Mini-review: Modern Concept of Pelvic Organ Prolapse

Botagoz Aitbayeva*, Serik Iskakov, Lazat Smailova

Department of Obstetrics and Gynecology №2, NJSC “Astana Medical University”, Nur-Sultan, Kazakhstan

Abstract

Symptomatic pelvic organ prolapse (POP) has been increasing in recent years for both developed and developing countries. By 2050, as the adult population grows, the number of women with symptomatic POP will increase by 46%. Due to the increasing number of complications after surgery among women with POP, the current understanding of treatment has become extremely important for researchers and practitioners. There are many novel conservative and surgical treatment approaches under investigation. However, some primary surgical treatments show an approximate 30–50% risk of repeated pelvic floor reconstruction. Therefore, the review aims to summarize several conservative treatment options and identify critical areas of need for future research.

Introduction

The female pelvic floor is a complex functional and anatomic system [1]. It is composed of an active muscular component and a passive support system and topographically divided into three main functional and anatomic compartments: The anterior (supporting the bladder and urethra), the middle (the vagina and uterus), and the posterior (anorectal) compartment. The definition of “POP” describes a condition in which the supporting function of the pelvic walls is lost, followed by the prolapse of the pelvic organs into the vagina [1], [2], [3]. The proportion of women with one or complex dysfunction of the pelvic floor is 6.3% at the age of 20–29, 31.6% at the age of 50–59, and 52.7% in women over 60 [4]. Most patients with POP are asymptomatic [5]. According to the current population studies, about 20% of women will undergo surgery for stress urinary incontinence and POP at some point in their lives [4], [6]. Earlier studies showed that among women who underwent surgery for POP, between 30% and 50% had a need for reoperation. More recent studies show reductions in reoperation rates from about 6% to 30%, with most estimates falling within the lower end of this range [7], [8]. By 2050, as the adult population grows, the number of women with symptomatic POP will increase by 46% (4.9 million) [9], which will lead to an increase in the demand for adequate treatment and, accordingly, an increase in the costs of this pathology [10]. According to the well-known POP Quantification (POP-Q) system in combination with the Valsalva probe, POP divided into stages (Table 1) [11].

All points (anterior vaginal wall [Aa, Ba], superior vaginal wall [C, D], and posterior vaginal wall [Ap, Bp]) should be measured on maximal straining (except total vaginal length).

The etiology of POP is multifactorial. The main risk factors described in the literature include: Family form of POP [12], chronic constipation [13], an increase in body mass index in the first trimester of pregnancy [14], high parity of childbirth, mode of delivery, prolonged second stage of labor [15], use of obstetric forceps, damage to the anal sphincter, levator ani muscle injury [16], [17], as well as childbirth with a large fetus [18], [19]. Significant risk factors for the second trimester of pregnancy are the caudal position of the anterior vaginal wall (point Ba) at 21 weeks of gestation, greater distance from the urethra to the anus (Gh + Pb), increased levator muscle extensibility (measurement of the levator area at rest and straining with using transperineal ultrasound) at 21 weeks of gestation, and episiotomy during labor [10], [18].
Furthermore, comparative studies were carried out among different populations, as a result of which the genetic determinant of POP was proved. Four variants of genes significantly associated with POP have been identified (rs2228480 in the ESR1 gene, rs12589592 in the FBLN5 gene, rs484389 in the PGR gene, and rs1800012 in the COL1A1 gene) [19]. Success in repairing a stretch or tear in connective tissue is less likely to be achieved where collagen deficiency is most evident [20], [21], [22], similar to that observed in sports injuries. It has been proven that women with symptomatic POP are diagnosed with a greater degree of POP compared to an asymptomatic disease [23], which proves the presence of a persistent connection between the stage and the clinic of this disease (Table 2) [24], [25].

