses were treated percutaneously by ultrasound guidance: 5 times needle evacuation alone, and 25 times drainage by catheter was followed by healing without operation, overall curing rate being 81%. In comparison with 60 operated abscess-patients the drainage-period was 11.9 days versus 16 and the hospital stay 17.6 versus 32.7 days respectively. Complication rate in the percutaneous-group was 5.4% versus 8.3% in the OP-group. None of the deaths (2.7% in the percutaneous versus 10.8% in the OP-group) was related to the drainage.

UDC: 616-002.3-073:534-8

Key words: abscess, abdomen, drainage, ultrasonic diagnoses

Profess paper

Radiol Iugosl 1990; 24:393-5

Introduction – Ultrasound guided fine needle puncture is an excellent method to differentiate intraabdominal liquids. Once the abscess is established, drainage either by surgical methods or percutaneous catheter is essential.

Material and methods – The abscess is punctured with an 18-gauge needle. Smaller abscesses, holding less than 50 cl liquid contents are evacuated and irrigated with 0.93 NaCl. Intervening loops of bowel and the urinary bladder are passed through with the needle without hesitating. In larger abscesses with ropy contents the 18-gauge needle is replaced by Seldinger technique, by a 7.6 F pigtail catheter. Intervening bowel loops must not be transversed with the catheter.

Results – In 37 of 88 patients with intraabdominal liquids 40 abscesses were identified and percutaneously treated from November 82 to April 85. 12 times an abscess was treated by percutaneous needle evacuation (PNE), 5 times followed by healing. 25 of 32 patients having percutaneous catheter drainage (PCD) were cured by this method. 12 cases had to be operated (OP), so the overall curing rate by percutaneous manipulations was about 81%. The size of the abscesses in case of PNE was 12-200 cl, in case of PCD varying from 20-90 cl. We differentiated the abscesses according to their sites. In 6 of 11 liver abscesses treatment was tried by PNE, 2 of them were cured. Their size was about 20 cl. Another 5 of 7 liver abscesses with the mean size of 120 cl were successfully treated by PCD. The drainage time was 12-21 days.

In case of pancreas one abscess with the size of 50 cl was treated by PNE without success. One of two others, having a size of 220 cl was successfully treated by PCD within draining time of 37 days. In the group of 21 abdominal abscesses 3 of 5 abscesses with the mean size of 45 cl were successfully treated by PNE. Another 16 of 18 abscesses with the mean size of 190 cl were successfully treated by PCD within draining time of 2-21 days. Two of the abscesses treated by PCD had to be operated, in one case because of rising temperature, in the other because the

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catheter had passed the cecum and the fistula had to be oversewed.

In case of retroperitoneal abscesses 3 of 5 with the mean size of 130 cl were successfully treated by PCD within draining time of 4-22 days. Two others had to be operated as the temperature raised after 48 hours. In comparison with a group of 60 operated patients, the whole period of drainage was 11.9 days of the PCD-group and 16 days of the operated patients.

The average duration of stay in hospital was 17.6 days, compared to 32.7 in the operated group. As far as the curing rate is concerned, 81% of the PCD-group in comparison to 93% of the operated patients could be discharged as cured.

The complication rate was 5.4% in the PCD group and 8.3% in the OP group. In none of the cases death was caused by drainage. Death unrelated to drainage happened in 2.7% in the PCD group and in 10.8% in the OP group.

hed. In many cases an operation is performed because the whole situs can be overlooked extensively, whereas the ultrasound method for draining abscesses is still new and unexplored. It cannot cure the cause of an abscess nor overlook its smaller and septated parts.

We suggest the following proceeding:

Before each percutaneous drainage a trial puncture is essential to make sure that there is a pus in the abscess cavity. In the following close cooperation with a surgeon is important. In case of the percutaneous way of draining an antibiotic should be given in order to avoid chills. Abscess holding less than 50 cl and being liquid should be treated by PNE and NaCl irrigation. Interventing loops of bowel and urinary bladder are passed through with a needle. Abscess holding more than 50 cl ropy content and being superficial (pleura and bowel must not be passed through) should be treated by PCD. An operation may be

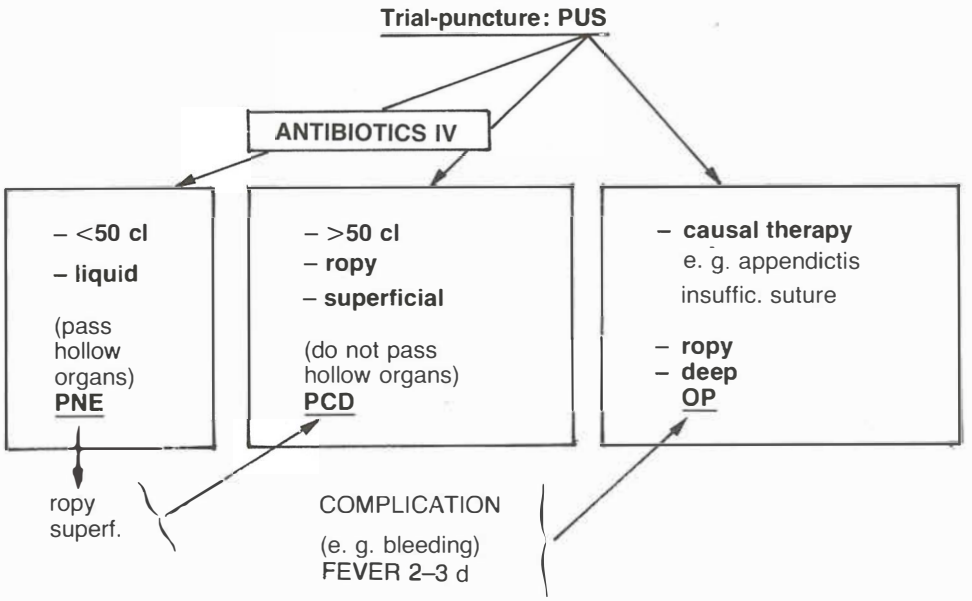

Fig. 1 – Decision tree for percutaneus drainage of abdominal abscesses (PNE = percutaneous needle evacuation; PCD = percutaneous catheter drainage; OP = operation)

Discussion – We assume the ultrasound guided percutaneous drainage of abdominal abscesses is an excellent method that helps to avoid a reoperation in many cases.

Unfortunately the selection criteria for the two methods percutaneous drainage and operative drainage have not clearly enough been establis-

necessary by rising temperature after 48-72 hours when additional abscesses or septatitons have been made sure by control sonography or computer tomography, or when a complication occurs related to drainage. No percutaneous drainage and a primary operation should be done when a persisting cause of the abscess is suspected (e. g. appendictis, ulcus perforated,

cholecystitis, insufficient suture. . .) or if a deeply situated abscess, being superimposed by lung or intestine, cannot be evacuated by PNE.

Sažetak

ULTRAZVUČNO VOĐENA PERKUTANA DRENAŽA ABDOMINALNIH PROCESA

Perkutano pod kontrolom ultrazvuka je tretirano 40 abscesa u 37 pacijenata: 5 samo evakuacija iglom, 25 drenaža kateterom, nakon čega je uslijedilo ozdravljenje bez operacije, sveukupna stopa izlječenja 81%. U usporedbi sa 60 operiranih abscesa-pacijenata period drenaže je bio 11,9 dana prema 16, a boravak u bolnici 17,6 odnosno 32,7 dana. Stopa komplikacija u perkutane grupe je bila 5,4% prema 8,3% kod operirane grupe. Niti jedan od smrtnih ishoda (2,7% kod perkutane prema 10,8% kod operirane grupe) nije doveden u vezu sa drenažom.

References :

1. Glass C et al. Drainage of Intraabdominal Abscesses. Am J Surg 1984; 147:315-7.
2. Gary R et al. Percutaneous Abscess Drainage. Gastrointest Radiol 1985; 10:79-84.
3. Gronwall S et al. Drainage of Abdominal Abscesses Guided by Sonography. AJR 1982; 138:527-9.
4. Johnson WC et al. Treatment of Abdominal Abscesses. Ann Surg 1981; 194:510-9.
5. Van Sonnenberg E et al. Percutaneous Drainage of Abscesses and Fluid Collections: Technique, Results and Applications. Radiology 1982; 142:1-10.
6. Van Sonnenberg E et al. Percutaneous Drainage of 250 Abdominal Abscesses and Fluid Collections. Radiology 1984; 151:337-41.

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TRANSCERVICAL AND TRANSABDOMINAL CHORIONIC VILLUS SAMPLING

Podobnik M, Singer Z, Kukura V, Bulić M, Profeta K

Abstract – We present our initial experience in developing a chorionic villus sampling in our clinic. In phase one we performed transcervical chorionic villus sampling in 35 patients and in 10 patients transabdominal chorionic villus sampling prior to elective first trimester abortion, assessing the reliability and reproducibility, or obtaining adequate villus samples and performing cytogenetic analysis by means of both the direct and culture methods. In phase two diagnostic aspiration of chorionic frondosum was performed on 50 patients, 25 had transcervical and 25 transabdominal chorion frondosum aspiration. The overall abortion rate in diagnostic series was 2%. We found in 3 (6%) patients abnormal karyotypes (45XX, –9, 45X, 47XY, +13). Significant post chorionic villus sampling AFP elevation took place in 17 (34%) of 50 chorionic villus sampling. No relation between rise in AFP and miscarriage was demonstrated. No corelation between AFP elevation and the amount of villi aspirated was found either.

UDC: 618.344-076

Key words: chorionic villi sampling – methods

Profess paper

Radiol Iugosl 1990; 24:397-400

Introduction – Prenatal diagnosis of fetal malformations and genetic disorders is the foremost concern of antenatal medicine. The technique of trofoblast biopsy, which is obtained by transcervical or transabdominal, ultrasound guided chorion frondosum aspiration has been more thoroughly tested in a number of centers throughout the world since 1983 (1-6).

Transscervical aspiration of chorionic villi has been performed at our clinic since 1985, whereas we started performing transabdominal aspiration towards the end of 1986. After a two year study of samples taken from women undergoing abortions for non-medical reasons, we started using the tested method in clinical practice in high-risk pregnancies. We analysed pregnancies involving heterozygot couples, carriers of X related recessive disorders and carriers of balanced chromosome aberrations. By the direct method, short-term cultivation, synchronisation and the enzyme procedure, we obtained the required material for karyotypisation, biochemical micromethods and DNK tests. We discovered normal karyotypes and ensured the continuation of the desired pregnancies, but also abnormal results which indicated the need for terminating such hopless pregnancies.

Material and methods – Each woman was first examined ultrasonically (Toshiba SAL 77 with a linear and curvilinear probe of 3.75 MHz and 5 MHz), and CRL, by which the gestation period is determined, was measured. Aspiration was performed between 7 and 12 weeks of gestation. Women who had transcervical aspiration of chorion frondosum were prior to this given Papanicolau's test and a microscopic examination of the smear, both of which were in order. To perform the aspiration we used a 26 cm long Portex catheter with a 1.3 mm inner diameter and 1.8 mm outer diameter (Trophocan CVS–USA) or the 24 cm long Holzgreve-Angiomed catheter, with a 1.13 mm inner diameter and 1.45 mm outer diameter. Ultrasonically we located the position of chorion frondosum. Before inserting the catheter it must be bent depending on the location of chorion frondosum. Under ultrasonic guidance the catheter is inserted about 1 cm into the chorion frondosum. Before inserting the catheter it must be bent depending on the location

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of chorion frondosum. Under ultrasonic guidance the catheter is inserted about 1 cm into the chorion frondosum tissue. By rotating the catheter the tissue is aspirated into a 20 ml plastic syringe. The syringe contains 5 ml of MEM, 10 IU/ml heparin and 1% Garamycin. 5 to 25 mg of chorion frondosum tissue is obtained and is immediately taken to the laboratory. In case of a negative test the procedure is repeated one more time. The contents of the syringe are placed in Petri's sterile plastic dish and examined in a stereo microscope (power 50 X). A small quantity of recognizable decidue is separated from the finger-shaped villi. With needles and a scalpel it is split into up to ten tiny pieces which are sufficient for making one tissue culture or the direct method of karyotypization, as well as for the X and Y test (Fig. 1). Transabdominal aspiration was performed when chorion frondosum is in the anterior position, whilst transcervical aspiration is prefered when it is in the posterior position. We use a 90 mm spinal needle, gauge 20. Upon the disinfection of the anterior abdominal wall and with the urinary bladder empty, the needle is inserted, under ultrasonic guidance, into the middle of chorion frondosum, the angle is changed by 20° and with a slow movement, in the presence of negative pressure, up to 20 ml of chorion frondosum tissue is aspirated into a syringe containing the medium specified earlier in the paper. When the results of the test are negative aspiration is repeated one more time. In case of each patient alfa-fetoprotein (AFP) was determined before and after aspiration of chorion frondosum, and so was fetal heart rate (FHR) by an M-mode. Special consideration was given to any complications that may have arisen, such as bleeding, perforation of the gestation sac and chorioamnionitis (Fig. 2).

In the first stage of the research we performed transcervical aspiration of chorion frondosum in 25 women, and we terminated the pregnancies two to four hours after the aspiration procedure. In 15 patients transcervical aspiration was performed, in 10 transabdominal. The pregnancies were terminated seven to fourteen days after the aspiration. In the second stage diagnostic aspiration of chorion frondosum was performed on 50 patients, 25 had transcervical and 25 transabdominal chorion frondosum aspiration.

