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Pelvic organ prolapse in women: how is it diagnosed and treated currently?

Paweł Milart, Ewa Woźniakowska, Piotr Czuczwar, Sławomir Woźniak

3rd Chair and Department of Gynecology, Medical University in Lublin, Lublin, Poland

Abstract

The aim of the paper was to summarize the current opinions about the management of pelvic organ prolapse in women. Food and Drug Administration safety announcements from 2008 and 2011 triggered the discussion about the methods of treatment of pelvic organ prolapse and the used materials and a partial return to the methods which had been totally criticized before the implementation of meshes. The decrease in mesh usage is also observed. The studies did not demonstrate the prevalence of any particular surgical procedure. The amount of studies concerning the evaluation and the treatment of pelvic organ prolapse ensures that the quality of care provided to women with urogynecological problems is continuously increasing.

Key words: pelvic organ prolapse, diagnosis, treatment.

Definition

Pelvic organ prolapse (POP) is a downward descent of the pelvic organs and results in a protrusion of the vagina and the uterus. It often provides additional symptoms to patient's life already complicated by menopause.

Reasons

Vaginal child birth, advancing age and increasing body mass index (BMI) are well known, established risk factors for the prolapse [1].

Vaginal child birth

Hendrix *et al*. [2] studied selective factors that were associated with prolapse in a group of 27 342 women who were enrolled in the Women's Health Initiative Hormone Replacement Therapy Clinical Trial. They found a very strong relationship between the parity and occurrence of POP. Giving birth to the first child was connected with a statistical increase in the uterine prolapse risk (OR = 2.13, 95% CI: 1.67-2.72). Every additional birth still gave an increase in the risk of 10% (OR = 1.1, 95% CI: 1.05-1.16). According to the results of the studies of Hendrix *et al*., birth giving women were at a higher risk of cystocele and rectocele as well. The first delivery was associated with a statistically significant rise in cystocele (OR = 1.91, 95% CI: 1.67-2.19) and rectocele (OR = 2.22, 95% CI: 1.84-2.68). The following deliveries increased the risk of cystocele and rectocele (OR = 1.21, 95% CI: 1.17-1.24; OR = 1.21, 95% CI: 1.17-1.26, respectively). Similar results were published by Progetto Menopausa Italia Study Group [3]. They analyzed consecutive deliveries in a group of 21 449 women and proved that the first, second, third and the following deliveries were associated with an elevated risk of prolapse (OR = 2.6, 95% CI: 1.8-3.8; OR = 2.7, 95% CI: 1.9-3.8; OR = 3.0, 95% CI: 2.1-4.3, respectively). Swift *et al*. [4] found that the parity in general was connected with a higher risk of prolapse (OR = 1.39, 95% CI: 1.27-1.52). Moreover, they demonstrated that gravidity itself produced a risk of prolapse (OR = 1.26, 95% CI: 1.17-1.35). Vaginal delivery of a newborn weighing more than 4500 g was proved to be associated with a risk of prolapse by Swift *et al*. [4] and the Italian authors [3] (OR = 1.12, 95% CI: 1.08-1.17 and OR = 1.2, 95% CI: 1.0-1.5, respectively). Swift *et al*. [4] showed that vaginal delivery alone constituted a risk of prolapse (OR = 1.39, 95% CI: 1.27-1.59) while Progetto Menopausa Italia Study Group [3] confirmed that cesarean section in the patient history decreased the prolapse risk (OR = 0.6, 95% CI: 0.5-0.8). The cesarean section as a method of labor which prevents the prolapse was promulgated by professor Milsom in his lecture during the 40th Annual Meeting of IUGA in Nice, France in June 2015.