### Table 2: Description of symptoms

| Category          | Description                                                                 |
|-------------------|-----------------------------------------------------------------------------|
| Local vaginal symptoms | Discomfort in the vagina                                                     |
|                   | Vaginal “bulge” or “something coming down”                                   |
|                   | Worse at the end of the day, better lying down                               |
|                   | Queeving (a little bit of air can get pushed into the vagina and pushed out during sexual intercourse or physical activity) |
| Urinary tract symptoms | Stress incontinence (less likely with advanced prolapse)                    |
|                   | Urgency and urgency incontinence                                            |
|                   | the need for a manual procedure for emptying, for changing                  |
|                   | the position of the body to urinating                                      |
|                   | Voiding difficulties – urinary retention                                     |
| Bowel symptoms     | Constipation, straining to defecate                                          |
|                   | Anal incontinence (rectal/fatal)                                            |
|                   | Painful defecation                                                          |
|                   | Feeling of incomplete bowel evacuation                                      |
| Sexual symptoms    | Decreased libido                                                            |
|                   | Dyspareunia                                                                 |
|                   | Embarrassment due to altered body image                                      |

### Management of POP

#### Non-surgical treatment

As world practice shows, despite all the variety of existing methods for correcting POP, the effectiveness of these measures remains unsatisfactory. Today, it is advisable to divide all types of treatment into non-invasive (exercises to strengthen the pelvic floor muscles and pessaries), minimally invasive (laser technologies), and invasive (surgical). A terminology report on the conservative management of pelvic floor dysfunction in women has been developed, including over 200 separate definitions. It is based on clinical evidence, identifying the most common symptoms, signs, assessments, diagnoses, and treatments [39]. Clarity and ease of use were key goals to make it readily interpretable by practitioners from all the different groups of specialists involved in pelvic floor dysfunction in women [40]. Ongoing review is not only expected but also required to ensure that the document is constantly updated and is as widely accepted as possible [2]. However, the therapeutic potential of conservative methods

---

**Table 1: Stages of POP according to POP-Q system (adapted by Haylen et al. [2])**

| Stage | Characterization |
|-------|------------------|
| 0     | No prolapse is demonstrated (points Aa, Ba, C, D Ap, and Bp are all $$< -3 \text{ cm}$$). |
| 1     | The most distal portion of the prolapse is more than 1 cm above the level of the hymen (points Aa, Ba, C, D, Ap, and Bp are all $$< -1 \text{ cm}$$). |
| 2     | The most distal portion of the prolapse is situated between 1 cm above the hymen and 1 cm below the hymen (any of the points Aa, Ba, C, D, Ap, and Bp has a value between−1 cm and + 1 cm). |
| 3     | The most distal portion of the prolapse is more than 1 cm beyond the plane of the hymen, but not completely everted meaning no value is $$> = \text{ TVL−2 cm}$$ (any of the Points Ba, C, D, or Bp is $$> = \text{ TVL−2 cm}$$. |
| 4     | Complete eversion or eversion to within 2 cm of the total vaginal length of the lower genital tract is demonstrated (any of the Points Ba, C, D, or Bp is $$> = \text{ TVL−2 cm}$$. |

---

**Diagnostic tools for the detection of POP**

There is no universally accepted criterion for diagnosis of pelvic floor disorders, including POP-Q. The true influence of symptoms associated with POP on quality of life may be underestimated because of women social stigmatization and mentality [26], [27]. Therefore, development of standardized criteria, including the use of a specific prolapse grading system that correlates with symptom burden scores, is becoming of paramount importance. Moreover, choosing the multidisciplinary approach is a key issue in correct interpretation and further treatment of POP [28].

Different imaging techniques should be employed for correct diagnosis of POP. In accordance with the latest International Urogynecological Association/International Continence Society recommendations, among the studies used in clinical practice, X-ray methods, ultrasound diagnostics, and magnetic resonance imaging (MRI) have become the most widely used [2], [12]. At present, an alternative method for assessing POP is dynamic MRI of the pelvic floor, especially with lesions of the posterior vaginal wall. Due to its multifunctionality and high contrast of soft tissues, MRI allows a complex morphological and functional assessment of all three compartments simultaneously, without the use of ionizing radiation. It allows real-time assessment of functional diseases with dynamic acquisitions, similar to conventional defecation proctography [12], [29], [30], [31]. As a result of comparative studies, it has been proved that there is no difference in the detection of clinically significant pathologies associated with pelvic floor abnormalities when performing magnetic resonance defecography in a sitting position (open magnet) or in a supine position (closed magnet) [32], [33], [34]. Adequate pelvic tension during tension (clear movement of the abdominal wall and small intestine is visible) and evacuation of the rectal gel during bowel movements are critical for the examination to be considered diagnostic [28], [35].

