ANATOMIC PREREQUISITES OF THE SURGICAL THERAPY OF VAGINAL PROLAPSE AFTER HYSTERECTOMY

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The prolapse of vaginal stub occurs in about 4 % of hysterectomised patients. Suspension of vaginal stub on the ligamentum sacrospinale dextrum is an effective method of the surgical management. The vaginal approach puts increased demands on handiness and orientation in the operation field. Using a proper operation technique and perfect knowledge of the anatomic situation in fossa ischiorectalis can minimize the increased risk of bleeding during the fixation, which results from frequent and varied anastomoses of pelvic vessels. The authors measured several parameters on the group of pelvic girdles of 32 females and found following results:
the distance between the base and the apex of spina ischiadica (17.1 mm); the distance between spina ischiadica and the lateral margin of the os sacrum in the axis of central fibres of ligamentum sacrospinale (29.8 mm); the lenght of axial fibres of ligamentum sacrospinale (37.2 mm); the longest (11.2 mm) and the shortest (1.3 mm) diameter of 15 mm from the top of spina ischiadica. In this site the thickness of muscular layer of musculus coccygeus (3.2 mm) has also been measured. The anatomic study can facilitate the introduction and implementation of more complex surgical techniques.

INTRODUCTION

The prolapse of vaginal stub after hysterectomy is one of the most difficult conditions to resolve. The frequence of prolapse is reported in 0,2 to 1,0 % after abdominal hysterectomies and in 4 % after vaginal hysterectomies, especially when performed by the intrafascial method. It is usually caused by an inborn or acquired relaxation of suspensory utero-sacro-cardinal complex. The suspensory ligament of vagina has three distinctive parts[4]:

1. The cranial 2 to 3 centimetres of vagina are suspended onto the long filaments which issue from the area of foramen ischiadicum, articulatio sacroiliaca and os sacrum and radiate to the vaginal surface. These filaments consists of perivascular connective tissue, smooth musculature, blood and lymphatic vessels and nerves.

2. The middle part of vagina is closer to the pelvic wall and its paracolpium is shorter and more condensed. It is composed mainly from smooth musculature and connective tissue. The connection of the anterior vaginal wall to arcus tendineus fasciae pelvis on this level is usually described as fascia pubocervicalis. Its dorsal equivalent, fascia rectovaginalis, radiates into fascia musculi levatoris ani and represents an important factor for the fixation of this part of vagina.

3. The caudal part of vagina is directly connected to surrounding organs – ventrally to urethra and diaphragma urogenitale, dorsally to perineal connective tissue. Laterally it touches the medial margins of levators. The connection of vagina with its environs is expressed not only by the visible contours of urethra and levators, but also by its synkinesis with movements and conformational changes of surrounding structures. Under normal conditions the upper and middle parts of vagina lie over the plate of levators, dorsally from hiatus urogenitalis[6].

The surgical correction must ensure a firm resuspension of the vaginal stub, which at the same time respects anatomy and topography of vagina and surrounding organs, as well as the function of vagina as a copulatory organ. Methods which close or remove vagina are more often laden with postoperative incontinence or relapse and therefore are applicable only quite exceptionally[3,9].

Abdominal suspensory procedures do not always respect physiological vaginal lie. The axis of vagina bows forward and, as a result, vagina shifts over hiatus urogenitalis and uncovers the pouch of Douglas. This facilitates conditions for the recurrence of prolapse and the creation of enterocele. This is the question particularly in the following surgical procedures:

1. The suspension of vaginal stub onto ligamenta sacrococcygea ventralia by means of fascial graft of musculus rectus abdominis or by mersilene tape (colposacropexis abdominalis).

2. The suspension of vaginal stub onto the fascial strips of musculi recti abdominis (colpopexis sec. Fletcher).

3. The suspension of the vaginal vault onto ligamenta iliopectinea on respective sides (colpopexis sec. Burch), which is to advantage at the surgical treatment of a concomitant relative urinary incontinence.

The abdominal procedures are preferred in cases of a short and narrow vagina, especially when a preservation of coital function is desirable.

The vaginal approach with the suspension of vaginal stub onto ligamentum sacrospinale on the right side (colpopexis sacrospinalis sec. Amreich-Richter) restores the physiological lie with a normal topographical-anatomical relations and respects the function ability of the organ[1,7,8].

At the operation, the anterior and posterior colpotomy is performed, the urethro-vesico-rectovaginal space is dissected, the hernial sac of enterocele is loosened, resected and closed. Fossa isciorectalis is entered pararectally on the right side by means of a blunt preparation. Two fixation stitches are placed at a same time into the musculus coccygeus and ligamentum sacrospinale as close as possible to os sacrum. The stitches are further drawn through the tops of both sides of the split vagina. This step is followed by the anterior vaginal plasty with plication of the urethro-vesico-vaginal septum and by the posterior plasty with bringing together musculi levatores ani. The fixation stitches are knotted in the direction of the future vaginal axis, which after elevation resumes physiological lie. The operation field is secured by suction drainage[5].