Advancing age

Italian women at the age of 52-55 were proved to be at a higher risk of descensus compared with younger women (OR = 1.3, 95% CI: 1.1-1.5). The tendency heightened in women over 55 (OR = 1.7, 95% CI: 1.5-2.0). Hen-

Corresponding author:
Paweł Milart, 3rd Chair and Department of Gynecology, Medical University in Lublin, 8 K. Jaczewskiego St., 20-090 Lublin, Poland, e-mail: pawel.milart@umlub.pl

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drix *et al*. [2] in the WHI population showed a higher risk of prolapse in 60-69-year-old women compared with 50-59-year-old group (OR = 1.16, 95% CI: 1.03-1.30) and the risk increased in 70-79-year-old group (OR = 1.36, 95% CI: 1.19-1.56). The risk was higher for uterine prolapse, as well as for rectocele and cystocele. In the multicenter observational study, Swift *et al*. [4] established that the risk of prolapse grew by 4% in every year of life (OR = 1.04, 95% CI: 1.03-1.05), and 46% in every 10-year period (OR = 1.46, 95% CI: 1.30-1.64).

Increasing body mass index

The risk of uterine prolapse, rectocele and cystocele was increased in overweight ($25 \leq$ BMI < 30 kg/m^2) women in the WHI study (OR = 1.31, 95% CI: 1.15-1.48; OR = 1.38, 95% CI: 1.25-1.53; OR = 1.39, 95% CI: 1.28-1.51, respectively) and was higher in obese women (BMI > 30 kg/m^2) for uterine prolapse (OR = 1.40, 95% CI: 1.24-1.59); rectocele (OR = 1.75, 95% CI: 1.54-1.99) and cystocele (OR = 1.57, 95% CI: 1.41-1.74) [2]. A comparable association was observed by Swift *et al*. [4]. Overweight women in their group were at the heightened risk of prolapse (OR = 3.13, 95% CI: 1.91-5.15) as well as obese women (OR = 3.52, 95% CI: 2.19-5.66).

The list of other, potential risk factors includes the shape or orientation of pelvis, family history of POP, race, heavy lifting, constipation, previous surgery in pelvis and connective tissue disorders.

A great number of different symptoms could be associated with the prolapse of pelvic organs. The distinctive symptoms are vaginal, like feeling of bulge and protrusion; urinary, connected with urinary stress as well as urge incontinence; bowel symptoms resulting in different forms of defecation disorders and sexual problems such as dyspareunia. It seems to be characteristic that women with prolapse rarely suffer from pain [5, 6].

The incidence of POP meaningfully alters the health related quality of life of patients and therefore they are looking for help from health care providers.

Conservative treatment

The conservative options for management of POP are lifestyle changing, pelvic floor training, mechanical supporting and pharmacological medication. These possibilities refer to women with contraindications to surgical treatment or women who do not agree to such treatment. The conservative treatment can comprise the introductory part of management leading to the surgery.

Lifestyle changing

Lifestyle changes involve the procedures which can inhibit the progress in the intensification of the prolapse symptoms. Prevention of the increase in the abdominal pressure seems to be the main goal of the behavior connected with the lifestyle. The purpose can be achieved by avoiding heavy lifting and extremal physical activity. Cough and constipation are the causes of occasionally increased abdominal pressure to a pathological extent. Prevention and treatment of chronic cough and constipation (i.e. by cessation of smoking) are desirable directions of medical management. Overweight people should lose their weight.

The proposed lifestyle changes seem to lead to the reduction of temporal or permanent escalation of intraabdominal pressure (IAP). The studies of Cobb *et al*. [7] demonstrated that normal intra-abdominal pressure measured in the urinary bladder varies between –1.0 and 6.0 mm Hg with a mean value of 1.8 mm Hg. The objective measurements established by Cobb *et al*. do not always correlate with the medical indications concerning the lifestyle changes. The highest intra-abdominal pressure was achieved while coughing in a standing position, up to the value of 141 mm Hg and while jumping, up to 252 mm Hg. These values were even higher than during Valsalva maneuver with the maximal value of 116 mm Hg. On the other hand, intra-abdominal pressure while lifting a 10-pound weight was not higher than 25.5 mm Hg. An increased body mass index is correlated with the higher intra-abdominal pressure [8]. They measured the intra-abdominal pressure in pathological obese patients, with a BMI value of 55 kg/m^2 and found that its mean value was 12 cm H_2O (8.83 mm Hg). It is interesting that intra-abdominal pressure during some maneuvers studied by Cobb *et al*. like standing, coughing and coughing in a standing position significantly correlated with body mass index measurements which can be the cause of the potentiation of the symptoms of POP.