There are many promising genetic markers underlying the heritability of POP needed further evaluation in large cohort prospective studies [19], [36], [37], [38]. Accumulating knowledge on the genetic aspects of POP gives hope to developing precise diagnostic algorithms based on the genetic features to achieve better preventative and treatment strategies for patients.
is effective only in prevention, as well as in the initial stages of prolapse [41]. Evidence for lifestyle changes is mixed, and there is a limited amount of research on specific interventions. Nevertheless, according to some authors, maintaining a healthy body mass index and smoking cessation significantly improve the condition of organs and tissues of the pelvic floor [42]. An exercise program aimed at improving the strength and function of the pelvic floor muscles in combination with physical therapy is the first line of therapy for symptomatic POP Stages 1–3 [39]. The essence of these exercises is to create negative intra-abdominal pressure. The use of physiotherapy, in turn, increases the effectiveness of these exercises [43]. If symptoms of pelvic floor muscle failure, urinary incontinence, or fecal incontinence are detected in the postpartum period, early referral to a physiotherapy program for at least 3 months is recommended [39].

Vaginal pessaries or rings are occlusive agents and can be used for any stage of prolapse. At present, a wide range of these products is offered, depending on the shapes and characteristics of the material being manufactured [44]. The main disadvantage of this method is its palliative needs, therefore, it is advisable to use them in women with pronounced prolapse of the vaginal walls, but having contraindications for surgical intervention [41], [45]. It is extremely important to consult with an experienced specialist when choosing a pessary to minimize the feeling of discomfort and prevent the development of inflammatory processes on the vaginal mucosa [40].

Due to the development of laser technologies in medicine, the relevance of using various techniques in the field of gynecology has also increased. Laser technologies release energy, which penetrates superficially into the tissues of the vagina, altering the structures of the vaginal epithelium and connective tissue. The impact occurs by triggering collagen synthesis. At the end of the treatment course, patients notice the “tightness” of the walls of the vagina. Nowadays, there is no any single large-scale multicenter study on the effectiveness of laser exposure in POP. However, the pathogenetic effect of this technology is not excluded, which may be effective under certain conditions [46].

**Surgical treatment**

Surgery remains the main treatment for dysfunction associated with POP. Treatment is considered successful when surgery is directed at well-defined triggers of the pathological process. All methods of surgical treatment are divided into organ preserving, organ losing ones using native tissues, as well as using mesh prostheses [47].

Colporrhaphy grafting with own tissues is the most frequently performed surgical treatment in the treatment of anteroposterior prolapse. The essence of the method consists in the reconstruction of the ligaments and fascia of the pelvic floor with surgical sutures [48]. When performing plastic surgery of the posterior vaginal wall, most specialists prefer the transvaginal approach. The presence of a defect after an old perineal rupture is an indication for perineorrhaphy (attachment of the pelvic floor wall to the rectovaginal septum) [41], [49].