Results – In the first experimental stage transcervical aspiration of chorion frondosum was performed on 25 women. Results were positive in 82.9% of the cases and negative in 17.1%. In 20.5% of the cases bleeding resulted as a side

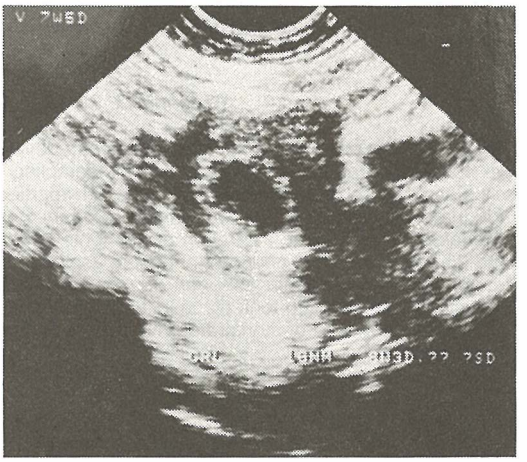

Fig. 1 – Transcervical apsiration of chorion frondosum at gestation age of eight weeks and three days. CRL 16 mm, for amenorea, posterior position of chorion frondosum, arrow pointing to the Portex catheter.

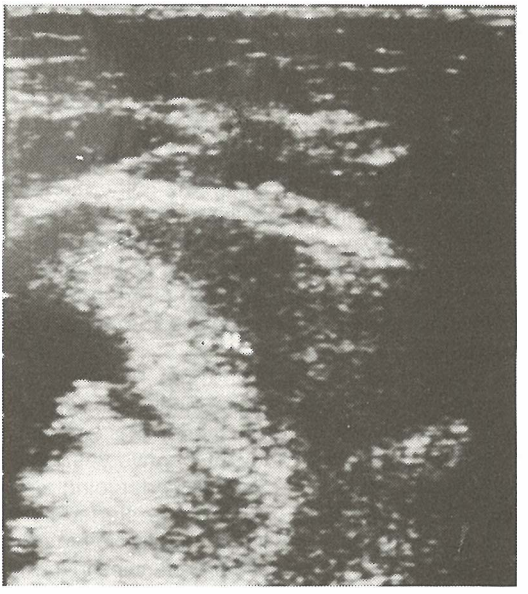

Fig. 2 – Transabdominal aspiration of chorion frondosum at gestation age of 11 weeks.

effect, and in 4.5% of the cases we caused the perforation of the gestation sac.

Transcervical aspiration of chorion frondosum was performed on 15 patients, transabdominal on 10. Results of the tests were positive in 95.5% of the patients and negative in 4.5%. Positive karyotypization was done in all 95.5% of the cases. In 16.7% of the women there was

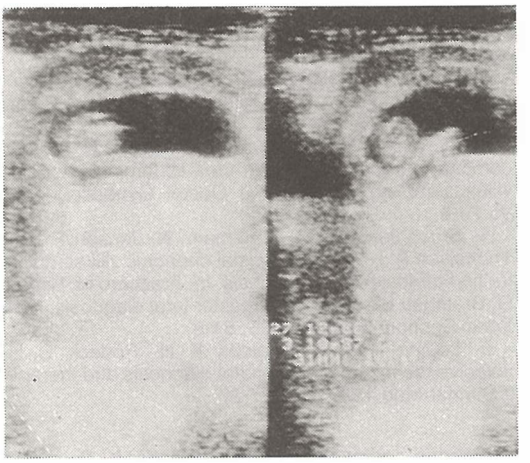

Fig. 3 – Intentionally caused perforation of the gestation sac by Portex catheter. CRL 31 for 10 1/7, chorion frondosum in the posterior position, in it a Portex Catheter (left), Portex catheter in the amnion (right).

bleeding, in 2.8% the perforation of the gestation sac. Chorioamnionitis, as a side effect occurred in one patient (4%). From this group of patients one woman had a miscarriage fourteen days after the procedure and at the same time chorioamnitis (Fig. 3).

In the second stage diagnostic aspiration of chorion frondosum was performed in 25 patients by the transcervical route and in the same number by the transabdominal route. We received positive results, as well as positive karyotypisation in all 50 women (100%). Bleeding, as a side effect of the procedure, occurred in 20% of the women; there was no perforation of the gestation sac in any of the women, nor were there any instances of chorioamnionitis. In 3 patients (6%) early amniocentesis was performed. In 3 (6%) we found a pathological karyotype (45 XX, –9, 45 X, 47 XY, +13). Of the 50 patients one had a miscarriage (2%). Twenty of the women gave birth to female children after a full term pregnancy; fifteen born male children also after a full term pregnancy. Fourteen pregnancies were progressed normally between the fifteenth and thirty-second week.

In 17 of the 50 subjects (34%) (Table 1) we found a significant change in AFP concentrations prior and following aspiration of chorion frondosum ($p < 0.01$). We found no correlation between the change in AFP concentration and the quantity of material aspirated. There was no statistically significant change in FHR before or after aspiration of chorion frondosum ($p < 0.01$).

Table 1 – Maternal serum alfa-fetoprotein (AFP) and featal heart rate (FHR) before and after chorionic villi sampling in 17 pregnancies progressed normaly

NO.	Pre-CVS AFP ng/ml	Post-CVS AFP ng/ml	Pre-CVS FHR FHR/min	Post-CVS FHR FHR/min
1.	110	145	155	150
2.	75	125	160	145
3.	25	52	145	160
4.	65	105	160	130
5.	45	75	145	150
6.	80	105	150	155
7.	70	100	150	130
8.	55	85	155	165
9.	25	50	150	140
10.	25	45	160	140
11.	45	80	150	130
12.	105	145	160	180
13.	75	125	140	160
14.	85	135	150	130
15.	45	90	160	170
16.	50	110	150	130
17.	35	80	160	140
Mean	59,71	97,18	153,23	147,35
SD	25,69	30,79	6,17	15,25
	$p < 0,01$		$p > 0,01$	

CVS = Chorionic villus sampling
AFP = Alfa – fetoprotein
FHR = Featal heart rate

Conclusion – When chorion frondosum is in the posterior position we perform transcervical aspiration, when it is in the anterior position or in the fundus, transabdominal aspiration is performed. Using the techniques suggested in the paper there were no instances of chorioamnionitis, 2% of the subjects had a miscarriage, whereas a pathological karyotype was found in 6% of the subjects. In 17 women (34%) we found a statistically significant change in the level of AFP before and after aspiration. However it was in no correlation with the extent of the bleeding, nor the quantity of the aspirated material or the number of miscarriages. We found no significant change in FHR before or after aspiration of chorion frondosum.

Sažetak

TRANSCERVIKALNA I TRANSABDOMINALNA ASPIRACIJA HORIJALNIH RESICA

Prikazujemo naše početne rezultate aspiracije horijalnih resica u našoj klinici. U prvoj fazi učinili smo u 35 bolesnica transcervikalnu aspiraciju horijalnih resica, a u 10 bolesnica transabdominalnu aspiraciju horijalnih resica, a prije artificijelnog pobačaja u prvom tromje-

sečju trudnoće, ocjenjujući kvalitetu dobivenih horijalnih resica i izvodeći citogenetsku analizu direktnom kariotipizacijom i kulturom tkiva.

U drugoj fazi dijagnostičku aspiraciju horijalnih resica izveli smo na 50 bolesnica – u 25 bolesnica transcervicalno a u 25 transabdominalno.

U sveukupno 2% bolesnica imali smo spontani pobačaj. U 3 bolesnica (6%) našli smo patološki kariotip (45XX, –9, 45X, 47XY, +13).

U 17 (34%) bolesnica našli smo signifikantni porast razine alfa fetoproteina nakon aspiracije horijalnih resica. Nije utvrđena povezanost razine alfa fetoproteina i spontanih pobačaja. Također nije utvrđena korelacija između promjene razine alfa fetoproteina i aspiracije horijalnih resica.

References

1. Boogert A, Mantingh A, Visser G H A. The imme diate effects of chorionic villus sampling on fetal movements. Am J Obstet Gynecol 1987; 157:137-9.

2. Brambati B, Oldrini A, Lanzani A. Transabdominal chorionic villus sampling: a freehand ultrasound guided technique. Am J Obstet Gynecol 1987; 157:134-7.

3. Hogge W A, Schonberg S A, Golbus M S. Chorionic villus sampling: experience of the first 1000 cases. Am J Obstet Gynecol 1986; 154:1249-52.

4. McKenzie W E, Deborah S H, John R N. A study comparing transcervical with transabdominal chorionic villus sampling (CVS). Br J Obstet Gynaecol 1988; 95:75-8.

5. Smidt Jensen S, Hahnemann N, Jensen P K A, Thekelsen A J. Transabdominal chorionic villi sampling for first trimester fetal diagnosis. In: Fraccaro M, Simoni G, Brambati B eds.: First trimester fetal diagnosis. New York: Springer-Verlag, 1985; 51-3

6. Soothil P W, Nicolaides K H, Rodeck C H: Invasive techniques for prenatal diagnosis and therapy. J Perinat Med 1987; 15:117-27.

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EXPOSURE TO ULTRASOUND IN MEDICAL DIAGNOSTICS: AN EXPERIMENTAL INVESTIGATION

Cardinale A, Lagalla R

Abstract – Experimental animals were exposed to increasing US doses in order to detect biological effects – if any – due to US similar to those used for diagnostic purposes. Electron microscope, hemochemical and histoenzymatic studies were then carried out on adult rats and rat embryos. Results showed the occurrence of liver cytolysis proportional to exposure times. Cytolysis was shown to be correlated to H3-thymidine incorporation and to enzyme kinetics. Clinical-experimental investigations on humans are in progress, and are aimed at detecting possible effects on embryo liver cells.

UDC: 534.78:616-001.2-092.8

Key words: ultrasonics-adverse effects, rats

Orig sci paper

Radiol Iugosl 1990; 24:401-3

Introduction – There is no definitive and univocal agreement on effective biological safety of ultrasounds (US) (1).

It depends on the extreme variability of experimental evidence, both in vivo and in vitro of the lack of reproducibility and on the difficulty of optimizing and unifying several physical, acoustic and operative parameters of US exposure (2).

We have carried out »in vivo« experiments aimed at clarifying whether morphological and functional alterations of some parenchymes (liver, kidney, ovary) and tissues could be shown in experimental animals (Wistar rats) following US exposure with parameters similar to those employed in diagnostic echography (3, 4, 5, 6).

Experiments performed on experimental animals do not clarify whether the same results may be extrapolated to humans. This is the most important question in radiobiological and protection research at present: in fact, the research on US bioeffects in man consists chiefly in retrospective and epidemiological analyses which are not quite significant from a statistical and experimental point of view (7, 8, 9, 10).

Material and methods – Different groups of Wistar rats were exposed to pulsed US beam (intensity 100 mw/cm^2) from 10'' to 500'' and sacrificed 1h,24h and 8 weeks after US exposure.

As reported in table 1, many morphological and functional parameters were evaluated in adult rats and in rat's embryo. Recently we also performed a series of experiments on human embryos studied after voluntary interruption of pregnancy and expulsion of the embryo after prostaglandin administration.

Results – Liver parenchyma, both in adult and embryo rats has been shown to be quite sensitive to US action. Progressive cell vacuolization has been shown to occur by increasing exposure times until 80' and to be associated with cytoplasma depletion, reaching almost cytolysis with nuclear piknosis which exposure ranged from 160'' to 500''. Clearly detectable connective tissue neogenesis, probably a reparation process, is shown to occur 8 weeks after US exposure.

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Table 1 – Experimental research carried out on wistar rats at our institute (1982-1988)

	Exp. t.	Survey
liver	10''-500''	1h-24h-8w
• Morphological investigation kidney	45	1h-24h
(light and electron microscope) ovary	45''	24h
embryo liver	120''	24h
Liver lysosome enzymes (acid phosphatase)	80''-160''	24h-4w
• Isoenzyme assay: Oxydizing liver enzymes (succinate dehydrogenase)	80''-160''	24h-4w
• Biohumoral assay (Gamma-G-T)	20''-500''	24h
• Nucleic acid kinetics (H^3-thymidine incorporation)	20''-500''	1h

Mitochondria showed the most marked injuries among cytoplasma organelles (6, 11, 12).

The occurrence of liver parenchymal damage was confirmed by the finding of altered biochemical markers of liver cytolysis (gamma-GT) and by reduced ability to incorporate H3-thymidine (13, 14). Morphological and structural alterations described hitherto were associated with changes of kinetics of oxidizing and lysosomial enzymes in rat liver (15).

US action upon liver enzymes seems to cause an early increase of lysosome enzyme activity followed by an altered behaviour of oxidizing enzymes showing an anomalous location troughout liver lobules. In experimental animals, kidney and ovary tissue failed to show any morphological and any structural alterations (4).

Fig. 1 – Human embryo liver (E. M. survey – U. S. treatment for 10'). Normal liver cells; normal erythropoietic cells at different stages of maturation.

Evaluation of US action upon human embryos was performed by investigating liver parenchyma.

Prelimanary results obtained from controls and from embryos exposed to US for 10' before induction of abortion do not show morphological and structural changes in liver cells (Fig. 1).

Discussion – Our preliminary experiments show that the results obtained with animals cannot be immediately extrapolated to humans and particularly to embryos.

Although further investigation is indispensable to clarify the mechanism of action of US waves, it is quite likely that tissue damage is probably caused by physico-chemical factors involving cell structure and function (16, 17, 18, 19).

Biological damage due to US is practically determined by haet production, by mechanical action (microstreaming) and by chemical factors (formation of free radicals) and is proportional to the duration of exposure.

The possible formation of cavities within tissue still raises a number of problems.

Since a definitive interpretation of results is still lacking, ultrasound examination should be carried out cautiously and carefully, only if clinically justified and technically optimized.

