DRUŠTVO ZA UROGINEKOLOGIJO

Review article/Pregledni prispevek

PROBLEMS AND PITFALLS IN PELVIC RECONSTRUCTIVE SURGERY

PROBLEMI IN ZAPLETI PRI REKONSTRUKTIVNI KIRURGIJI MEDENIČNEGA DNA

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Key words: *pelvic floor reconstructive surgery; anatomy; surgical approach; complications*

Abstract – Background. *Pelvic reconstructive surgery requires a solid understanding of the anatomy of the small pelvis and the pelvic floor, in particular to avoid complications during and after pelvic reconstructive surgery.*

Methods. *Possible complications of the pelvic floor reconstructive surgery are analised. There are 2 typical surgical problems encountered in pelvic reconstructive surgery: lesion of adjacent structures (rectum, bladder, ureter, small bowel) and hemorrhage.*

Results. *Postoperatively there is always a risk of pain, stenosis and dyspareunia, erosion of allograft, voiding problems, incontinence and prolapse.*

Conclusions. *These complications can be reduced by insisting on an exact preoperative diagnosis and by choosing the correct procedure, by having a good knowledge of anatomy and by using meticulous surgical technique.*

Ključne besede: *rekonstruktivna kirurgija medeničnega dna; anatomija; kirurški pristop; komplikacije*

Izvleček – Izhodišča. *Rekonstruktivna kirurgija medeničnega dna zahteva dosledno poznavanje anatomije male medenice in medeničnega dna zato, da se prepreči komplikacije med operativnim posegom in po njem.*

Metode. *Predstavljene so možne komplikacije rekonstruktivne kirurgije medeničnega dna. Izpostavljeni sta dve značilni skupini komplikacij: poškodbe sosednjih organov (rektum, sečni mehur, sečevod, tanko črevo) in krvavitev.*

Rezultati. *Bolečine, stenoza, dispareunia, erozija implantata, težave z uriniranjem, nenadzorovano uhajanje urina in prolaps so možni postoperativni pojavi.*

Zaključki. *Komplikacijam rekonstruktivne kirurgije medeničnega dna se izognemo z dosledno predoperativno diagnostiko, z izborom ustreznega kirurškega pristopa, z dobrim znanjem anatomije in z uporabo dosledne kirurške tehnike.*

Introduction

The term pelvic reconstructive surgery encompasses several routes of approach: vaginal, abdominal, combined, and laparoscopic. Pelvic reconstructive surgery also denotes a wide range of distinct operations: operations for genital prolapse, for urinary and fecal incontinence, fistulas, stenosis, trauma, etc. This paper will discuss some typical pitfalls when doing pelvic reconstructive surgery and complications after pelvic reconstructive surgery (1, 2).

Anatomic basis of pelvic reconstructive surgery

The fact that surgery for reconstruction of the pelvis can be performed abdominally and vaginally requires a thorough understanding of the anatomy of the pelvis, the pelvic floor and the perineum. The position of the different organs, the blood supply, the nervous system, the different layers of muscle and connective tissue, and the spaces between these layers are all important in maintaining the function of the pelvic floor. They must also be well understood when performing pelvic reconstructive surgery.

Figure 1 offers a schematic view on the pelvic floor from above. The pelvic floor is made up mainly by the levator ani muscle with its 3 parts: the pubo-rectalis, the pubo-coccygeus, and the ilio-coccygeus muscle. An important landmark is the ischial spine. The arcus tendineus runs from the symphysis pubis to the ischial spine, offering lateral support to the levator ani muscle.

In the midline there is the urogenital hiatus. The urethra, the vagina and the rectum pass through the hiatus, which is flanked on both sides by the pubo-coccygeus muscle. Contraction of the levator ani muscle narrows the urogenital hiatus and induces kinking in the rectum, which in turn is important for maintaining fecal continence.