According to some authors, the treatment of anterior compartment prolapse secondary to a lateral wall defect with an abdominal approach (open or laparoscopic) has shown sufficient anatomical success [39]. However, in terms of the duration of the operation, the frequency of complications and relapses, this method is still inferior to the anterior colporrhaphy and remains the least preferred among practicing doctors. The feasibility of organ carrying methods (extirpation and supravaginal amputation of the uterus) for uterovaginal prolapse has been discussed [50], since the main pathophysiology is associated with connective tissue, and not with a potentially healthy uterus. Removal of the organ does not in itself solve this problem, and the recurrence rate of prolapse ranges from 10% to 40%, since after removal of the uterus, an additional defect forms in the pelvic support apparatus [51]. The current review of all evidence suggests that, in the absence of indications for uterine preservation, vaginal hysterectomy with simultaneous apical fixation is the most appropriate treatment for uterovaginal prolapse [52]. Abdominal hysteropexy can be performed by anchoring the uterus to a fixation point within the pelvis. Most often, the cervix is fixed to the anterior longitudinal ligament of the sacrum using a mesh [49]. The efficacy rates 1 year after surgery for laparoscopic sacrohysteropexy turned out to be equivalent to those of vaginal hysteropexy [52]. Techniques have been developed to reduce the recurrence of vaginal dome prolapse after hysterectomy. Fixation of the vaginal vault to the sacrouterine ligament, as well as sacrosinous fixation [41], [53] as options for plastic surgery with one’s own tissues, is often used as a method of treating apical prolapse. The results of the effectiveness of these interventions 2 years after the operation are 64.5% and 63.1%, respectively [7]. However, the implementation of these methods is technically difficult due to the anatomical relationship of the ligaments and ureters. Foreign experts use indigo carmine for intraoperative prophylaxis of ureteral kinking. In the group of elderly sexually inactive patients in whom comorbidities are relative and absolute contraindications for extensive reconstructive surgery of the genitals, an alternative is obliteration procedures, which consist in partial or complete closure of the vagina [54]. The advantage of these methods of treatment is the short duration of the operation, the low rate of intra- and post-operative complications, and in most cases 100% efficiency [55]. The main disadvantage is the impossibility of sexual intercourse and difficult access to the uterine cavity when it is necessary to carry out diagnostic procedures [56].
Therefore, it is necessary to exclude the presence of gynecological cancers before performing the procedure, however, routine hysterectomy is not recommended due to the increased incidence in older patients [57].

For the 1st time in 1997, P. Petros put forward the idea of using synthetic implants for a posterior intravaginal sling [58]. The essence of this method is to form “neofascia” in the necessary compartments using endoprostheses. Over the years, the technology has gone through a series of modifications (Elevate, Calistar, Perige, Surelif, etc.), gaining the advantage of replacing the pubocervical and rectovaginal fascia [59]. By 2010, a third of all POP operations in the United States used mesh prostheses [60], [61]. However, a Cochrane systematic review of apical prolapse surgery did not show a significant advantage between prolapse treatment with native tissues and meshes, and patients with reconstructed meshes had a high risk of complications, including mesh erosion in 18% of cases [62]. In 2011, the United States Food and Drug Administration issued an advisory message warning professionals of an increase in mesh-related complications in urogynecologic procedures. The use of volumetric mesh prostheses entailed the development of implant-associated complications (erosion of the vaginal mucosa, vaginal synechiae, wrinkling of the mesh, de novo dyspareunia, and chronic pelvic pain) from 4.8% to 10% of cases [63]. It is believed that the possible causes of these complications are unjustified use of mesh implants in unexpressed stages of POP, insufficient qualification of the surgeon, peculiarities of the technical performance of the operation (superficial location of the polypropylene implant, excessive tension of the mesh, inadequate expansion followed by “wrinkling,” excision of excess vaginal mucosa, and fixation of the edge of the prosthesis in the projection of the limits of the fascial defect without peritonization [64], [65]. Cost analysis also showed that vaginal mesh correction was not cost effective compared to native tissue [66].

Numerous studies have shown that laparoscopic promontofixation, in which the vaginal dome or cervix is attached to the sacral promontory with a synthetic prosthesis, is the “gold standard” treatment for Stages 3–4 POP. The effectiveness of the intervention ranges from 78% to 100% if performed correctly, and the recurrence rate of stump prolapse ranges from 0% to 10% [67], [68]. However, this method is technically difficult, which requires a high competence of the surgeon and sufficient equipment of the operating departments.

Hybrid pelvic floor reconstruction implies a comprehensive approach to the treatment of POP, in particular the anterior-apical support level (DeLacey level I). The essence of the intervention is to use the maximum required amount of mesh prosthesis, carried out through the sacrospinous ligaments with simultaneous correction of the pubocervical fascia. The advantage of hybrid pelvic floor reconstruction is the subfascial suture method (according to Halstead), which reduces the risk of erosion of the vaginal mucosa [69]. Speaking about the effectiveness of the method, it should be noted that after a 2-year observation, the authors note high objective (91.7%) and subjective (95.8%) effectiveness [70]. Given the relative novelty of the method, research is required on the long-term results of objective and subjective data.