MATERIAL AND METHODS

The aim of the study was to appraise, in 32 female pelvis girdles, the following morphometric parameters:

1. The distance between the base and the apex of spina ischiadica.
2. The distance between spina ischiadica and the lateral margin of the os sacrum in the axis of central fibres of ligamentum sacrospinale.
3. The lenght of axial fibres of ligamentum sacrospinale.
4. The longest and the shortest diameter of ligamentum sacrospinale measured in the distance of 15 mm from the top of spina ischiadica.
5. In this site the thickness of muscular layer of musculus coccygeus has also been measured.

RESULTS

The parameters found are summarized in Table 1.

Table 1. Studied parameters of pelvic girdles.

	n	x ± s	min.	max.
1	32	17.1 ± 3.2	12.5	22.0
2	32	29.8 ± 4.8	22.5	35.5
3	32	37.2 ± 5.9	30.0	44.5
4a	32	11.2 ± 1.7	8.5	14.0
4b	32	1.3 ± 0.5	0.5	2.5
5	32	3.2 ± 1.5	1.5	5.5

1 – The distance between the base and the apex of spina ischiadica
2 – The distance between spina ischiadica and the lateral margin of the os sacrum
3 – The maximal lenght of axial fibres of the ligamentum sacrospinale
4a – The maximal diameter of ligamentum sacrospinale (15 mm from the spina ischiadica)
4b – The minimal diameter of ligamentum sacrospinale (15 mm from the spina ischiadica)
5 – The thickness of the musculus coccygeus (15 mm from the spina ischiadica)

DISCUSSION

Ligamentum sacrospinale is an important part of the fibrous apparatus which reinforces the pelvic girdle. Together with musculus coccygeus it represents a firm support for the anchorage of elevatory vaginal stitches. The nature of ligamentum sacrospinale as well as the topography of foramen infrapiriforme and the Alcock's canal provide an ideal site for the anchorage of elevatory stitches. The pudendal complex consisting of the artery, the vein and the nerve, which could become a cause of a severe peroperative complication[2], leads dorsomedially from spina ischiadica. In this localisation there are many arterial anastomoses, which enable a collateral circulation in 20 to 100 % of cases from the following sources:

1. arteria glutea superior et inferior.
2. arteria pudenda interna.
3. arteria sacralis mediana.

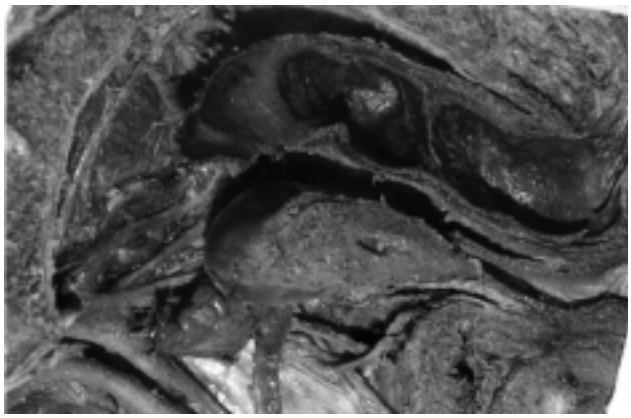

Fig. 1. Topographical relationships in the sagital section of the female small pelvis.

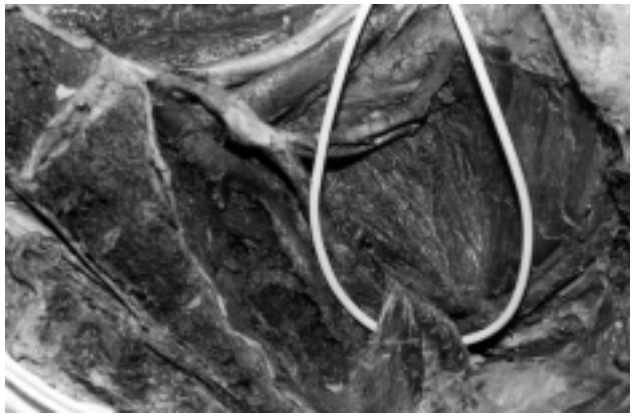

Fig. 2. The excised ligamentum sacrospinale.

4. arteriae sacrales laterales.
5. arteria iliaca externa (through the system of arteriae circumflexae femoris).

The safest place for the insertion of fixation stitches is in the distance of 2 to 3 cm medially from spina ischiadica. Care must be taken not to penetrate the whole depth of the muscle and the ligament. The most often injured vessel is arteria glutea inferior. In this case, contrary to the injury of the pudendal artery, the ligature of the internal iliac artery does not have a hemostatic effect. Hemorrhage from gluteal artery can only be controlled by the insertion of vascular clips, tamponade and aimed arterial embolisation. On the other hand, the injuries of rectum or urinary bladder are infrequent. The operation technique makes possible to reconstruct the impaired proximal suspension with the eversion of vaginal stub and to restore the natural direction of vaginal axis, e.g. vagina in its cranial and medial parts lies on the plate of levators almost horizontally, which minimises the possibility of recurrence of the prolapse.

CONCLUSIONS

Colpopexis sec. Amreich-Richter is an efficient method of treatment of the vaginal prolapse after hysterectomy. The vaginal approach puts increased demands on handiness, as well as on a perfect orientation in the operation field. The topographical-anatomical study of proportions in female small pelvis is a prerequisite for a succesful management of operation technique.

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