Looking at the pelvic floor from below one becomes aware that the pelvic floor in reality is not a flat »floor« but rather funnel-shaped. More superficially is the urogenital diaphragm, made up in the female by relatively small and unimportant muscles: the bulbo-spongiosus muscle, and the transverse perineal muscle. To better understand the perineum it is helpful

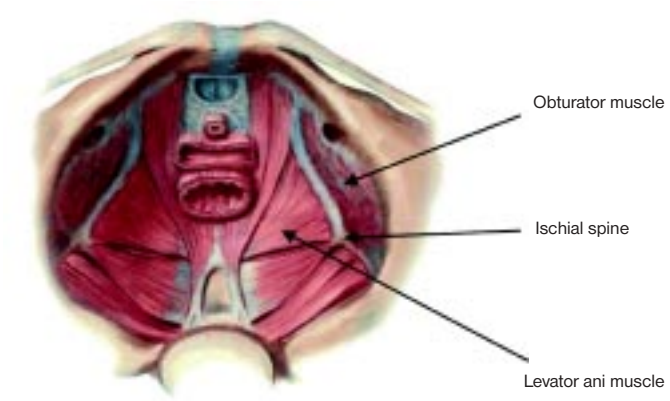

Figure 1. *View of the muscles of the small pelvis from above.*
Sl. 1. *Pogled na mišice male medenice od zgoraj.*

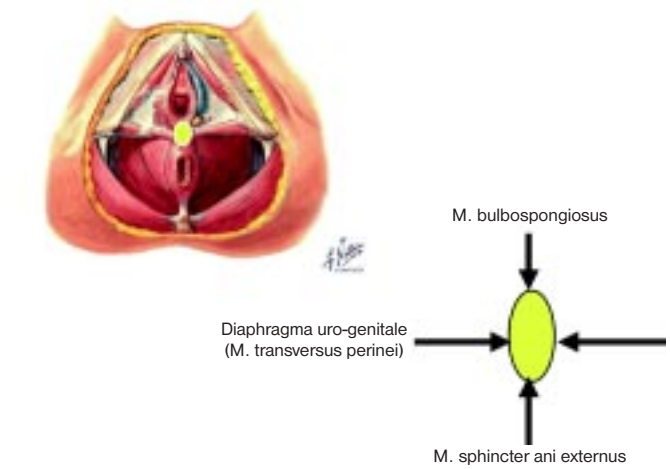

Figure 2. *Perineum and perineal body.*
Sl. 2. *Presredek in telo presledka.*

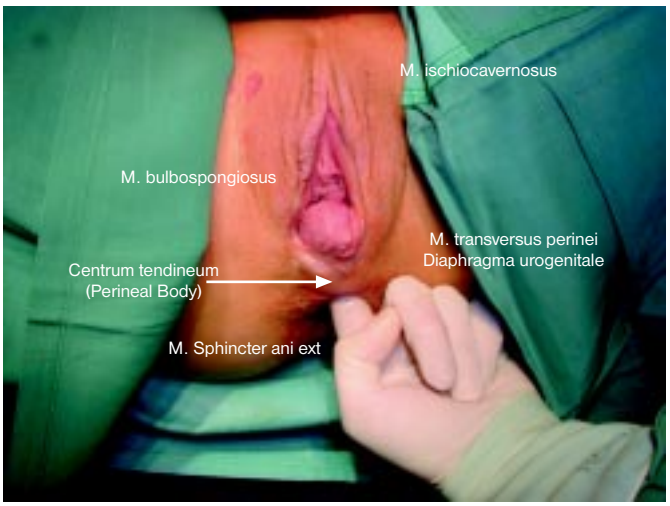

Figure 3. *Vulva and perineum in a patient prepared for colpoperineoplasty for rectocele.*
Sl. 3. *Vulva in perinej pri bolnici, pripravljeni za kolpoperineoplastiko zaradi rektokele.*

to keep in mind that midway between the introitus and the anus there is the so-called perineal body. The perineal body is not a distinct anatomic entity but rather the area where the bulbo-spongiosus muscle, the transverse perineal muscle, the external anal sphincter, and from inside the pelvis the recto-vaginal septum meet (Figure 2).
In real life, these structures can easily be identified – if one knows what to look for and where to find it (Figure 3).