Conclusion

Thus, POP is common and at the same time highly variable in terms of anatomical and functional defects. Considering the growth of the older population, it is quite obvious that the burden of this pathological process will only increase. There are many novel conservative and surgical treatment approaches under investigation. The choice of a multidisciplinary approach, as well as patient focus in the diagnosis and treatment of prolapse, as well as associated pelvic organ dysfunctions, is an important link in the effectiveness of the treatment of these women. New techniques of minimally invasive surgical treatments are also required further research. Assuming that genetic biomarkers can be both diagnostic and prognostic to assist in the prediction of response to a certain therapy, prognostic risk groups stratification along with specific biomarkers identification will ensure low recurrence.

Authors’ Contributions

Conceptualization, S.S.; methodology, S.S., B.A., and S.L.; resources, B.A.; data curation, S.S. and B.A.; writing – original draft preparation, B.A.; writing – review and editing, B.A.; supervision, S.S; and project administration, S.S.

References

1. DeLancey JO. The anatomy of the pelvic floor. Curr Opin Obstet Gynecol. 1994;6(4):313-6. PMID:7742491
2. Haylen BT, de Ridder D, Freeman RM, Swift SE, Berghmans B, Lee J, et al. An international urogynecological association (IUGA)/international continence society (ICS) joint report on the terminology for female pelvic floor dysfunction. Int Urogynecol J. 2010;21(1):5-26. https://doi.org/10.1007/s00192-009-0976-9 PMID:19937315
3. Doaee M, Moradi-Lakeh M, Nourmohammadi A, Razavi-Ratki SK,
El Sayed RF, Alt CD, Maccioni F, Meissnitzer M, Masselli G, Manganaro L, et al. Magnetic resonance imaging of pelvic floor dysfunction-joint recommendations of the ESUR and ESGAR pelvic floor working group. Eur Radiol. 2017;27(5):2067-85. https://doi.org/10.1007/s00330-016-4471-7

PMid:27488850

Dietz HP. Ultrasound in the assessment of pelvic organ prolapse. Best Pract Res Clin Obstet Gynaecol. 2019;54:12-30. https://doi.org/10.1016/j.bpbopy.2018.06.006

PMid:30082146

Lalwani N, Khatri G, El Sayed RF, Ram R, Jambhekar K, Chenyak V, et al. MR defecography technique: Recommendations of the society of abdominal radiology’s disease-focused panel on pelvic floor imaging. Abdom. Radiol (NY). 2021;46(4):1351-61. https://doi.org/10.1007/s00261-019-02160-7

PMid:31335010

Iacobellis F, Brillantino A, Renzi A, Monaco L, Serra N, Feragalli B, et al. MR Imaging in diagnosis of pelvic floor descent: Supine versus sitting position. Gastroenterol Res Pract. 2016;2016:6594152. https://doi.org/10.1155/2016/6594152

PMid:26880893

Poncelet E, Rock A, Quinton JF, Cosson M, Ramdane N, Nicolas L, et al. Dynamic MR defecography of the posterior compartment: Comparison with conventional X-ray defecography. Diagn Interv Imaging. 2017;98(4):327-32. https://doi.org/10.1016/j.diii.2016.03.018

PMid:28089181

Kumar NM, Khatri G, Christie AL, Sims R, Pedrosa I, Zimmern PE. Supine magnetic resonance defecography for evaluation of anterior compartment prolapse: Comparison with upright voiding cystourethrogram. Eur J Radiol. 2019;117:95-101. https://doi.org/10.1016/j.ejrad.2019.05.018

PMid:31307659

Maccioni F, Al Ansari N, Buonocore V, Mazzamurro F, Indinnimeo M, Mongardi M, et al. Prospective comparison between two different magnetic resonance defecography techniques for evaluating pelvic floor disorders: Air-balloon versus gel for rectal filling. Eur Radiol. 2016;26(8):1783-91. https://doi.org/10.1007/s00330-016-4016-5

PMid:26443600

Kieserman-Shmokler C, Pandit A, Zawistowski M, Swenson CW. Genome wide association study (GWAS) of pelvic organ prolapse using an institutional genomics initiative. Female Pelvic Med Reconstr Surg. 2019;25 Suppl 5:S143.