Sažetak

IZLAGANJE ULTRAZVUKU U MEDICINSKOJ DIJAGNOSTICI:
EKSPERIMENTALNO ISTRAŽIVANJE

Da bi se ustanovili mogući biološki efekti, pokusne su životinje bile izlagane povećanim dozama ultrazvuka. Elektronski mikroskop, hemokemijske i histoenzimatske studije su nakon toga bile provedene na odraslim štakorima i zamecima štakora. Rezultati su pokazali pojavljivanje citolize jetre proporcionalno vremenu izlaganja zračenju. Pokazalo se da je citoliza u vezi sa inkorporiranim H3-thymidinom i kinetikom enzyma. Kliničko-kinetička istraživanja na čovjeku su u toku, a imaju za cilj otkrivanje mogućih posljedica na stanicama jetre ljudskog embrija.

References

1. A. I. U. M. Bioeffects considerations for the safety of diagnostic ultrasound. J of Ultrasound in Med. 1988; 7: no. 9.

2. Carson P L, Fischella P R, Oughton T V. Ultrasonic power and intensities produced by diagnostic ultrasound equipment. Ultrasound Med Biol 1978; 3:341.

3. Cardinale A E, Lagalla R, De Maria M and Coll. Biologic Effects of ultrasound on liver cells of rat embryos. Acta Radiol 1987; 28:221-3.

4. Cardinale A E, Lagalla R, De Maria M and Coll. Biological effects of ultrasounds. An experimental contribution on liver and ovaries. Ital Curr Radiol 1984; 2:115.

5. Laconi A, Cardinale A, Lagalla R, Valentino B. La interazione degli ultrasuoni con i tessuti biologici. Moderne prospettive in radiologia. Valutazioni sperimentali degli effetti biologici conseguenti all'impiego diagnostico di radiazioni non ionizzanti di tipo ultrasonico. Atti 31 Congresso Nazionale S.I.R.M.N., Monduzzi Edit., Bologna, 1984.

6. Cardinale A, Lagalla R, De Maria M, Valentino B, Laconi A. Ricerche sperimentali su ecodiagnostica e possibili effetti biologici: analisi ultrastrutturale su embrione di ratto. Radiol Med 1985; 71:505-6.

7. Waldenstrom V, Axelsson O, Nilsson S and Coll. Effects of routine one-stage ultrasound screening in pregnancy: a randomised controlled trial. Lancet 1989; 8€11:585.

8. Waldenstrom U, Nilsson S, Fall O, Axelsson O, Eklund G, Lindeberg S. Effetti dello screening ecografico di routine in gravidanza: uno studio randomizzato controllato. Lancet (Italian edition) 1989; 2:64-7.

9. Persson P H, Kullander S. Long term experience of general ultrasound screening in pregnancy. Am J Obstet Gynecol 1983; 146:942-7.

10. Eiknes S H, Okland O, Aure J C, Ulstein M. Ultrasound screening in pregnancy: a randomized controlled trial. Lancet 1984; 1:1347.

11. Torbit C A, Groth D G, Edmonds P D. Mitochondrial changes resulting from ultrasound irradiation. In: Ultrasound in Medicine. Edited by White D N, Brown R E. Plenum Press, New York, 1978.

12. Trump B, Golblatt P J, Stowell R E. Studies on necrosis of mouse liver in vitro. Ultrastructural alterations in the mitochondria of hepatic parenchyma cells. Lab. Invest 1978; 14:343.

13. Cardinale A, De Maria M, De Simone G F, Grisafi D, Lagalla R, Palma A, Valentino B. Possibili effetti biologici degli ultrasuoni, impiegati a scopo diagnostico sul parenchima epatico di ratto. Modificazioni morfologiche e ultrastrutturali e ricerche sperimentali su eventuali modificazioni di parametri bioumorali. Min Med 1983; 74:45-50.

14. Cardinale A, De Maria M, De Simone G F, Lagalla R, Grisafi D, Palazzoadriano M. Effetti biologici degli ultrasuoni impiegati a scopo diagnostico. Ricerche sperimentali sull'incorporazione Min. Med. 1982; 73:3475-6.

15. Cardinale A, Lagalla R, Tessitore V. Biological effects of ultrasound (U. S.) employment for diagnostic purposes: histochemical investigation on rat liver enzymes. Radiol. Iugosl. 1988; 22:2.

16. Edmonds P D, Sancier k M. Evidence for free radical production by ultrasonic cavitation in biological media. Ultrasound Med Biol 1983; 6:635.

17. Hredziza I. Changes in cells ultrastructure under direct action of ultrasound. High Energy Ultrasound. 1970; 59:457.

18. Nyborg W. L. and Steele R. B. Temperature elevation in a beam of ultrasound. Ultrasound Med Biol 1983; 6:611.

19. Stephens R J, Hart C P, Torbit C A, Edmonds P D. Reproducible subcellular alterations in hepatocytes resulting from ultrasound. Ultrasound Med Biol 1980; 6:239.

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ROC COMPARISON OF INTRAOPERATIVE ULTRASOUND PROBES

Boko H

Abstract – Imaging objectivity of both extracorporal and intraoperative ultrasonic probes was measured by means of ROC analysis. The results have shown significantly higher precision of intraoperative probe.

UDC: 617-089:534-8

Key words: ultrasonic diagnoses, intraoperatic period

Profess paper

Radiol Iugosl 1990; 24:405-7

Introduction – Recent development of intraoperative sonography is due to technological solutions that enable constant visualisation of the position of biological structures during operation. Until recently, the position of a lesion was determined only approximately. The achieved level of miniaturisation also enables constant application in vivo.

In a previous paper of the same author (1) borderline resolution of intraoperative ultrasound probes was researched. By researching actual effects of resolutions in medical practice, this paper is a continuation of the previous one. Abilities of a researcher to recognize biologic structures using intraoperative and extracorporal probe respectively, placed close to a biologic structure, have been statistically compared.

Material and methods – As examination material we used two ultrasonic probes of the same manufacturer (CGR Thomson) and of similar technologic characteristics: linear extracorporal, frequency 3.5 MHz, and intraoperative linear, frequency 7.5 MHz. As a biologic material, fresh hepatocelular carcinoma placed into the liver of a pig was used.

The characteristics that two hepatocellular carcinomas be differentiated as two separate samples was tested in an experiment.

The results were statistically analysed using ROC analysis (receiving operating characteristics) (2, 3), which gives coresponding sensitivity of a method for all the specific values of a biomedical treatment.

The results showing it was possible to differentiate biologic structures put apart up to 3 mm (1) were taken as a starting point of the experiment. This stage of the experiment was repeated so that the samples of hepatocelular carcinoma were pur apart laterally up to 2 mm, the pig's liver and luke warm water respectively simulating human intracorporal biologic structures. In this way a common linear ultrasonic probe was placed about 8 cm from the »lesion«, while intraoperative probe was placed only 1 cm from the structure.

The task of researchers, experienced in the field of ultrasonography, was to give their jud-

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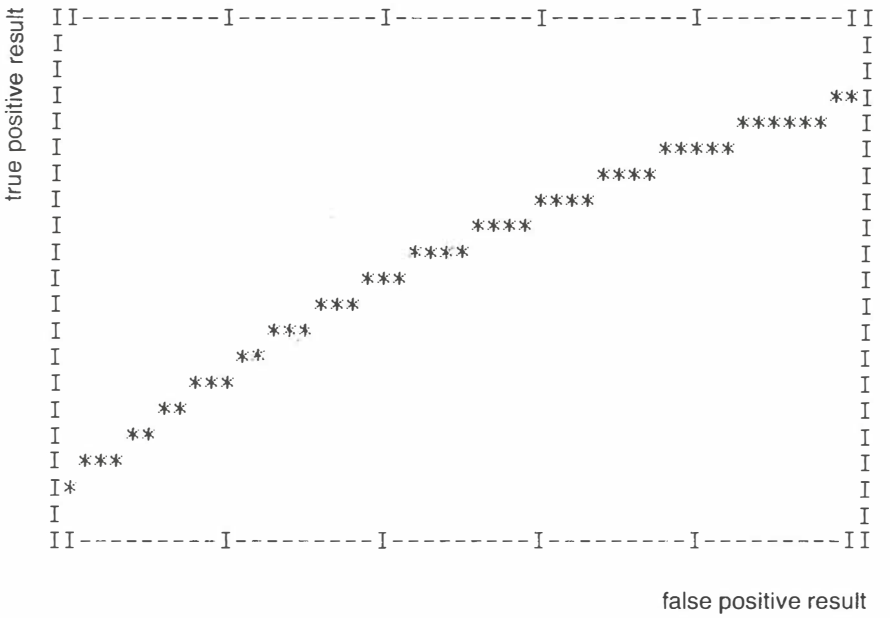
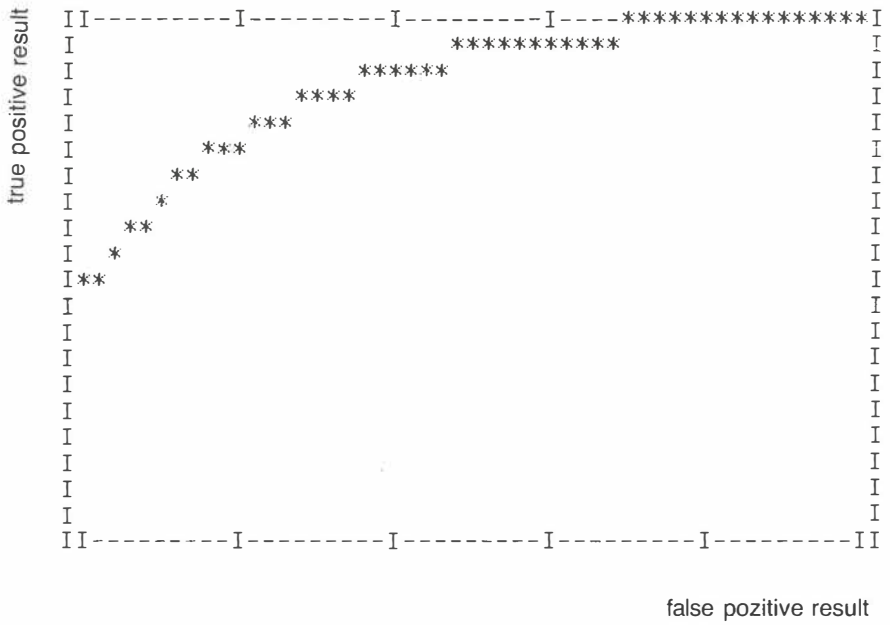


Graph 1 – ROC curve of extracorporal ultrasonographic probe



Graph 2 – ROC curve of intraoperative ultrasonographic probe

gment of a structure whose position and structure they did not know, and to categorize it in one of the following categories relevant for ROC analysis:

- I do not see biological structure
- I see biological structure very vaguely
- I see a compact biological structure
- I see a compact biological structure which seems to be separated into two sections
- I see two biological structures clearly

Results – None of the 17 researchers, using extracorporeal probe, has chosen the highest category (I can clearly see two biological structures). Ten of the researchers noticed a »lesion«, but only four (23%) of them remarked that the structure »might not have been a compact one«. As many as seven (41%) examiners have not noticed a particular biologic structure at all.

On the contrary, using on intraoperative probe, all the examiners (100%) have, with certainty, noticed the biologic structure, while 13 of them (76%) have also noticed possible non-homogeneity of the lesion. Nine of 17 examiners have registered and exactly identified biologic structure as a double one.

Conclusion – Comparative representation of the ROC curves obtained for extracorporal and intraoperative probe respectively, are shown in graph 1 and 2. As the ROC analysis gives simoultaneous presentation of the sensitivity and specificity of a method tested, ultrasonic probes in our case provided considerably favourable performance of the intraoperative probe.

References :

1. Boko H, Drinković I, Kos N, Vidaković Z. Rezolucija intraoperativnih ultrazvučnih sondi. Radiol Iugosl 1989; 22(4):365-7.
2. Metz C E. Basic Principles of ROC Analysis, Seminars in Nuclear Medicine 1978; VIII(4):282-98.
3. Swets J A. ROC Analysis Applied to the Evaluation of Medical Imaging Techniques, Investigative Radiology 1979; 14:109-21.

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- **zdravilo izbire za bolnike s Zollinger-Ellisonovim sindromom**

Indikacije

Duodenalni ulkus, želodčni ulkus, refluksni ezofagitis, Zollinger-Ellisonov sindrom.

Doziranje

Duodenalni ulkus

1 kapsula (20 mg) Ultopa 1-krat dnevno pred zajtrkom; če ulkus ne zaceli v 2 tednih, zdravljenje podaljšamo še za 2 tedna.

Želodčni ulkus in refluksni ezofagitis

1 kapsula (20 mg) Ultopa 1-krat dnevno pred zajtrkom 4 tedne; če ulkus ne zaceli, zdravljenje podaljšamo še za 4 tedne.

Bolnikom, ki ne reagirajo na druga zdravila, priporočamo 40 mg (2 kapsuli Ultopa) na dan, 4 tedne pri duodenalnem ulkusu, oz. 8 tednov pri želodčnem ulkusu ali refluksnem ezofagitisu.

Zollinger-Ellisonov sindrom

Priporočamo začetno dozo 60 mg (3 kapsule Ultopa) dnevno. Nadaljnje doziranje je individualno, zdravljenje pa traja, dokler je indicirano. Če je dnevna doza višja od 80 mg, jo razdelimo v dve posamezni dozi.

Kontraindikacije
Niso znane.

Oprema
14 kapsul po 20 mg

Podrobnejše informacije in literaturo dobite pri proizvajalcu.

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NEW CATHETER SET FOR US–GUIDED PROCEDURES

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Abstract – A large number of catheters is used for US guided drainages, different in their construction and for different purposes. Small lumen catheters enable better US visualisation and are less traumatic. For US guided drainages a new universal type of catheter has been constructed, very suitable because of simple positioning, good visualisation, and very helpful in bringing a procedure to a successful end.