Surgical problems

There are 2 typical surgical problems encountered in pelvic reconstructive surgery: Lesion of adjacent structures and hemorrhage (Table 1). Both the *rectum* and the *bladder* are at risk of being entered during anterior repair or colpo-perineoplasty (Figure 4). Although there is a layer of connective tissue between the bladder and the vagina anteriorly and between the vagina and the rectum posteriorly, these septa are relatively thin and offer no protection to the bladder and the rectum. On the contrary these septa have to be separated from their surrounding tissue in pelvic reconstructive surgery increasing the danger of entering the bladder or the rectum.

Table 1. *Intraoperative surgical problems in pelvic reconstructive surgery.*

Razpr. 1. *Medoperativni kirurški problemi pri rekonstruktivni kirurgiji medenice.*

– Lesion of adjacent structures
– Rectum
– Bladder
– Ureter
– Bowel
– Hemorrhage
– Arterial
– Venous

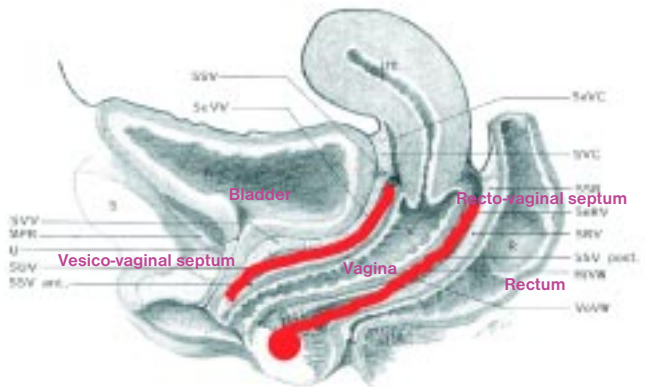

Figure 4. *Sagittal section of the small pelvis, illustrating the relationship between bladder, vagina and rectum, and the corresponding layers of connective tissue: vesico-vaginal septum between bladder and vagina, and recto-vaginal septum between rectum and vagina. The recto vaginal septum fuses with the perineal body.*

Sl. 4. *Sagitalni prerez male madenice, ki prikazuje odnos sečnega mehurja vagine in rektuma in pripadajoče plasti veznega tkiva: veziko-vaginalni septum med sečnim mehurjem in vagino in rektovaginalni septum med rektumom in vagino. Rektovaginalni septum prehaja v telo perineja.*

The ureter is at risk particularly during hysterectomy. In abdominal hysterectomy there are 3 wellknown areas were the ureter can easily be injured (3, 4):

1. where the ureter enters the small pelvis and is in close proximity to the vessels of the infundibulopelvic ligament.
2. in the cardinal ligament, and
3. distally, where the ureter enters the bladder.

In vaginal surgery the ureter usually is away from the area of surgery and therefore not at risk. There are 2 exceptions, however:

1. in severe uterine prolapse, when the uterus is outside the vulva and the pelvis, the bladder is pulled downwards together with the uterus. As a consequence the ureters also follow the uterus downward before turning back into the small pelvis (Figure 5). This position of the ureter has to be taken into account when doing vaginal hysterectomy in severe uterine prolapse.

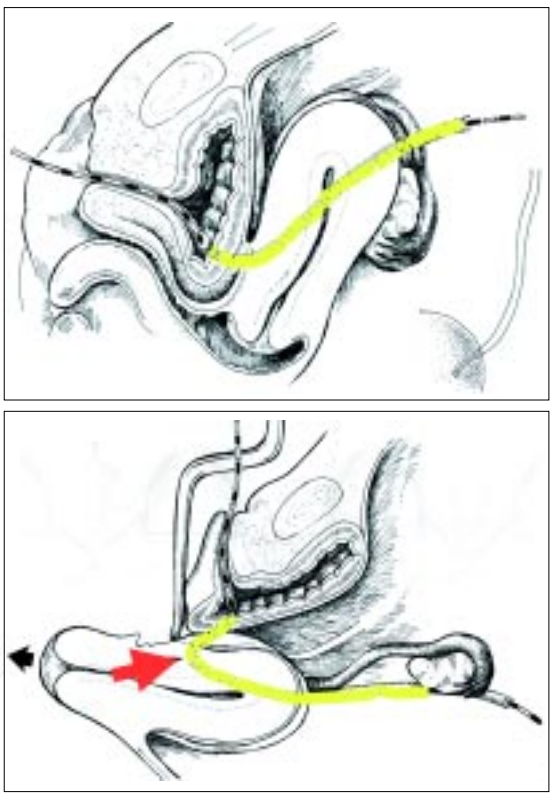

Figure 5. *Position of the ureter in the nomal uterus and in uterine prolapse.*

Sl. 5. *Lega sečevoda pri maternici v normalnem položaju in pri povešeni maternici.*

2. in anterior repair, when insufficient care is taken and the sutures of the vesico-vaginal septum are placed too far laterally, kinking of the ureter may result.