PMid:30082146

Li L, Sun Z, Chen J, Zhang Y, Shi H, Zhu L. Genetic polymorphisms in women with and without advanced pelvic organ prolapse. Int Urogynecol J. 2018;29(1):99-107. https://doi.org/10.1007/s00192-017-3372-x

PMid:28600758

de Boer TA, Milani AL, Kluivers KB, Withagen MI, Vierhout ME. The effectiveness of surgical correction of uterine prolapse: Cervical amputation with uterosacral ligament plication (modified Manchester) versus vaginal hysterectomy with high uterosacral ligament plication. Int Urogynecol J Pelvic Floor Dysfunct. 2009;20(11):1313-9. https://doi.org/10.1007/s00192-009-0945-3

PMid:19669866

Tadir Y, Iglesia C, Alexiades M, Davila GW, Guerette N, Lamers BH, Broekman BM, Milani AL. Pessary treatment for pelvic organ prolapse and health-related quality of life; a review. Int Urogynecol J. 2011;6:637-44. https://doi.org/10.1007/s00192-011-1390-7

PMid:21472447

Hagen S, Glazener C, McClurg D, Macarthur C, Elders A, Herbison P, et al. Pelvic floor muscle training for secondary prevention of pelvic organ prolapse (PREVPROL): A multicentre randomised controlled trial. Lancet. 2017;389(10067):393-402. https://doi.org/10.1016/S0140-6736(16)32109-2

PMid:28010994

Lamers BH, Broekman BM, Milani AL. Pessary treatment for pelvic organ prolapse and health-related quality of life; a review. Int Urogynecol J. 2018;29(1):99-107. https://doi.org/10.1007/s00192-017-3372-x

PMid:28600758

de Boer TA, Milani AL, Kluivers KB, Withagen MI, Vierhout ME. The effectiveness of surgical correction of uterine prolapse: Cervical amputation with uterosacral ligament plication (modified Manchester) versus vaginal hysterectomy with high uterosacral ligament plication. Int J Gynaecol Obstet. 2019;25 Suppl 5:S143.

PMid:29532123

Li L, Sun Z, Chen J, Zhang Y, Shi H, Zhu L. Genetic polymorphisms in women with and without advanced pelvic organ prolapse. Int Urogynecol J. 2018;29(6):893-8. https://doi.org/10.1007/s00192-018-3597-3

PMid:29502352

American College of Obstetricians and Gynecologists and the American Urogynecologic Society. Interim Update: This Practice Bulletin is Updated as Highlighted to Reflect the
52. Maher C, Feiner B, Baessler K, Christmann-Schmid C, Haya N, Brown J. Surgery for women with apical vaginal prolapse. Cochrane Database Syst Rev. 2016;10(10):CD012376. https://doi.org/10.1002/14651858.CD012376
PMid:27696620

53. Gutman RE, Rardin CR, Sokol ER, Matthews C, Park AJ, Iglesia CB, et al. Vaginal and laparoscopic mesh hysteropexy for uterovaginal prolapse: A parallel cohort study. Am J Obstet Gynecol. 2017;216(1):38.e1-11. https://doi.org/10.1016/j.ajog.2016.08.035
PMid:2796620

54. Favre-Inhofer A, Carbonnel M, Murtada R, Revaux A, Asmar J, Ayoubi JM. Sacrospinous ligament fixation: Medium and long-term anatomical results, functional and quality of life results. BMC Womens Health. 2021;21(1):66. https://doi.org/10.1186/s12905-021-01195-7
PMid:33579252

55. Linder BJ, Gebhart JB, Occhino JA. Total colpocleisis: Technical considerations. Int Urogynecol J. 2016;27:1767-9. https://doi.org/10.1007/s00192-016-3034-4
PMid:27197790

56. Glazener C, Breeman S, Elders A, Hemming C, Cooper K, Freedman R, et al. Clinical effectiveness and cost-effectiveness of surgical options for the management of anterior and/or posterior vaginal wall prolapse: Two randomised controlled trials within a comprehensive cohort study-results from the PROSPECT Study. Health Technol Assess. 2016;20(95):1-452. https://doi.org/10.3310/hta20950
PMid:28052810