UDC: 617-089.48:534-8

Key words: drainage, ultrasonic diagnoses, catheters

Orig sci paper

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Introduction – Today a large number of different types of catheters for US guided drainages and therapeutic interventions is offered by different manufacturers. Specific catheters have been developed for the drainage of different organs, systems and contents too.

Depending on their type and manufacturer, the catheters are placed by Seldinger or modified Seldinger technique, as well as by trocar technique, all under US guidance. However the most simple for US guidance is the last one.

On the other hand, despite of constant visualisation of the needle tip in US guided drainages, very often we encounter problems of localisation of both the needle tip and the catheter, especially in performing punctures of small collections or puncturing narrow channel systems or ducts. Not seldom is US used for initial puncture only, while the intervention is continued under radiologic guidance. Depending on the collection or systems which are to be drained, catheters of various lumens, ranging from 4 F to 14 F are used. However, under US guidance wider catheters may present a problem because of difficulties in using a guide wire and dilatators.

For our everyday practice, we tried to construct a catheter set which is easier to manipulate, smaller in lumen and therefore less traumatic while passing through other structures (intestineum), and whose tip has better visualisation. Its price was also an important factor.

Material and methods – The drainage set consists of a needle with stiffening cannula and a pigtail catheter made of poliurethane, with a stopcock mechanism, making it thus possible to connect either a container bag or suitable for more often used negative pressure. As a catheter guidance, we used a needle 19.5 G wide, with a stiffening cannula. For the purpose of better visualisation of the needle tip we used an MS cut needle. A catheter 27.5 cm long with a perforated pigtail 1.5 cm wide and 4.5 cm long is drawn on the needle. The catheter is placed by trocar technique with previous incision and anasthesia.

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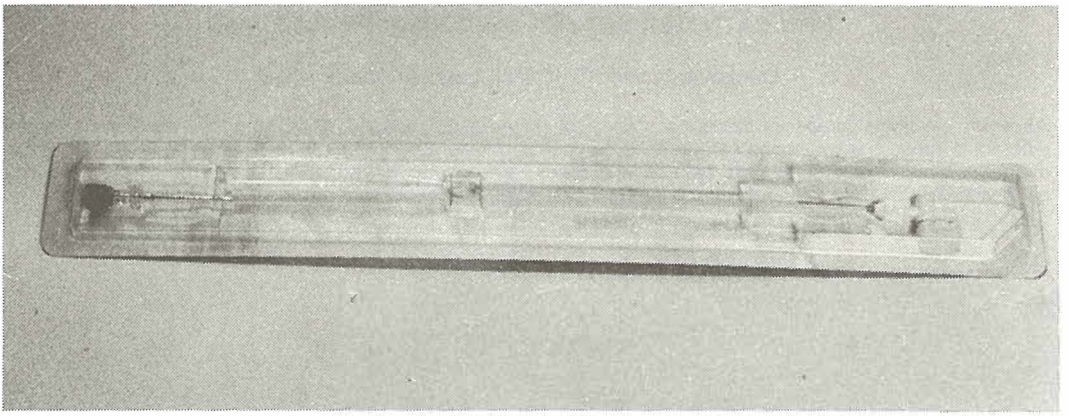

Fig. 1 – 5F catheter set, produced by ANGIOMED code name: ASKS 5, by Dr. Drinkovic

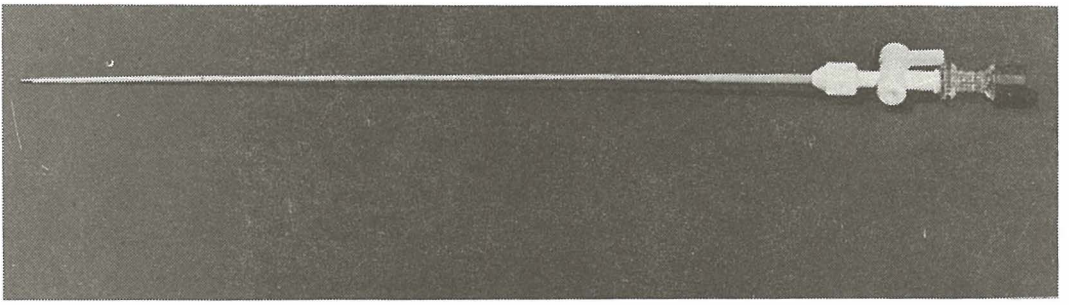

Fig. 2 – Pigtail catheter with a needle, ready for use

Its width enables us to perform a puncture through the guider, thus making the intervention easier as well as more accurate, i. e. makes it applicable in cases of very small collections or dilated ducts. The catheter is made by Angiomed and is available under the code ASKS 5 (Fig. 1, 2). The application of the set is very simple. The unnecessary manipulation with guider or dilators is avoided, because after performing the US guided puncture and setting the needle tip in the wanted structure, the catheter is pushed forward along the needle, and after a few centimetres the needle is simultaneously pulled out. Using this technique 61 drainages of various abdominal collections, gallbladder and bile ducts, as well as widened renal channel system and pericardial effusion were performed on the in-patients.

Results – Testing the set in vitro proved that its width is sufficient for the aspiration of thick contents, and that the visualisation of the needle, compared to other sets, is improved from 10% to 15%. The catheter does not change its characteristics in absolute alcohol nor in detergent solutions. By applying the catheter in vivo 61 puncture of collections and channel systems were performed, plus six outer drainages of pancreatic pseudocysts. On 30 patients alcoholic sclerosation of renal cysta was carried out. In five patients liver abscesses have been drained succesfully, while in four patients we performed drainages of intestinal abscesses. Two cholecystic drainages and three drainages of peripheric dilated bile ducts were accomplished, as well as 11 urgent nephrosthomas. In one case we carried out the drainage of pericardial effussion.

The needle tip was visualised in 94% of patients, while in 6% the visualisation was insufficient or impossible. The average duration of drainage was from 15 min to 30 days.

Discussion – US drainage of abdominal collections and dilated channel systems is a safe diagnostic and therapeutic method, due to real time sonography characterized by high accuracy and effectiveness. However, due to well known problems of visualisation of the needle tip and

catheter, especially dilators and guide wires, US is often used for the initial opacificative puncture only.

Using the small lumen catheter, its manipulation is simplified, while its positioning remains identical to US guided puncture. Due to better visualisation of the needle tip we are able to apply the catheter to very small changes, collections, dilated ducts and channels.

Small lumen reduces the tissue trauma and shortens the time of intervention. Application of contrast media and exposure to radiation are excluded. A small lumen catheter also gives a patient more freedom for movement. It drains liquid as well as thick substances, except the purulent contents, which can be found out by previous US examination. Setting up the catheter and not succeding in sucking the contents should not be considered a failure, since by inserting the guide wire the intervention can be continued by applying a wider catheter. This catheter set enables a drainage of abdominal collections, of hydronephrotic renal changes, gallbladder and dilated bileducts, excluding the use of radiographic techniques.

It can also be used in the drainage of pericard effusion. Because of its characteristics, i. e. good visualisation of the needle tip, small lumen, good US guidance and simple application, the catheter is of the polivalent usage. However, small in lumen, it asks for more careful care.

Conclusions – The small lumen catheter for drainage and therapeutic interventions proved very useful in the drainages of various collections and substances. Quick application, small trauma and possibility of application by the guide needle alltogether increase the accuracy of the puncture.

Better viualisation of the needle tip make it applicable on biliar and pancreatic ducts as well as small hydronephrotic changes.

Sažetak

NOVI KATETER U UZ–VOĐENI DRENAŽI

Za ultrazvučno (UZ) vođene drenaže koristimo velik broj katetera, različitih po svojoj konstrukciji i za različite svrhe. Kateteri malog lumena omogućuju bolju vizualizaciju vrha igle i manje su traumatski. Za UZ vođenu drenažu konstruiran je novi univerzalni tip katetera, vrlo pogodan zbog lakog postavljanja, dobre vizualizacije, i vrlo koristan u privođenju zahvata uspješnom završetku.

References

1. Martin E C, Fankuchen E I, Neff R A. Percutaneous Drainage of Abscesses: A report of 100 Patients. Clin Radiol 1984; 35:9-11.
2. Tores W E, Evert M B, Baumgartner B R, Bernandino M E. Percutaneous Aspiration and Drainage of Pancreatic Pseudocysts. AJR 1986; 147:1007-9.
3. Newhouse J H, Pfister R C. Percutaneous Catheterisation of the Kidney and Perinephric Space: Trocar Technique. Urol Radiol 1981; 2:157-64.

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RENTGENSKA KONTRASTNA SREDSTVA:

HEXABRIX

— kontrastno sredstvo niskog osmoaliteta, smanjene toksičnosti i gotovo bezbolan u primeni.

INDIKACIJE:

Sva arteriografska ispitivanja, zatim cerebralna angiografija, i flebografija, kao i selektivna koronarografija.

PAKOVANJA:

Hexabrix amp. (5 amp. × 10 ml)
Hexabrix amp. (20 amp. × 20 ml)
Hexabrix boč. (2 boč. × 50 ml)
Hexabrix boč. (1 boč. × 100 ml)
Hexabrix inf. (1 boč. × 200 ml bez pribora za infuziju)

DIMER X ampule 5 × 5 ml

— kontrast za lumbosakralnu mielografiju

TELEBRIX

— kontrast za urografije, angiografije, periferne i selektivne arteriografije.

PAKOVANJA:

Telebrix 300 amp. (20 amp. × 30 ml sa špricom)
Telebrix 300 amp. (20 amp. × 30 ml bez šprica)
Telebrix 380 amp. (20 amp. × 30 ml sa špricom)
Telebrix 380 amp. (20 amp. × 30 ml bez šprica)
Telebrix 380 za inf. (2 boč. × 50 ml)
Telebrix 300 za inf. (2 boč. × 50 ml)
Telebrix 30 za inf. (1 boca × 100 ml)
Telebrix 45 za inf. (1 boca × 250 ml)

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ONKOLOŠKI INŠTITUT, LJUBLJANA

VLOGA SCINTIGRAFIJE S ^{57}Co–BLEOMYCINOM V ODKRIVANJU IN ZAMEJITVI PLANOCELULARNIH RAKOV

THE ROLE OF SCINTIGRAPHY WITH ^{57}Co–BLEOMYCIN IN THE DETECTION AND STAGING OF PLANOCELLULAR CARCINOMAS

Jančar B, Šuštaršič J, Mačkovšek M

Abstract – Opinions on usefullness of ^{57}Co-bleomycin in the diagnostics of planocellular carcinomas have been differing. This method was reported in early 70-ties, but was never generally accepted because of some physical characteristics of ^{57}Co (half-life of ^{57}Co 270 days).
The authors report two cases in which radiography and imaging with this agent helped to provide correct diagnosis: an unclear case of Pancoast tumor and a case of metastatic involvement of thoracic wall after laryngeal carcinoma.

UDC: 616-006.6:539.163

Key words: carcinoma planocellular-redionuclide imaging, cobalt radioisotopes, bleomyicin

Case report

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Uvod – Bleomycin je antibiotik s citostatičnim delovanjem, ki se uporablja v kemoterapiji planocelularnih rakov. Označen z različnimi radionuklidi (^{131}J, ^{111}In, ^{57}Co), se normalno akumulira v ledvicah, jetrih in hrustančnih delih, bistvena lastnost pa je akumulacija v planocelularnih rakih. Bleomycin, označen s ^{57}Co, je v primerjavi z ostalimi radionuklidi najstabilnejši in kaže največjo tumorsko specifičnost, zato so ga pričeli klinično uporabljati že v zgodnjih sedemdesetih letih (1). Zaradi dolge fizikalne razpolovne dobe ^{57}Co (T/2 je 270 dni) in visoke absorbirane radiacijske doze ter nespecifičnega kopičenja tudi v vnetno spremenjenih tkivih, ni nikoli prišel v širšo uporabo.

V našem članku prikazujemo dva bolnika, pri katerih smo s pomočjo rentgenskih preiskav in kasnojše scintigrafije s ^{57}Co-Bleomycinom uspješno diagnosticirali Pancoast tumor pljuč in razširjenost metastatskega procesa pri raku grla.

Prikaz bolnikov – Prvi bolnik – 82-letni bolnik je prišel na pregled zaradi povečane prostate in štiri do pet mesecev trajajočin bolečin v desnem ramenskem sklepu.

Klinični pregled je pokazal močno palpatorno občutljivost desne lopatice ter zgornjega dela prsnega koša desno. Prostata je bila zmerno difuzno povečana.

Laboratorijske preiskave so pokazale povišano sedimentacijo (51 mm/h) ter povišano koncentracijo karcinoembrionalnega antigena v serumu (CEA 21 ng/ml, normala je 2,5 ng/ml) in v urinu 50 ng/ml (normala je 2,5 ng/ml).

Ostali hematološki in biokemični izvidi so bili v mejah normale. Citološka preiskava povečane prostate ni pokazala rakavih celic. Na rentgenogramih pljuč so bile vidne obsežne spremembe po preboleli tuberkulozi in zadebeljena apikalna plevra desno.

V desnih rebrih in desni lopatici so bile prisotne zmerne spremembe v smislu strukturne atrofije, brez rentgenskih znakov metastaz. V vratni hrbtenici so bile vidne izrazite degenerativno-involutivne spremembe; tudi tu metastaz ni bilo videti.

Naredili smo scintigrafijo skeleta s ^{99m}Tc, ki je pokazala le zmerno povišano kopičenje izotopa v prvem in drugem rebru desno zadaj.

Bolnik je bil zdravljen z analgetiki, fizioterapijo in blokadami brahialnega pleksusa, brez večjega uspeha.

