UMIK MEHKEGA TKIVA PRI SLIKANJU MEDENICE STOJE: PRIMERJAVA DOZNE OBREMENITVE IN KAKOVOSTI RENTGENOGRAMA

FAT TISSUE DISPLACEMENT IN ERECT PELVIC RADIOGRAPHY: COMPARISON OF RADIATION DOSE AND IMAGE QUALITY

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IZVLEČEK

Uvod in namen: V primerjavi s slikanjem medenice leže je pri slikanju medenice stoje višja doza in slabša kakovost rentgenograma. Namen raziskave je bil ugotoviti, ali se kakovost rentgenogramov in prejeta doza razlikujeta pri dveh različnih načinih slikanja medenice stoje – z odmikom in brez odmika mehkega tkiva.

Metode dela: Prvi del je obsegal meritve na fantomu, kjer smo izbrali trak, ki ni povzročal vidnih artefaktov na rentgenogramu pri odmiku tkiva med preiskavo. Drugi del študije je bil izveden na 60 pacientih, ki so bili napoteni na rentgensko slikanje medenice stoje. Naključno so bili razdeljeni v dve skupini z enakim številom. Polovica jih je umaknila tkivo s področja slikanja, druga polovica pa ne. Pri vseh smo izmerili obseg pasu in bokov, telesno višino in maso, DAP, velikost polja, razdaljo med goriščem in objektom slikanja, tokovni sunek (mAs) in napetost (kV). Naknadno smo iz meritev izračunali še indeks telesne mase, vstopno kožno dozo in efektivno dozo. Dobljene slike so ocenili trije radiologi.

Rezultati in razprava: Tanka trikotna ruta ni povzročala artefaktov na rentgenogramu. Obseg pasu se je zmanjšal za 4,7 % po umiku mehkega tkiva, medtem ko je obseg bokov ostal enak. V skupini pacientov, ki so umaknili maščobno tkivo med preiskavo, se je DAP znižal za 38,5 %, vstopna kožna doza za 44 %, efektivna doza pa za 38,7 %. Kolčna sklepa, veliki in mali grči stegnenice, sklepna ponvica kolčnega sklepa, vratova stegnenice, sredica in skorja kosti medenice, križnica in križnične odprtine ter mehka tkiva medenice in kolkov so bili bolj vidni na slikah z odmikom mehkega tkiva.

Zaključek: Z umikom maščobnega tkiva se znižajo DAP, vstopna kožna doza in efektivna doza, hkrati pa se izboljša kakovost slike.

Ključne besede: slikanje medenice stoje, odmik mehkega tkiva, kakovost slike, dozna obremenitev

ABSTRACT

Introduction and purpose: When previous studies compared erect pelvic imaging with the supine position, they reported lower image quality and higher radiation dose for erect pelvic X-ray in larger patients. The purpose of this study was to determine whether radiation dose and image quality differ for radiographs of the pelvis in the erect position with and without adipose tissue displacement.

Methods: The first part of the study was performed on a phantom in which we determined a band that would not produce artefacts on the resulting image when displacing fat tissue. The second part was performed on 60 patients who were randomly divided into two groups. One group had adipose tissue displaced from the pelvic region and the other did not. We measured waist and hip circumference, height, weight, DAP, primary field size, source-to-skin distance, mAs, and kV. We then calculated BMI, ESD, and effective dose. The images were evaluated by three radiologists.

Results and Discussion: A thin cotton triangular bandage showed no visible artefacts. Thickness around the waist decreased by 4.7% after tissue displacement, while hip circumference remained the same. In a group of patients with tissue displacement, DAP was 38.5% lower, ESD was 44% lower and effective dose was reduced by 38.7%. Hip joints, trochanters, acetabula, femoral necks, medulla and cortex of the pelvis, pelvic/hip soft tissues, and sacrum and its foramina were more visible on images obtained with fat tissue displacement.

Conclusion: When fat tissue was displaced from the pelvic region DAP, ESD and the effective dose decreased and the image quality increased.

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