Pelvic floor muscle training

The scientific literature about the role of pelvic floor muscle training in management of POP is scarce. In the Cochrane Library report of 2011, the authors were able to include only 6 clinical trials [9]. In 4 of them the studied groups of individuals were less than 25, and in two of them, according to Hagen and Stark, the moderate to high risk of bias existed. Pelvic floor muscle training was compared with control/waiting list/no active treatment and as a supplementation to the surgery. In a study published by Brækken *et al*. [10], which compared the active physical management with doing nothing, it was proved that the prolapse symptoms occurred less frequently (OR = 0.37, 95% CI: 0.21-0.65) and were less bothering (OR = 0.56, 95% CI: 0.33-0.97) in the physically treated group of women. Ghroubi *et al*. [11] demonstrated that pelvic heaviness was less frequently felt by treated women (OR = 0.26, 95% CI:

0.11-0.61). Hagen *et al*. [12] noted that the prolapse symptoms score reported by pelvic floor muscle trained women was lower from baseline (OR = –3.37, 95% CI: –6.23-0.51). Moreover, 7 out of 19 treated women reported no improvement in prolapse compared with 16/21 women from the control group (OR = 0.48, 95% CI: 0.26-0.91). Several studies compared the pelvic floor surgery with the surgery supplemented by pelvic floor muscle training. Frawley *et al*. [13] observed better results of composed treatment in comparison with surgery alone (OR = 0.48, 95% CI: 0.12-0.84). Hagen and Stark [9] concluded that pelvic floor muscle training has benefits in terms of anatomical and symptomatic improvement but demanded larger trials to give clear evidence of the usefulness of such a treatment. In 2015, Wiegersma *et al*. [14] published the results of their randomized controlled trial in 278 women aged 55 and over. They compared the effects of pelvic floor muscle training with watchful waiting and concluded that the difference between groups was below the presumed level of clinical relevance.

Mechanical supporting

Bugge *et al*. [15] published the results of meta-analysis performed according to the Cochrane Library rules about the usage of pessaries in treatment of POP. They were able to include only one randomized crossover trial to the study. The authors of the included study compared the results of the ring pessary with the support and the Gellhorn pessary used in 134 women with prolapse who disagreed to be operated on [16]. The studied women were randomly enrolled in the group of ring pessary or Gellhorn pessary. After three months of treatment, the crossover change of pessaries was performed. The statistical significant improvement of POP symptoms was established by several questionnaires in both studied groups; however, the difference between the used pessaries in lowering the intensity of POP symptoms was not proven. Although the usage of pessaries is classified as an alternative therapy, performed in women who decline the surgery, there is evidence of serious and even fatal events reported as a complication of the therapy. Abdulaziz *et al*. [17] summarized the complications related to pessary use in the treatment of female POP. They classified the complications according to the Clavien-Dindo grading system [18]. They found that the most frequent complications were vaginal discharge, bleeding erosion, ulceration and foul odor. The vesicovaginal fistulas occurred in 34/1190 studied cases (2.9%). They reported 9 cancers related to the use of the pessary. It has been suggested that chronic inflammation in association with viral infections predispose women to cancers appearing at the site of the pessary placement [19]. Abdulaziz *et al*. noted three deaths due to the use of pessaries. Two of them resulted from the pyelonephritis and hydronephrosis [20, 21] and one followed the erosion of the pessary into the rectum [22]. Reviewing several types of pessaries the authors concluded that no single pessary design was complication free.