Pet mesecev po prvem pregledu so bile bolečine v desnem ramenskem sklepu močnejše,

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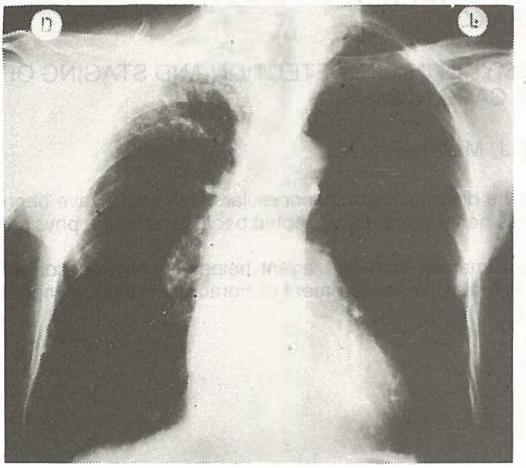
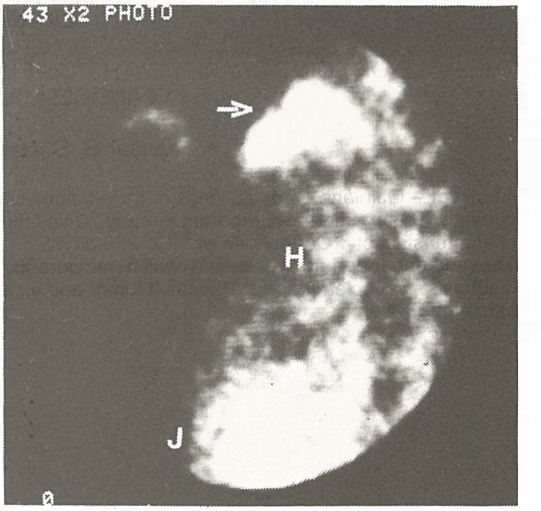


Slika 1 – Rentgenogram pljuč pokaže obsežne fibrozne post-tuberkulozne spremembe v obeh hilusih in v zgornjem delu desnega pljučnega krila, ki prekrivajo primarni tumor.

Fig. 1 – Radiograph of the lungs showing widespread post-tuberculotic fibrous changes in both hiluses and in the upper part of the right lung, obscuring the primary tumor.



Slika 2 – Scintigram s 57 Co-Bleomycinom (lmCi oz. 37 MBq, 24 h p.i.) desne strani prsnega koša kaže poleg fiziološkega kopičenja v hrustancih (H), jetrih (J), patološko kopičenje v zgornjem delu prsnega koša desno (puščica), (kamera gamma General Electric WFOV, računalnik Star, čas zbiranja 1000 sekund).

Fig. 2 – Scintigram with 57 Co-Bleomycin (lmCi – 37 MBq, 24 h p.i.); anterior view of the right thoracic region showing normal accumulation in cartilages (H) and liver (J), and an abnormal one in the upper part of the right lung (arrow), (General Electric WFOV camera, Star Computer, acquisition time 1000 sec).

desna očesna reža je postala širša, vrednosti CEA v serumu so se povišale na 24,3 ng/ml. povišana je bila tudi sedimentacija (70 mm/h). V levi nadlehti se je pojavila zatrdlina premera dveh centimetrov, v kateri je citološka preiskava pokazala metastazo slabo diferenciranega planocelularnega raka. Tudi citološka analiza sputuma je odkrila celice enakega raka.

Ponovni rentgenogram pljuč je še vedno kazal le obsežne fibrozne spremembe in zadebeljeno apikalno plevro desno (slika 1).

Glede na citološki izvid smo se odločili za scintigrafijo s ^{57}Co-bleomycinom. Bolniku smo intravenozno aplicirali lmC (37 MBq) ^{57}Co-bleomycina in po 24 urah na gamma kameri posneli scintigram, ki je pokazal jasno patološko kopičenje v zatrdlini leve nadlehti in v zgornjem delu desne strani prsnega koša, kar je topografsko ustrezalo zadebelitvi plevre na rentgenogramu (sliki 2 in 3).

Ponovno slikanje desnih reber je tokrat pokazalo začetno osteolitično destrukcijo srednjega dela drugega rebra.

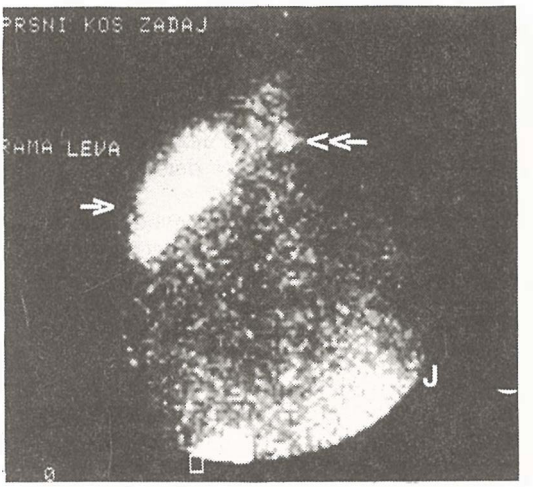
Na osnovi teh preiskav smo postavili diagnozo Pancoast tumorja.

Po obsevanju primarnega tumorja so se bolečine v desnem ramenskem sklepu bistveno zmanjšale; nastopila je delna remineralizacija osteolitične destrukcije v drugem rebru.

Drugi bolnik: 58-letni bolnik je bil leta 1986 operiran zaradi epidermoidnega raka grla ($T_1N_oM_o$). Dve leti kasneje so pri bolniku rentgenološko našli metastazo v prvem rebru levo. Novembra istega leta so prizadeto rebro operativno odstranili, vendar so med operacijo našli še metastatsko prizadetost sprednjega dela drugega rebra, leve polovice manubriuma sterni in medialnega dela ključnice. Vsa prizadeta mesta so operativno odstranili.

Histološki izvid je potrdi metastatično prizadetost odstranjenega tkiva (metastatski planocelularni rak).

Meseca decembra je bil prizadeti del prsnega koša obsevan. Dva meseca po zaključenem obsevanju so se pri bolniku pojavile bolečine vzdož prsne hrbtenice in leve strani prsnega koša. Rentgenogrami pljuč, levih reber in prsne hrbtenice so pokazali spremembe po operativ-



Slika 3 – Scintigram s 57 Co-Bleomycinom (37 MBq, 24 h p. i.) prsnega koša zadaj kaže poleg fiziološkega kopičenja v jetrih (J) patološko kopičenje v dveh metastazah v gornjem delu prsnega koša levo (enojna puščica) in desno (dvojna puščica), (kamera gama General Electric WFOV, računalnik Star, čas zbiranja 1000 sekund).

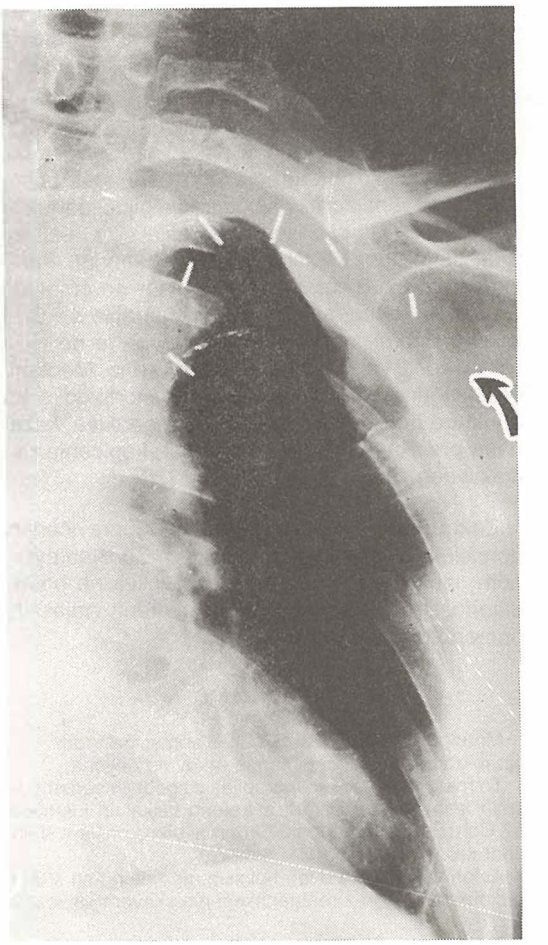
Fig. 3 – Scintigram with 57 Co-Bleomycin (37 MBq, 24 h p. i.), posterior thoracic view showing normal accumulation in the liver (J) and an abnormal one in two metastases of the carcinoma in the upper thoracic region left (arrow) and on the right side (double arrow), (General Electric WFOV camera, Star Computer, acquisition time 1000 sec).

nem posegu, osteolitične defekte v ostanku drugega rebra in v zadnjem delu tretjega rebra. Zasumili smo, da ti defekti niso posledica operativnega posega, temveč da predstavljajo ponovitev metastatskega procesa (slika 4). Scintigrafija s ^{57}Co-bleomycinom (ImC oz. 37 MBq) je na istem mestu pokazala obsežno patološko kopičenje.

Po dodatnem obsevanju so bolečine popustile, kar je spet potrdilo, da je rezultat scintigrafije s ^{57}Co-bleomycinom pravilen.

Diskusija – Mnenja o uporabnosti scintigrafije s ^{57}Co-Bleomycinom so še vedno deljena. Frederiksen in sodelavci 62) menijo, da s to preiskavo lahko v večini primerov prikažemo primarni pljučni tumor in često tudi metastaze planocelularnih rakov v prsnem košu, medtem ko Georgy (3) trdi, da tovrstna scintigrafija v sodobni diagnostiki ni več potrebna.

V odgovoru k našemu prejšnjemu poročilu (4) Georgi (5) ugotavlja, da v naše poročilo o bolniku



Slika 4 – Rentgenogram levega hemitoraksa po resekciji 1. in dela 2. rebra in medialnega dela ključnice. Puščica kaže destrukcijo zadnjega dela 3. rebra.

Fig. 4 – Radiograph of the left hemithorax after resection of the first and part of the second rib and medial part of the clavicula. The arrow points to a large destruction of dorsal part of the 3rd rib.

nismo vključili rezultate CT-ja in standardne rentgenske tomografije ter dodaja lastne izsledke, po katerih je gornja preiskava sicer potrdila tumor pri vseh 33 bolnikih z rakom bronhusa, vendar ni dala dodatnih klinično pomembnih diagnostičnih informacij poleg rezultatov konvencionalne rentgenske tomografije in CT-ja (6). Njegovi rezultati se skladajo tudi z izsledki Frederiksena in sodelavcem (2), ki je s ^{57}Co-Bleomycinom potrdil tumor pljuč pri 22 od 25 bolnikov, vendar pa ni uspel prikazati metastaz (v bezgavkah) v enaki

meri kod je tumor. Kljub temu Frederiksen in sodelavci menijo, da se lahko s to preiskavo velikokrat izognemo nepotrebni torakotomiji (2)

Lorenz in sodelavci (7) omenjajo poleg obveznih preiskav za zamejitev raka bronhusa še nekatere nuklearnomedicinske preiskave, ki lahko dopolnijo informacijo o razširjenosti bolezni. To so ventilacijska scintigrafija pljuč, perfuzijska scintigrafija pljuč in scintigrafija s ^{67}Ga-citratom, ki se tudi kopiči v pljučnih tumorjih. Preiskave s ^{57}Co-Bleomycinom ta avtor ne omenja. Čeprav je večina avtorjev do scintigrafije s ^{57}Co-Bleomycinom prej kritična kot ne, pa je ne moremo izločiti kot popolnoma nepotrebno. Medtem ko rentgenske preiskave kažejo morfologijo in strukturo bolezensko spremenjenega tkiva, kaže naša preiskava biološko aktivnost: kopičenje radiaktivnega sledilca v tumorju.

Zaključek – Menimo, da kljub upravičenim pomislekom proti scintigrafiji s ^{57}Co-Bleomycinom, lahko ta metoda odločilno vpliva na potek diagnostike in zdravljenja v nekaterih nejasnih primerih planocelularnega raka.

Povzetek

Mnenja o uporabnosti 57 Co-Bleomycina v odkrivanju in zamejitvi planocelularnih rakov so deljena.

To metodo so pričeli uporabljati v zgodnjih sedemdesetih letih, vendar zaradi nekaterih fizikalnih lastnosti 57 Co (razpolovna doba 270 dni) ni nikoli prišla v širšo uporabo.

Avtorji poročajo o dveh bolnikih, pri katerih so s tem radiofarmakom in z rentgenskimi preiskavami uspešno razrešili nejasen primer Pancoast tumorja pljuč in določili obseg metastatske prizadetosti torakalne stene pri primarnem raku grla.

Literatura

1. Grove RB et al. Clinical evaluation of radiolabelled bleomycin for tumor detection. J Nucl Med 1974; 15:386.

2. Frederiksen PB et al. ^{57}Co-Bleomycin scintigraphy for the preoperative detection and staging of lung tumors. Nucl Med 1988; 27:79-82.

3. Georgy P. Maligne Tumoren. In: Bull U Hor G Hsgb. Klinische Nuklearmedizin. Weiheim: Edition Medizin VCH 1 1987:229.

4. Šuštaršič J, Jančar B, Mačkovšek M, Erjavec M, Movrin T. ^{57}Co-Bleomycin Scintigraphy for the Preoperative Detection and Staging of Lung Tumors. Nucl Med 1989; 28:160-1.

5. Georgi P. Leserbrief-Letter to the Editor. Bettrifft: ^{57}Co-Bleomycin Scintigraphy for the detection and Staging of Lung Tumors. Nucl Med 1989; 28:162.

6. Georgi P, Schaaf J, Vogt-Moykopf I, Loehlein A, Sinn H. Zur Frage der klinischen Relevanz der ^{111}In-Bleomycin-Szintigraphie bei intrathorakalen Erkrankungen. Strahlentherapie 1979; 155:622-7.