Fortunately the *small bowel* rarely is a problem in pelvic reconstructive surgery (5). When closing the peritoneum in vaginal hysterectomy or after resection of an enterocele bowel might be included in a suture. A rare but potentially serious complication related to pelvic reconstructive surgery is injury to the bowel when placing a suprapubic bladder drainage.
Hemorrhage in pelvic reconstructive surgery can be the result of injury to an artery, such as the iliac artery, particularly from above, the uterine artery during hysterectomy. More of a concern is venous bleeding, which can be especially troublesome since venous plexus can not be isolated and ligated. Very often the only possibility in controlling venous bleeding is employing pressure on the site of bleeding and waiting for coagulation to occur.

Two areas where bleeding from venous plexus can be a problem are the presacral area – where the sutures during abdominal sacrocolpopexy are placed – and the para-urethral retropubic venous plexus. The latter are sometimes encountered in anterior repair when the dissection of the vesico-vaginal septum is carried too far anteriorly and behind the pubic bone.
It must be kept in mind that bleeding problems in pelvic reconstructive surgery are not seen at the time of operation but are encountered as hematoma formation in the postoperative period. Typical examples would be hematomas in the retropubic space after TVT, hematomas originating from the pudendal vessels behind the sacro-spinal ligament in vaginal sacro-spinous fixation (Amreich procedure) (6).

Functional problems

While surgical problems during or immediately after an operation usually are easily recognized and can be managed successfully, functional problems are another matter. They are particularly annoying because very often functional problems are the indication for pelvic reconstructive surgery, and the patient consents to the operation because of her symptoms. Which are the most important functional problems after pelvic reconstructive surgery (Table 2)?

Table 2. *Functional postoperative problems after pelvic reconstructive surgery.*

Razpr. 2. *Funkcionalni pooperativni problemi po rekonstruktivni kirurgiji medenice.*

- Pain
- Stenosis / Dyspareunia
- Erosion and rejection of allograft
- Voiding problems
  - Impaired micturition
  - Urgency
- Incontinence
- Prolapse

Fortunately, *pain* normally is a minor problem after pelvic reconstructive surgery. If it occurs it usually does not last long and is self-limiting. Many patients complain about pain in the perineum after colpo-perineoplasty. This is to be expected considering that this is precisely the area where sutures are placed and postoperative edema develops. Sometimes it is helpful to remove sutures from the perineum to allow the patient to resume a comfortable sitting position.
Pain also sometimes is reported in the right gluteal region after vaginal sacro-spinous fixation (on the right side). This is not surprising and can be explained by a possible irritation of the pudendal or ischial nerve behind the sacro-spinous and sacro-tuberal ligaments. This pain usually is not severe, and responds well to treatment with analgesics with antiphlogistic and antirheumatic properties (such as Diclofenac).
Stenosis and subsequent *dyspareunia* is a very serious consequence of pelvic reconstructive surgery, in particular after anterior or posterior repair. Although the percentage of sexually active women declines with age most women are sexually active and expect to be able to have sexual intercourse after pelvic reconstructive surgery.
Stenosis can occur after both anterior and posterior repair, after vaginal sacro-spinous fixation and of course after newer, less standardized procedures such as the so-called posterior IVS or anterior levatorplasty. In anterior and posterior repair it is important to mobilize the vagina sufficiently and to use extreme caution when placing the sutures plicating the vesico-vaginal or recto-vaginal septum. It is highly recommended to test for sufficient width of the vagina by inserting 3