Estrogen administration

Although the laboratory evidence of the presence of estrogen receptors in the genital tract tissues is inconsistent, the deleterious role of estrogen deficiency is quite often observed. Particularly during menopause, the lack of estrogens is visible in the weakening of the genital tract connective tissue of fasciae and ligaments, the thinning of the vaginal mucous membrane and the loss of the vaginal folds [23, 24]. Reay Jones *et al*. [25] suggested that estrogen deficiency may decline the supporting function od pelvic fasciae, ligaments and muscles, and Lang *et al*. [26] demonstrated a decreasing number of estrogen receptors in these structures. Weakened pelvic tissues are considered to be the cause of the prolapse. Ismail *et al*. [27] reviewed the literature about the role of estrogen in the treatment of prolapse. Four studies fulfilled the conditions of the inclusion to the meta-analysis. The analyzed papers differed in the form and route of administered estrogens during the prolapse therapy. Only one significant relationship of estrogen treatment and prolapse could be proved. Using selective estrogen receptor modulators in menopause reduced the number of women requiring surgery for prolapse (OR = 0.50, 95% CI: 0.31-0.81).

Surgical treatment

There are several options for surgical management for treating the POP. They differ from one option to another in the route of approach: abdominal or vaginal, usage of grafts or not, and in the type of additionally used materials: biological or synthetic. Synthetic materials may be further divided into permanent polypropylene or absorbable polyglactin, three types of biological grafts may be used: autologous (using the person's own tissue), alloplastic (from animals) or homologous (cadaveric fascia lata). Additionally there is a choice between types of the sutures: absorbable, delayed-absorbable or non-absorbable.

Maher *et al*. [28] published the meta-analysis concerning the surgical methods for treating the prolapse. The authors included 56 randomized controlled trials, which evaluated 5954 women. They systematically compared procedures with the purpose of finding any significant differences. The comparisons they performed were:

- one type of upper vaginal prolapse repair versus another,

- one type of anterior vaginal wall prolapse repair versus another,
- one type of posterior vaginal wall prolapse repair versus another,
- any type of surgical prolapse repair versus conservative treatment,
- any type of surgical prolapse repair versus mechanical devices,
- no graft versus use of graft (synthetic mesh or biological graft),
- one type of graft (synthetic mesh or biological graft) versus another type of graft,
- one type of sutures versus another type of sutures,
- prolapse surgery and bladder function,
- one type of POP surgery alone versus another type of POP surgery alone,
- POP surgery alone versus POP surgery with an additional continence procedure.

The main results of the review were as follows:

- for upper vaginal prolapse, abdominal sacral colpopexy was associated with a lower rate of recurrent vault prolapse on examination and painful intercourse than with vaginal sacrospinous colpopexy,
- native tissue anterior repair was associated with more recurrent anterior compartment prolapse than when supplemented with a polyglactin (absorbable) mesh inlay (RR = 1.39, 95% CI: 1.02-1.90) or porcine dermis mesh inlay (RR = 2.08, 95% CI: 1.08-4.01),
- standard anterior repair was associated with more anterior compartment prolapse on examination than for any polypropylene (permanent) mesh repair (RR = 3.15, 95% CI: 2.50-3.96),
- awareness of prolapse was higher after the anterior repair as compared to polypropylene mesh repair (28% vs. 18%, RR = 1.57, 95% CI: 1.18-2.07),
- the reoperation rate for prolapse was similar at 14/459 (3%) after the native tissue repair compared to 6/470 (1.3%) (RR = 2.18, 95% CI: 0.93-5.10) after the anterior polypropylene mesh repair,
- for vaginal prolapse in multiple compartments, the recurrence rate on examination was higher in the native tissue repair group compared to the transvaginal polypropylene mesh group (RR = 2.0, 95% CI: 1.3-3.1),
- the posterior vaginal repair had fewer recurrent prolapse symptoms (RR = 0.4, 95% CI: 0.2-1.0) and lower recurrence on examination (RR = 0.2, 95% CI: 0.1-0.6) and on defecography (MD = –1.2 cm, 95% CI: –2.0-0.3),
- women undergoing prolapse surgery have benefited from having continence surgery performed concomitantly, especially if they had stress urinary incontinence (RR = 7.4, 95% CI: 4.0-14.0) or if they were continent and had occult stress urinary incontinence demonstrated pre-operatively (RR = 3.5, 95% CI: 1.9-6.6).