7. Lorenz J, H Jakob, R Ferlinz. Das Bronchial-karzinom – eine zunehmende Herausforderung in Klinik und Praxis. Therapiewoche 1989; 39:1368-78.

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THE USE OF MCA AND CEA IN PROSTATIC CANCER FOLLOW UP

Novaković S, Marolt F, Serša G

Abstract – Immunodiagnosis in oncology is based on the detection of tumor products in body fluids such as serum, urine, pleural fluid and peritoneal fluid. The products specific for some tumors are called tumor markers. The aim of the present study was to establish possible relationship between urine and serum concentrations of MCA and CEA tumor markers and prostatic cancer spread. Compared to healthy donor values, urine MCA levels were highly elevated in some prostatic cancer patients with progressed disease, whereas serum MCA levels in these patients were moderately elevated; this finding might contribute to a better understanding of the information on urine MCA values. In contrast, the urine CEA concentrations were not elevated above the cut-off limit whereas the serum CEA concentrations were moderately elevated; this finding might contribute to a better understanding of the information on urine MCA values. In contrast, the urine CEA concentrations were not elevated above the cut-off limit, whereas the serum CEA concentrations were elevated in patients with bone metastases. MCA and CEA in both urine and serum have not proved sufficiently specific for follow up of prostatic cancer. Nevertheless, MCA in urine proved somewhat more useful in this respect, whereas CEA in serum was found to be more effective for follow-up prostatic cancer patients with bone metastases.

UDC: 616.65-006.6-097

Key words: prostatic neoplasms, carcinoembryonic antigen, tunar markers biological

Orig. sci paper

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Introduction – Mucin-like carcinoma associated antigen (MCA) is a glycoprotein with molecular mass of 350 000 daltons, recently described by Stahli et al. (1, 2). It is produced also by some cells of normal healthy tissue, such as ductal epithelium of the breast, renal epithelium, prostatic epithelium and apithelium of the endometrium (3). Increased MCA serum concentrations were found in epithelial carcinomas, most frequently in mucinous carcinoma of the breast (4, 5).

Murine monoclonal antibodies B-12 against MCA antigen have been proved to react also with carcinomatous tissue of the prostate. The reaction between b-12 monoclonal antibodies and MCA antigen determinant was found to be present in 10 of 11 prostatic adenocarcinomas (3).

Our preliminary study was therefore aimed to establish the MCA and CEA urine and serum concentrations in patients with prostatic carcinoma, in relation with spread of the disease, and compare the obtained values with those in the control group of healthy males.

Material and methods – In the present investigation 18 patients with prostatic carcinoma (serum and 24-hour urine samples) were included. The patients were distributed by stage of disease as follows:

a) Eight patients with the diagnosis of prostatic carcinoma, but without present evidence of disease (NED); these were either the patients with completed treatment (n=5), or treatment under way (n=3), their age ranging between 54-81 years.

b) Ten patients with the diagnosis of prostatic carcinoma, and evidence of progressive disease (PD). On sample taking, 3 of these patients with advanced primary disease and skeletal metastases were without therapy, whereas 2 were receiving hormonal therapy. The remaining 5 patients in this group had progression in the bones and were receiving treatment with antiandrogen agent (cyproteronacetat). The age of patients in this group ranged between 60 and 83 years.

Controls – The first control group (CG) comprised urine samples of 34 healthy Sanford-negative males; their age ranged from 40-82 years.

The second control group consisted of serum samples collected in 15 healthy male blood donors aged 28-60 years.

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Methods : Mucin-like carcinoma – associated antigen levels were measured using MCA EIA »Roche« kits. The method is a two-step phase enzyme immunoassay based on the sandwich principle (6). The monoclonal antibody used was a highly specific murine monoclonal antibody b-12 (MAb b-12) to MCA.

For carcinoembryonic antigen determination in the urine serum samples the CEA EIA Dumob 60 »Roche« kits were used. This is a solid phase enzyme immunoassay based on the sandwich principle using highly specific murine monoclonal antibodies to CEA (7).

Statistical evaluation : From the obtained data, arithmetic mean (AM), standard deviation (SD), standard error (SE), median value (M) and cut-off value were calculated (4).

Results: Control groups with MCA urine and serum concentrations and CEA urine concentrations are presented in Table 1 and Figures 1-2.

Arithmetic mean (AM) of MCA urine concentrations in the control group was 97.9 U/ml (SD = 82.0 U/ml), whereas AM of MCA serum concentrations in the control was 9.4 U/ml (SD = 4.0 U/ml).

The cut-off value of MCA serum concentration was 17 U/ml (4). The cut-off value of MCA tumor marker in the urine was determined as well and was found to be 180 U/ml (Fig. 1).

AM of CEA urine concentrations in the control group was 6.1 ng/ml (SD = 10.3 ng/ml), whereas the calculated cut-off value of CEA urine concentrations was 17 ng/ml (Fig. 2).

Data of Hoffman la-Roche company were used as a control group for CEA tumor marker in the serum (cut-off level was 2.5 ng/ml) (7).

Patients : In patients with no evidence of disease, presented in Table 2, AM of MCA urine concentrations was 74.8 U/ml (SD = 50.8 U/ml) (Fig. 1), whereas the AM of MCA serum concentrations was 10.7 U/ml (SD = 4.2 U/ml).

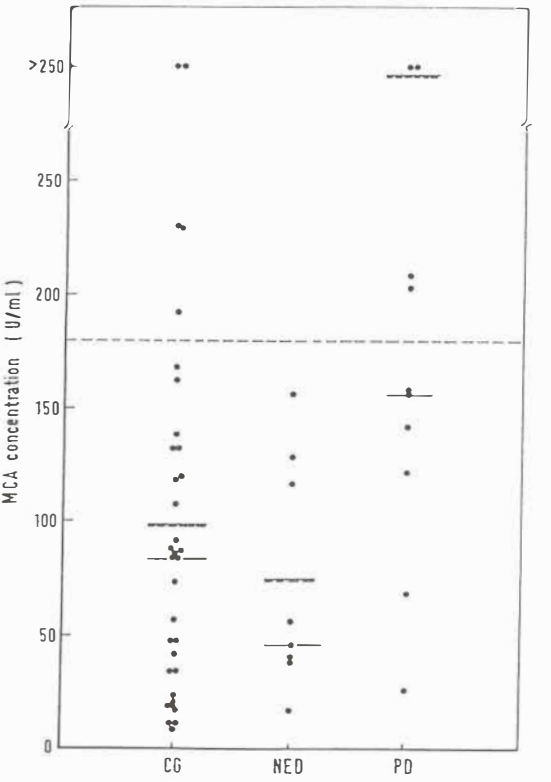

Fig. 1 – MCA levels in urine samples of control group (CG), prostatic cancer patients with no evidence of disease (NED), and prostatic cancer patients with progressive disease (PD).

cut-off level
median value
arithmetic mean

Table 1 – Urine and serum levels of MCA and urine levels of CEA in normal (males) healthly donors (CG)

TUMOR MARKER	No. of cases	MCA and CEA levels				
		AM	SD	SE	Median	Min – Max
MCA – Urine+ (U/ml)	34	97,9	82,0	14,0	84,5	9,8 – 334,6
MCA – Serum (U/ml)	15	9,4	4,0	1,0	10,1	1,4 – 15,1
CEA – Urine+ (ng/ml)	34	6,1	10,3	1,8	2,2	0,1 – 49,0

+ Urine samples were Sanford negative

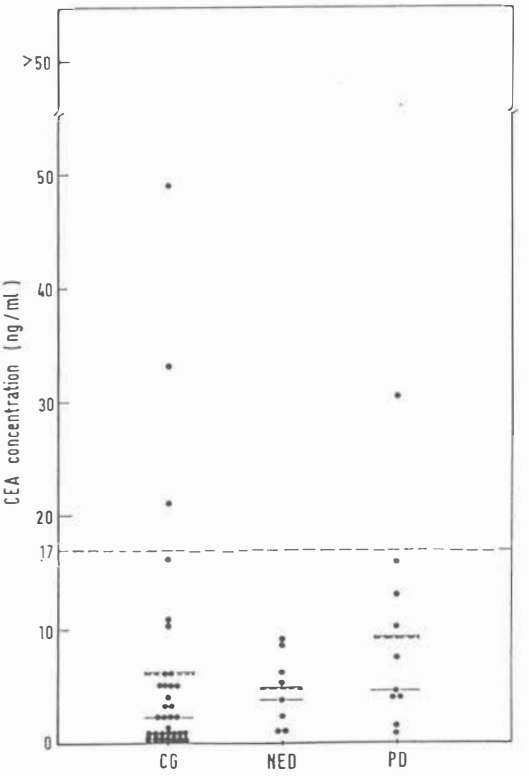

Fig. 2 – CEA levels in urine samples of control group (CG), prostatic cancer patients with no evidence of disease (NED), and prostatic cancer patients with progressive disease (PD).

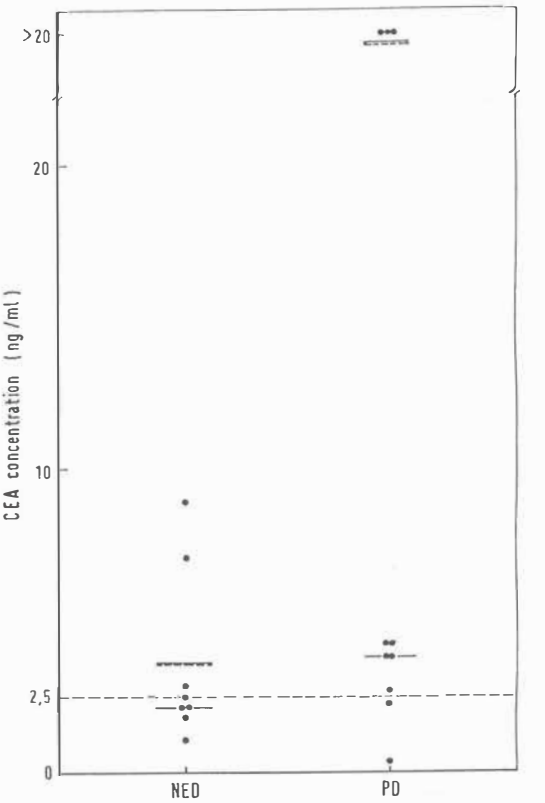

Fig. 3 – CEA levels om serum samples of prostatic cancer patients with no evidence of disease (NED), and prostatic cancer patients with progressive disease (PD).

cut-off level
median value
arithmetic mean

AM of CEA urine concentrations in NED patients was 4.8 ng/ml (SD = 3.2 ng/ml) (Fig. 2) and AM of CEA serum concentrations 3.5 ng/ml (SD = 2.7 ng/ml) respectively (Fig. 3).

Basic characteristics of patients with progressed disease are presented in Table 3. AM of MCA urine concentrations was 385.2 U/ml (SD = 570 U/ml) (Fig. 1) and AM of MCA serum concentrations 25.0 U/ml (SD = 29.7 U/ml). In this group, AM of CEA urine concentrations was 9.3 ng/ml (SD = 8.9 ng/ml) (Fig. 2) and serum concentrations 463.3 ng/ml (SD = 1336.9 ng/ml) (Fig. 3).

In the group of patients with progressed disease, elevated CEA serum concentrations (over 2.5 ng/ml were established in 80.0% of cases; in only 2 of 10 patients these concentrations were under 2.5 ng /ml (Fig. 3). Three patients from this group had progression of the primary disease and bone metastases (without therapy); the highest MCA urine concentration, i. e. 1833.0 U/ml was established in one of them, whereas MCA serum concentration in the same patient was 108.3 U/ml, CEA urine concentration 16.2 ng/ml and CEA serum concentration 4.4 ng/ml.

The highest CEA concentration was found in a patient with progressed primary disease and bone metastases: CEA serum concentration was 4258.0 ng/ml, urine concentration 30.2 ng/ml; MCA serum concentration was 5.9 U/ml, urine concentration 25.3 U/ml – both values were far below the cut-off limit for serum and urine concentrations of this marker.

Table 2 – Urine and serum levels of MCA and CEA in prostatic cancer patients with no evidence of disease (NED)

TUMOR MARKER		No. of cases	MCA and CEA levels				
			AM	SD	SE	Median	Min – Max
MCA (U/ml)	Urine	8	74,8	50,8	17,9	46,6	15,2 – 155,5
	Serum	8	10,7	4,2	1,5	9,9	3,8 – 16,8
CEA (ng/ml)	Urine	8	4,8	3,2	1,1	3,6	1,0 – 9,1
	Serum	8	3,5	2,7	0,9	2,1	1,1 – 8,7

Table 3 – Urine and serum levels of MCA and CEA in prostatic cancer patients with progressive disease (PD)

TUMOR MARKER		No. of cases	MCA and CEA levels				
			AM	SD	SE	Median	Min – Max
MCA (U/ml)	Urine	10	385,2	570,0	180,3	155,0	25,3 – 1833,0
	Serum	10	25,0	29,7	9,4	15,5	5,9 – 108,3
CEA (ng/ml)	Urine	10	9,3	8,9	2,8	4,5	1,0 – 30,2
	Serum	10	463,3	1336,9	423,1	3,9	0,4 – 4258,0

Discussion and conclusions – Graphical presentation shows that MCA concentrations in the urine of healthy persons are relatively scattered. However, only 15% of these exceed normal values. Nevertheless, it can be concluded that this is a heterogeneous group of healthy male persons. Similar observation applies also to the distribution of CEA concentrations in the urine samples of healthy males. Only 9% of all concentration values exceed the upper limit of normal values.

It is interesting, however, that in the NED group both MCA and CEA urine concentrations are below the upper limit of normal values. In other words, the concentrations of both markers have decreased below the limits of normal values in patients with remission or stagnation of the disease.