fingers into the vagina after placing the sutures. Even then, however, scar formation can cause narrowing of the vagina.
Erosion of allograft is becoming much more common with the increasing use of prosthetic material in pelvic reconstructive surgery. Prolene tape in various configurations and pore sizes is used in the TVT operation and its modifications, and many surgeons prefer to use meshes in the repair of pelvic floor defects. These meshes often cause scarring and vaginal stenosis more often than anterior or posterior repair without an allograft, resulting in stenosis, dyspareunia or even inability to have sexual intercourse.
While the use of a mesh sometimes can be very useful it must be kept in mind that a synthetic mesh always remains a foreign body, may cause a severe inflammatory response with scar formation, and may change its location to areas where it should not be. A typical example is erosion of the prolene tape into the vagina after a tension free vaginal tape operation.
Voiding problems after pelvic reconstructive surgery are particularly troublesome because the patient often has pelvic reconstructive surgery because of urinary problems. Very often we just do not know how voiding problems come about after surgery: is it the changed anatomy? Is it the localization of certain sutures? Is it the tension on a tape? In any case the patient has to be fully informed about the possibility of impaired micturition after an incontinence procedure.
Particularly troublesome is urgency as a postoperative complication. While voiding problems can sometimes be explained by some degree of obstruction, the pathophysiology of urgency is not understood – contrary to what some clinicians claim. Here again it is extremely important to inform the patient before an operation that she probably will be dry but may experience de-novo urgency, requiring anticholinergic therapy.
Incontinence very often is the reason for pelvic reconstructive surgery being done, but might also be a consequence of surgery in an otherwise healthy and dry patient. The phenomenon of »masked incontinence« is poorly understood but there is no doubt that pelvic reconstructive surgery can change the anatomy of the pelvic floor resulting in a pressure imbalance at he bladder outlet.
The same is true for *prolapse.* Not only can prolapse recur after initially successful surgery but it also can be brought about for example by an incontinence procedure in a patient without prolpase (e. g. cystocele or enterocele formation after colposuspension).
Table 3 offers a look at specific complications after frequently performed operations.

Table 3. *Specific functional and anatomic complications after pelvic reconstructive surgery.*

Razpr. 3. *Specifične funkcionalne in anatomske komplikacije po rekonstruktivni kirurgiji medenice.*

Procedure	Complication
– Colpo-perineoplasty	Stenosis, dyspareunia
– Colposuspension	Impaired micturition, cystocele
– TVT	Urgency
– Vaginal vault suspension	
– vaginal	Stenosis, dyspareunia, cystocele
– abdominal	Allograft reaction, cystocele

How to avoid complications

Exact preoperative diagnosis: it is plainly wrong to take a patient into the operating room without knowing exactly what her problems are, how they reflect on her quality of life, whether there is concomitant pathology. In short, we need to have an accurate preoperative diagnosis. Surgery never is an end in itself but only a means to help the patient.
Choice of procedure: on the basis of an exact diagnosis the surgeon has to choose the best procedure (7). »Best« means a procedure which is tailored to the signs and symptoms presented by the patient, and one with which the surgeon is familiar (8).
Knowledge of anatomy: good surgery depends on a through knowledge of relevant anatomy. It is worth investing into gaining an ever better understanding of the small pelvis, the pelvic floor and the perineum in order to be able to choose the best procedure and to perform it according to the highest standards.
Surgical technique: the same is true for surgical technique. Surgery also is an art, but one which requires hard work, meticulous attention to detail and long training (9, 10). Especially when the aim is to »reconstruct« the surgeon has an obligation to use the best techniques available.
»Less is more«: in pelvic reconstructive surgery it is wise to err on the safe side. The surgeon does not have to be the first one to apply unproven techniques and untested materials. In complex cases it is often wise to restrict oneself to one procedure and come back later. Much harm has been done by the unqualified application of concepts involving several procedures in the course of one operation.

Conclusions

Pelvic reconstructive surgery has evolved into the most important field of gynecologic surgery. Operations for prolapse and incontinence have become ever simpler, more standardized, and better tailored to the needs of the individual patient. On the other hand surgery is always dangerous, and there are many pitfalls and complications in pelvic reconstructive surgery. By keeping in mind the principles outlined above the surgeon will be able to achieve the desired result while minimizing intra- and postoperative complications.

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