The authors were able to establish the side effects which lowered the benefits of selective operations:

- the benefits of abdominal sacral colpopexy compared with vaginal sacrospinous colpopexy must be balanced against a longer operating time, longer time to return to activities of daily living and the increased cost of the abdominal approach,
- blood loss (MD = 64 ml, 95% CI: 48-81), operating time (MD = 19 min, 95% CI: 16-21), recurrences in apical or posterior compartment (RR = 1.9, 95% CI: 1.0-3.4) and de novo stress urinary incontinence (RR = 1.8, 95% CI: 1.0-3.1) were significantly higher with transobturator meshes than for native tissue anterior repair. Mesh erosions were reported in 11.4% (64/563), with surgical interventions being performed in 6.8% (32/470),
- for vaginal prolapse in multiple compartments, the mesh erosion rate was 35/194 (18%), and 18/194 (9%) underwent surgical correction for mesh erosion; the reoperation rate after transvaginal polypropylene mesh repair of 22/194 (11%) was significantly higher than after the native tissue repair (7/189, 3.7%) (RR = 3.1, 95% CI: 1.3-7.3).

In 2008, the Food and Drug Administration (FDA), after receiving more than 1000 reports from surgical mesh manufacturers about complications associated with the implantation of meshes warned on its web site about rare complications, which, however, could have serious consequences [29]. On the same web site, the FDA issued recommendations for physicians who apply meshes. In 2011, the FDA issued the update with the information that complications connected with meshes were not rare [30]. The information was published about the most frequent complications of meshes such as erosion, pain, infection, bleeding, pain during sexual intercourse, organ perforation and urinary problems. The new recommendations were issued and addressed not only to the health care providers but to the patients as well. The recommendations were the continuation of previously published ones, but stressed the weighing of risks and benefits of surgery with mesh, and advised to recognize that in most cases POP can be treated successfully without mesh thus avoiding the risk of mesh-related complications [30]. The European counterpart of the FDA, the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) announced public consultations on the preliminary opinion on the safety of surgical meshes used in urogynecological surgery [31]. In this preliminary opinion, the SCENIHR concluded that the clinical outcome following the mesh implantation is influenced by material properties, product design, overall mesh size, route of implantation, patient characteristics, associated procedures and the surgeon's experience. All interested parties were invited to submit comments on the preliminary opinion by July 2015. To date no further records have been published. Ghoniem and Hammett [32] conducted an on-line survey among members of the International Urogynecological Association to study

the current practice patterns regarding the diagnosis, evaluation and surgical management of stress urinary incontinence and POP. The survey demonstrated that after the FDA's safety announcement about complications of transvaginal meshes, 45% of respondents reported a decreased use of meshes while 31% reported that it had no effect. Over 60% of surgeons in South America and more than 50% in Australia and Oceania reduced the usage of meshes. The lesser influence of the FDA warning was visible in North America and Europe (more than 40%). Europe was the only one region where there was a group of physicians who increased the usage of meshes in the treatment of POP. The method preferred by respondents for treatment of apical vault prolapse via the vaginal approach was sacrospinous ligament suspension (59%), the preferred method for anterior prolapse repair was simple colporrhaphy without using either synthetic or biological grafts (80%). Currently, 7% of IUGA survey respondents use transvaginal mesh for primary repair and 58% of them for recurrences. As many as 34% of gynecologists frequently use pessaries in the treatment of POP.

There are totally different opinions about the treatment of POP. Von Theobald [33] pushed forward the attitude that POP is a disease of the connective tissue, not an illness of the uterus and hysterectomy does not cure the prolapse. On the other hand, in the Patient Information Leaflet published on the official web site of the British Society of Urogynaecology there is information that the most common operation for uterine prolapse is a vaginal hysterectomy [34] and 93% of respondents of the IUGA members survey opt for this method [32].

The knowledge about the reasons and mechanisms of POP is insufficient, which leads to completely different opinions about its treatment. Nevertheless, the amount of studies concerning the evaluation and the treatment of POP ensures that the quality of care provided to women with urogynecological problems is continuously increasing.

Disclosure

Authors report no conflict of interest.

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