Scattered values for both markers could be found in the group of patients with progressive metastatic disease as well. MCA concentrations ranged from normal up to 1883 U/ml. Thus, MCA concentrations are found to exceed the upper limit of normal values in 40% of cases, whereas the CEA urine concentrations in the same group of patients exceed the upper normal limits in only 10% of cases. Based on this observation, it can be concluded that in such cases MCA is a more sensitive marker and indicator of the disease progress than CEA in urine samples.

Further, we wanted to find out the characteristic features of the patients with progressive disease and elevated concentrations of MCA. According to the review of clinical data, these were most frequent in patients who had undergone orchidectomy and/or were treated with antiandrogens (cyproterone acetate); two out of 4 patients with elevated MCA urine concentrations had orchidectomy and 1 had therapy with antiandrogens.

The preliminary analysis does not allow any definite practical conclusion. However, the results indicate that MCA marker is present in the urine of males, and that in normal controls it is mostly found within limits of normal values.

In the prostatic cancer patients with remission the urine values were found to be within normal limits, whereas in the cases with progressive disease the relevant values were elevated mostly when for some reason (therapeutic) the sources of androgenous hormones had been eliminated. In comparison with MCA, CEA in urine is not a specific marker for following of the disease in prostatic cancer patients, whereas a correlation

has been established between CEA serum concentrations and the extent of disease. Finally, based on the results of out study, it can be concluded that there is a poor correlation between MCA urine concentrations and CEA urine concentrations as well as between MCA serum concentrations and CEA serum concentrations.

These preliminary data indicate that further research on a sufficient number of study subjects is required in order to confirm the above findings.

Povzetek

UPORABA MCA IN CEA PRI SPREMLJANJU BOLEZNI BOLNIKOV S KARCINOMOM PROSTATE

Uporaba imunodiagnostike v onkologije sloni predvsem na odkrivanju tumorskih produktov v telesnih tekočinah kot so serum, urin, pleuralna in peritonealna tekočina ter druge. Te, za posamezne vrste tumorjev bolj ali manj specifične snovi, imenujemo tumorski markerji in jih uporabljamo za spremljanje poteka bolezni pri bolnikih s tumorskimi boleznimi. Namen naše študije je bil ugotoviti morebitno povezavo med MCA in CEA urinskimi in serumskimi koncentracijami in potekom bolezni pri bolnikih s karcinomom prostate. Primerjava urinskih MCA koncentracij zdravih moških z urinskimi MCA koncentracijami bolnikov s karcinomom prostate nam pokaže, da so urinske MCA koncentracije pri bolnikih občutno povišane, medtem ko pri primerjavi serumskih MCA koncentracij nismo dobili značilnih razlik. Določanje serumskih MCA koncentracij pri bolnikih s karcinomom prostate je smiselno edino kot dodatna informacija rezultatom, ki jih dobimo z določitvijo urinskih koncentracij. Za razliko od MCA, CEA kaže popolnoma obratno uporabno vrednost: Urinske CEA koncentracije so le redko povišane nad zgornjo mejno vrednostjo, medtem ko so serumske CEA koncentracije pri večini bolnikov s karcinomom prostate povišane, zlasti še pri bolnikih s kostnimi metastazami. Na osnovi dobljenih rezultatov lahko zaključimo, da sta MCA in CEA premalo zanesljiva za spremljanje poteka bolezni pri bolnikih s karcinomom prostate. Vseeno pa se je pokazalo, da je bolj smiselno določevati MCA v urinu in CEA v serumu.

Refrences

1. Stahli C, Takacs B, Miggiano V, Staehelin T, Carmann H. Monoclonal antibodies against antigens on breast cancer cells. Experientia 1985; 41:1377-81.

2. Stahli C, Caravatti M, Aeschbacher M, Kocyba C, Takacs B, Carmann H. Mucin-like carcinoma-associated antigen defined by three monoclonal antibodies against different epitopes. Cancer Res 1988; 48:6799-802.

3. Zenklusen H-R, Overbeck V. J, Stahli C, Gudat F, Rolink J, Heitz PU. The immunohistochemical reactivity of a new anti-epithelial monoclonal antibody (MAb b-12) against breast carcinoma and other normal and neoplastic human tissues. Cell Pathol 1988; 3-10.

4. Novaković S, Krošl G, Plesničar S. Prognostic value of a mucin-like carcinoma associated antigen (MCA) in patients with breast carcinoma. Tumor Diagn Ther 1989; 10:136-41.

5. Eskelinen M, Tikanoja S, Collan Y. A new tumor marker MCA in breast cancer diagnosis. Anticancer Res 1988; 8:665-8.

6. MCA EIA (Roche) 100 tests. Roche Diagnostica, 1988.

7. CEA EIA Duomab 60 (Roche) 100 tests. Roche Diagnostica 1986.

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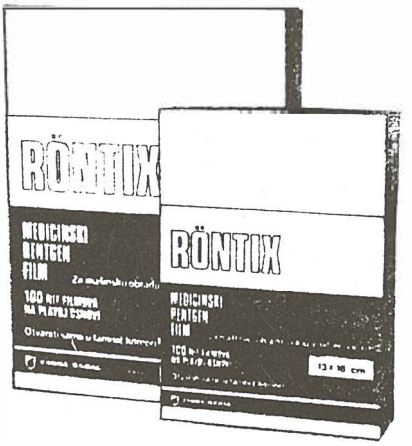
RÖNTIX



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THE INSTITUTE OF ONCOLOGY, LJUBLJANA

THE STATE AND PROBLEMS OF RADIOTHERAPY IN SLOVENIA

Debevec M

Abstract – Practically all radiotherapy in Slovenia is concentrated at the Institute of Oncology in Ljubljana. The service disposes of two linear accelerators, two cobalt units, one X-ray unit for conventional and one for superficial irradiation, as well as an apparatus for low-activity source afterloading applications. Radiation treatment planning is performed on 2 simulators and 2 planning machines. The staff of radiotherapy service comprises 21 radiotherapists and 23 radiotherapy technicians. Load on individual units as well as the problems related to the use and maintenance of radiation equipment are presented.

UDC: 616-006.6-08:615.849.1

Key words: radiotherapy-trends, Slovenia

Review paper

Radiol Iugosl 1990; 24:423-6

The republic of Slovenia covers a territory of 20.000 km^2 with almost 2 million population. The latest data published by the Cancer Registry of Slovenia refer to the year 1986; according to this information, 5.750 new cancer cases were reported in the appointed year. Practically all radiotherapy is concentrated at the Institute of Oncology in Ljubljana (IO). An exception to this rule is X-ray irradiation for some skin diseases, performed by the University Department of Dermatology in Ljubljana and the dermatological department of the General Hospital in Maribor, as well as occasional palliative irradiations carried out at the radiological department of the latter hospital.

At the Institute of Oncology in Ljubljana, supervoltage radiotherapy is performed by means of two linear accelerators and two cobalt units. The first, older accelerator MEL 75-20 Philips has been used for irradiation with X-rays 8 and 16 MeV of energy and electrons 5-20 MeV since 1977. The other, new accelerator – SL 75-15 Philips – was installed in December 1988 to be used for irradiation with 6 and 10 MeV energy X-rays and electrons 5-15 MeV of energy. There is a difference between the two machines that needs to be pointed out: The old accelerator was operated manually, in the same way as cobalt units, whereas the new one is guided by computer which cannot be switched off, and therefore, manual operating is not possible. Undoubtedly the computed control of accelerator has improved the accuracy of irradiation and reduced the possibility of mistake, but on the other hand, it has also adversely affected the load of patients that can be irradiated in a given time: prior to irradiation, the computer must be loaded with general information on the patient as well as with all irradiation parameters. This practically means that 23 columns have to be filled in for a single irradiation field, whereas every second and next irradiation field requires another 14-16 columns to be filled in, and in the case of irradiation with wedge filters, yet another 10-20 additional columns. Thus, in 4-field irradiation the score totals to 100 columns. Evidently, the time required for loading of the computer cannot be considerably shortened by improving manual skill. Namely, the information to be filled in are short, generally numeric data that require full attention of the person performing the task. The problem becomes urgent particularly when a larger number of patients has to be irradiated on the new accelerator owing to a damage on the old one.

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Table 1 – Load on the supervoltage irradiation units of the Institute of Oncology in Ljubljana in 1989

Unit	No. of patients	No. of irradiat.	No. of rad. fields	Operat. days/year	Mean no. of pts/day
LINAC MEL 75–20	1219	22625	43001	237	92
LINAC* SL 75–15	528	3557	5251	152	20
COBALT PHILIPS	900	16903	37099	247	66
COBALT THERATRON 80	858	10808	21377	246	41

* test operation (measurements, adjustments, irradiation of patients, repairs)

Both cobalt units had the starting activity of 10.000 Ci. The older, Philips machine was installed in 1979, whereas the new one – Theratron 780 AECL – has been in use since May 1990 when it replaced our completely worn out Theratron 80 that had been used since 1968. The load on our supervoltage units is presented in Table 1. At this, the fact that during the last ten years the number of irradiation fields for one irradiation performed on these supervoltage units has increased for approximately 20%, i. e. from 1.6 to almost 2, should not be disregarded.

Considering our actual needs, it is difficult to asses how many and what type of supervoltage units would be required to ensure underlayed and efficient irradiation of all patients. It is estimated that sooner or later as many as 50% (1) or even 60% (2) of cancer patients will turn up for irradiation therapy.

According to the recommendations of WHO from 1972 (3), any center where approx. 2000 new cancer patients per year are being irradiated should dispose of at least 3 supervoltage units and 2 machines for irradiation with 200-400 keV energies.

Calculated per number of inhabitants in Slovenia, there is one supervoltage unit available for each 500.000 inhabitants. For comparison with other countries, the respective figures are as follows: Austrija 1 / 318.000, the Netherlands 1 / 237.000, Sweden 1 / 133.000 and the U.S.A 1 / 130.000 of population (2). At this, the wear out of machines should also be considered. Namely, a unit that has been constantly used under maximum load for well over 10 years cannot be expected to perform as accurately and reliably as a newer one, irrespective of careful maintenance. Generally, the lifespan of linear accelerators is estimated to be 12 years, and that of cobalt units 15-18 years (4). The use of machines untill their total breakdown is risky. Our old Theratron had been in use for 22 years before it failed completely; it has been established that the personnel working on this machine just before it broke down was exposed to excessive radiation.

The comparison of all properties of cobalt units and accelerators is in favor of the former machines from economical point of view: if the relative cost of a cobalt unit is 1, a low-energy accelerator would cost 2.5, and a high-energy accelerator as much as 5 (4).

Indications for conventional X-ray irradiation are being restricted as preference is given to cobalt units whenever available. The same is true of superficial X-ray irradiation, provided that a linear accelerator is at hand. Kogelnik reported (2) that in 1988, one third of all new cancer patients in Austria were irradiated on supervoltage units. At the Institute of Oncology we still use a Siemens X-ray irradiation machine that dates back to 1957, and an apparatus for superficial irradiation produced by El Niš in 1966.

In comparison with teleradiotherapy, the indications for brachyradiotherapy are much more restricted. In 1989 we performed 205 sealed and 45 open-source radionuclide applications, as well as 51 intracavitary afterloading applications of low-activity sources with Curietron; the latter were exclusively gynecological intracavitary applications. By the use of afterloading applicators for high-energy sources the indications for this type of therapy have been broadened to include also malignomas of other hollow organs such as the esophagus, bronchi, rectum, and the urinary

bladder. In 4 patients interstitial brachyradiotherapy was combined with hyperthermia.

Our equipment for radiation treatment planning at IO comprises 2 simulators, i.e. a Ximatron TEM from 1974 and a Philips simulator installed in 1978. In the year 1989 there were 1631 patients »simulated« on the former and 3.426 on the latter machine. Two planning systems are available for preparation of radiation treatment planning: TPS Philips from 1979 and OSS Philips from 1989. In the year 1989, plans for altogether 584 patients were prepared on both machines, whereas the total number of radiation treatment plans performed exceeded 800. Unfortunately, also our new OOS neither has a direct cable connection with the new accelerator, nor the possibility of irradiation plan transfer by means of a discette, despite the fact that both machines (accelerator and OSS) were made by the same producer – Philips. Accordingly, all data from the plans that have been prepared by computer need to be repeatedly loaded, i. e. retyped, into the acelerator's computer. With a larger number of new patients, this procedure represents quite an unnecessary waste of time. IO does not dispose of its own CT for the needs of irradiation planning.

In our circumstances, regular maintenance of the machines is of crucial importance. There are problems associated so with the purchasing and storing of expensive spare parts as well as with costly service performed by foreign professionals. Sometimes the procedure for obtaining an ordered spare part through the customs takes longer than the ordering and shipment of the part to the border itself. Expensive spare parts such as magnetrone and tiratrone for accelerators, and tubes for X-ray units are not kept in store by importing companies because of economical reasons. Thus, IO is forced to have its own store of these parts, and by doing this, runs a risk that the stored parts would become more liable to damage due to deffects on vacuum systems. For this reason it also seem reasonable to have the radiation equipment produced by as few different producers as possible. Therefore, in the past years we have mainly stuck with two companies, i. e. Philips (both accelerators, simulator, one cobalt unit, both planning systems and all irradiation tables) and AECL (two cobalt units). On the other hand, such a strategy, by automatically giving preference to the chosen producers, may adversely affect their competitive position.

In comparison with the situation in other, more developed countries, the load on our radiotherapeutic equipment is coinsiderably higher. There, irradiation machines are generally in operation from 8 or 9 a. m. till 4 or 5 p. m. Deducing the time for lunch and coffee breaks, the turnover of patients on one machine is calculated to be approximately 35-40 patients in 8 hours per day which amounts to 320-400 patients per year (2). The load on our supervoltage units, provided that they are fully operational, is greater.

Radiotherapy service at IO is staffed by 21 full-time radiotherapists and 23 radiotherapeutic technicians. Our ratio of specialists-radio-therapists vs. radiotherapeutic technicians differs significantly from that in other countries with developed radiotherapy service: in IO this rate is 1 : 1.1, whereas in Great Britain it is 1 : 3.3 (1), and in Austria 1 : 2.4 (2). Obviously, a greater number of radiation units calls for more technicians, but not necessarily also for more radiotherapists. It is a typical characteristics of radiotherapy that it requires expensive equipment and team work (radiotherapist, radiophysicist, radiotherapeutic technician and planner) at a relatively small number of specialized physicians, compared with other branches of medicine.

It seems that also in the future, radiotherapy in Slovenia will lag far behind radiotherapy in economically more developed countries owing to the high costs of irradiation equipment and shortage of financial means available for health care. Some of the modern machines such as. e. g. neutron generators are so expensive that, owing to relatively restricted indications for this type of irradiation, one or two such units would cover the needs of the whole European Community (5).

Izvleček

STANJE IN PROBLEMI RADIOTERAPIJE V SLOVENIJI

Radioterapija v Sloveniji je praktično v celoti zbrana na Onkološkem inštitutu v Ljubljani. Obsega dva linearna pospeševalnika, dva telekobalta, en rentgenski aparat za konvencionalno in en rentgenski aparat za površinsko obsevanje ter afterloading aparat za vire nizkih aktivnosti. Za planiranje sta dva simulatorja in dva planirna aparata. Obsevanje izdvaja 21 radioterapevtov in 23 radioterapevtskih tehnikov. Prikazane so obremenitve pozameznih aparatov in opisani problemi v zvezi z uporabe in vzdržavanjem obsevalne opreme.

References

1. Kormano M, Stieve FE. Planning of radiological departments. Stuttgart: 1974; G. Thieme.
2. Kogelnik HD. Radiotherapy in Austria. ESTRO News 1990; 22:29-30.

3. The medical uses of ionizing radiation and radioisotopes. WHO Technical Report Series 492, Geneva 1972.

4. Rawlinson JA. The choice of equipment for external radiotherapy. IAEA seminar on organisation and training of radiotherapy in Africa. Cairo 1989.

5. Richonnier M. Europe against cancer. Eur J Cancer 1990; 26:549.

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LECTURE NOTES ON THE PHYSICS OF RADIOLOGY

Knjiga avtorice Susan J Armstrong: »Lecture notes on the physics of radiology«, Clinical Press, Bristol, UK, 1990, 205 strani je pregled fizikalnih in tehničnih pojmov v radiologiji. Poleg fizikalnih osnov sevanja so zajeta področja klasične rentgenologije, dozimetrije z zaščito pred sevanjem, računalniške tomografije, ultrazvočnega, radioizotopskega in magnetno rezonančnega slikanja.

Pojmi so razloženi kratko, vendar dovolj natančno za solidno poznavanje obravnavane tematike. Avtorica predvsem definira pojme ter dodaja sheme in pomembne podatke o aparaturah.

Knjiga je kot učbenik namenjena zdravnikom ter višjemu zdravstvenemu kadru v radiologiji, kot koristno uvodno čtivo pa jo lahko uporabljajo tudi medicinski fiziki in elektrotehniki. Distribuira jo Gazelle Book Services (Lancaster).

Mag. Valentin Fidler, dipl. ing. fiz.

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The Carduiovascular System is aimed at candidates for postgraduate examinations in all specialities and especially those doctors with some training in cardiovascular diseases who need to assess their knowledge of the subject.

The book is published by Clinical Press (Bristol) and distributed by Gazelle Book Services (Lancaster).

dr. Janez Klančar, M. D.

II. JUGOSLAVENSKI SIMPOZIJUM IZ PEDIJATRIJSKE RADIOLOGIJE

Beograd, 2–3. novembar 1990

U Beogradu, u Institutu za zdravstvenu zaštitu majke i deteta Srbije, 2. i 3. novembra održan je II Simpozijum iz pedijatrijske radiologije u organizaciji Sekcije za dječju radiologiju Udruženja radiologa Jugoslavije.

Ova sekcija je bila osnovana na zadnjem kongresu radiologa Jugoslavije u Ohridu s programom stručno-znanstvenog razvijanja dječje radiologije, odnosno proučavanje i analize svih aspekata i problema pedijatrijske radiologije, kao subspecijalnost opće radiologije.

Simpozijum je bio organiziran na zavidnoj visini i za taj uspjeh nesumnjivo je zaslužan doc. dr. Pravdoljub Komar, te kolege radiolozi iz Instituta za zaštitu majke i deteta Srbije.

Skupu su prisustvovali radiolozi i pedijatri praktički iz svih naših republika i oni su aktivno sudjelovali na predavanjima i u raspravama.

U stručnom dijelu simpozijuma dr. Perišić, iz Beograda, je u svom predavanju detaljno i dokumentirano iznio pedijatrijsko-radiološke probleme poremećaja motiliteta jednjaka, kao faktor određenih kritičnih stanja kod djece, posebice u najranijoj dječjoj dobi. Tu je istaknuta nezaobilazna uloga dijagnostičkih radioloških postupaka u ocjenjivanju realnih morfoloških stanja kao i anomalija organske ili funkcionalne etiologije jednjaka.

Prof. dr. Nada Grivčeva – Janošević, iz Skoplja, govorila je o preoperativnim i postoperativnim promjenama kod atrezije jednjaka. Ova naša priznata entuzijata dječje radiologije i jedan od utemeljitelja Sekcije za pedijatrijsku radiologiju, demonstrirala je svu složenost ove problematike čija detaljna dijagnostika vrlo često određuje mogućnost preživljavanja takvih bolesnika.

Dr. Danijela Brešnarova – Bakalinova, iz Skoplja, poznata kao vrlo aktivan i perspektivan pedijatrijski radiolog, iznosila je vlastita iskustva o značaju gastroezofagealnog refluksa kod recidivirajućih pneumonia u djece u prvoj godini života. Pitanja vezana sa dijagnostikom gastroezofagealnog refluksa su stalno prisutna u dječjoj radiologiji, i takvo je izlaganje nesumnjivo pridonijelo upoznavanju metode i načina radiološkog dokazivanja funkcionalnih anomalija kardije kao uzrok pojave gastroezofagealnog refluksa u dječjoj dobi.

Dr. Čedomir Matejić, iz Beograda, izložio je domet i ulogu standardnog pregleda gastroduodenuma u dječjoj dobi.

Vrlo široko, na znanstvenoj osnovi bazirano predavanje izložio je kolega dr. Tihomir Mihajlović, iz Beograda. Njegovo predavanje je imalo naslov: »Radiologija žučnih i pankreatičnih puteva u dječjoj dobi«. Obuhvaćeni su svi aspekti radiološke anatomije, patofiziologije i patologije ovih abdominalnih organa na osnovu ultrazvučne kao i radiološke metode sa posebnim osvrtom na interventu ERCP dijagnostiku kod bolesnika u dječjoj dobi.

Doc. dr. Aleksandar Leković, iz Rijeke, opisao je metodu pregleda tankog crijeva kod djece enteroklizom, tj. dvostrukom kontrastnom metodom uz primjenu hipotonizacije crijeva. Ova metoda omogućava plastičnu analizu i najmanjih organskih promjena jejunuma i ileuma.

Dr. Slavko Čop, iz Zagreba, izložio je vlastita iskustva o radiološkim metodama u dijagnostici primarnih poremećaja motiviteta crijeva u djece.

Dr. Živa Zupančić, iz Ljubljane, sa već uobičajenim efektnim dijapozitivima izuzetno zanimljivih slučajeva obradila je tematiku ultra zvuka u dijagnostici oboljenja gastrintestinalnog trakta kod djece. Dr. Zupančić je još jednom dokazala neslućene mogućnosti ultrazvuka u detekciji određenih patoloških stanja digestivnog trakta.

Moramo posebno naglasiti da nakon svakog predavanja razvijala se je neobično živa diskusija, na momente sa polemičnim tonovima ali diskusija uvijek izuzetno kolegijalna, dobronamjerna i konstruktivna. Takve rasprave su zaokupile pažnju svih sudionika simpozijuma i dokazale veliki i evidentni interes za sve aspekte radiološke dijagnostike digestivnog trakta kod djece.

Drugi dan simpozijuma organiziran je okrugli stol sa glavnom temom standardizacije radioloških pregleda kod djece. Prema našem mišljenju tema je stručno dobro pogođena i od posebnog interesa jer su se pokazale sve razlike koje postoje u Jugoslaviji u pristupu radioloških pre-

gleda kod pedijatrijskih bolesnika. Očito je da samo veći centri imaju radiološki personal educiran za rad sa pacijentima dječjeg uzrasta. S druge strane radiološka aparatura u Jugoslaviji je prvenstveno namijenjena radiologiji odraslih bolesnika i samo u većim centrima nalazimo aparaturu i specifičnu opremu za radiološke dijagnostičke postupke sa djecom.

I pored nepotpunog uvida u stanje opreme radioloških odjela u zemlji, donesen je zajednički zaključak da se radioskopski pregledi djece ne smiju obavljati ukoliko nema mogućnosti korištenja televizijskog pojačivača slike.

Uslijed značajne redukcije zračenja korištenjem folije rijetkih zemalja sekcija zaključuje da se kasete s ovim folijama moraju obavezno koristiti pri snimanju djece.

Radi uključivanja sekcije za pedijatrijsku radiologiju Jugoslavije u evropsko udruženje pedijatrijskih radiologa, zadužen je po jedan član iz svake republike da prikupi podatke o radiolozima koji se bave dječjom radiološkom dijagnostikom »Full time« ili samo »Part time«, i da te podatke pošalju prim. dr. Ervinu Schusteru, Srebrnjak 9, Zagreb.

Predložen je amblem Sekcije za pedijatrijsku radiologiju i razmatrani su organizacioni problemi samog udruženja.

Odlučeno je da se III simpozijum iz pedijatrijske radiologije održi u Skoplju početkom novembra 1991. godine. Tema slijedećeg skupa će biti: »Radiološka dijagnostika bolesti respiratornog trakta u djece«.

Potpredsjednik Sekcije za
pedijatrijsku radiologiju
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Doc. dr. Aleksandar Leković

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2. Chapman S, Nakielny R. A guide to radiological procedures. London: Bailliere Tindall, 1986.
3. Evans R, Alexander P. Mechanisms of extracellular kiling of nucleated mammalian cells by macrophages. In: Nelson DS ed. Immunobiology of macrophage. New York: Academic Press, 1976; 45–74.

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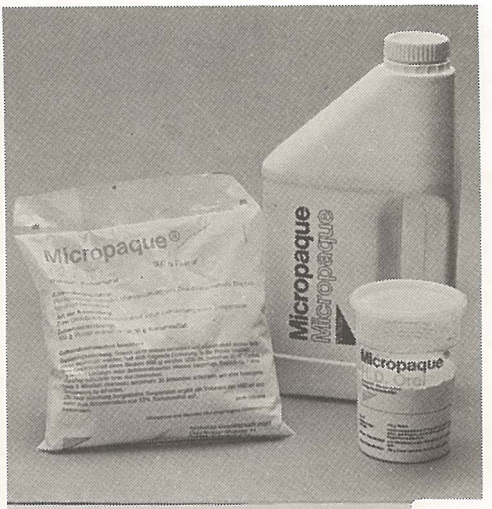

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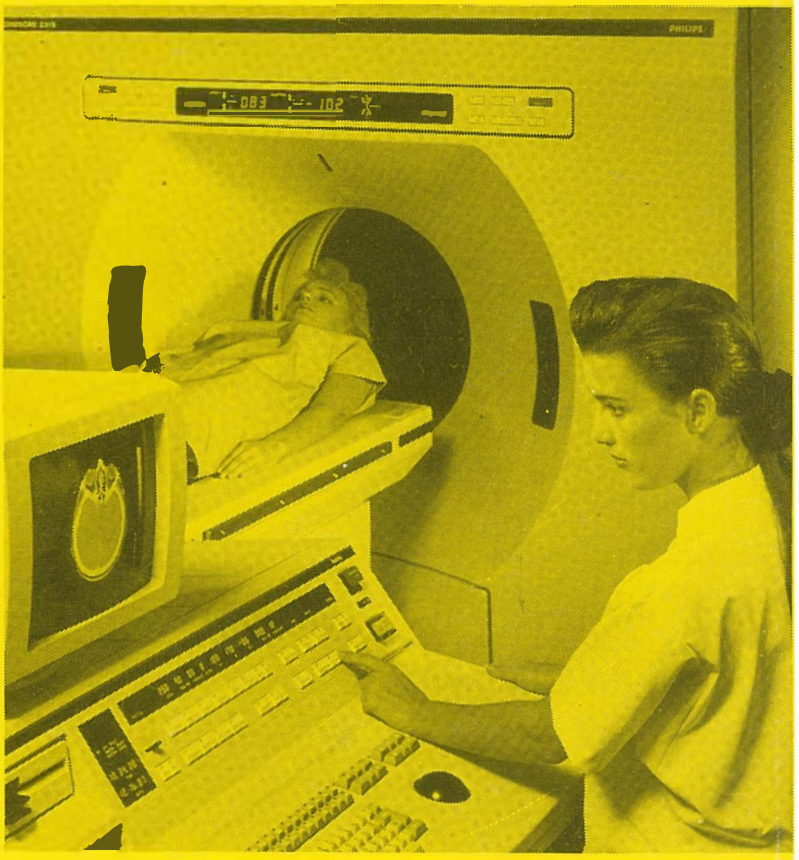

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