57. Jones KA, Zhuo Y, Solak S, Harmanli O. Hysterectomy at the time of colpocleisis: A decision analysis. Int Urogynecol J. 2016;27(5):805-10. https://doi.org/10.1007/s00192-015-2903-6
PMid:26658894

58. Caliskan A, Ozeren M, Goeschen K. Modified posterior intravaginal slingplasty: Does the additional bilateral tape attachment to the sacrospinous ligament improve the results? Cent European J Urol. 2016;71(3):326-33. https://doi.org/10.5173/ceju.2018.1685
PMid:30386655

59. Rogowski A, Kluz T, Szafarowska M, Mierzejewski P, Sienkiewicz-Jarosz H, Samochowicz J, et al. Efficacy and safety of the Calister and Elevate anterior vaginal mesh procedures. Eur J Obstet Gynecol Reprod Biol. 2019;239:30-34. https://doi.org/10.1016/j.ejogrb.2019.05.033
PMid:31163354

60. Campbell P, Jha S and Cutner A. Vaginal mesh in prolapse surgery. Obstet Gynaecol. 2018;20:49-56.

61. Funk MJ, Edenfield AL, Pate V, Visco AG, Weidner AC, Wu JM. Trends in use of surgical mesh for pelvic organ prolapse. Am J Obstet Gynecol. 2013;208(1):79.e1-7. https://doi.org/10.1016/j.ajog.2012.11.008
PMid:23195692

62. Funk MJ, Edenfield AL, Pate V, Visco AG, Weidner AC, Wu JM. Trends in use of surgical mesh for pelvic organ prolapse. Am J Obstet Gynecol. 2013;208(1):79.e1-7. https://doi.org/10.1016/j.ajog.2012.11.008
PMid:23195692

63. Bugge C, Adams EJ, Gopinath D, Stewart F, Dembinsky M, Sobiesuo P, et al. Pessaries (mechanical devices) for managing pelvic organ prolapse in women. Cochrane Database Syst Rev. 2020;11(11):CD004010. https://doi.org/10.1002/14651858.CD004010.pub4
PMid:33207004

64. Lo TS, Ng KL, Huang TX, Chen YP, Lin YH, Hsieh WC. Anterior-apical transvaginal mesh (sureslift) for advanced urogenital prolapse: Surgical and functional outcomes at 1 year. J Minim Invasive Gynecol. 2021;28(1):107-16. https://doi.org/10.1016/j.jmig.2020.05.002
PMid:32416263

65. Maher C, Feiner B, Baessler K, Christmann-Schmid C, Haya N, Marjoribanks J. Transvaginal mesh or grafts compared with native tissue repair for vaginal prolapse. Cochrane Database Syst Rev. 2016;2(2):CD012079. https://doi.org/10.1002/14651858.CD012079
PMid:26858090

66. Glazener C, Breeman S, Elders A, Hemming C, Cooper K, Freedman R, et al. Clinical effectiveness and cost-effectiveness of surgical options for the management of anterior and/or posterior vaginal wall prolapse: Two randomised controlled trials within a comprehensive cohort study-results from the PROSPECT Study. Health Technol Assess. 2016;20(95):1-452. https://doi.org/10.3310/hta20950
PMid:28052810

67. Bø K, Hilde G, Steer-Jensen J, Siafarikas F, Tennfjord MK, Engh ME. Postpartum pelvic floor muscle training and pelvic organ prolapse-a randomized trial of primiparous women. Am J Obstet Gynecol. 2015;212(1):38.e1-7. https://doi.org/10.1016/j.ajog.2014.06.049
PMid:24983687

68. Matsuoka S, Bonnin M, Fournet-Fayard A, Bazin JE, Botchorishvili R. Effects of low intraperitoneal pressure on quality of postoperative recovery after laparoscopic Surgery for genital prolapse in elderly patients aged 75 years or older. J Minim Invasive Gynecol. 2021;28(3):1972-8.e3. https://doi.org/10.1016/j.jmig.2020.09.017
PMid:32979535

69. Shkarupa DD, Kubin ND, Popov EN, Shaposvalova EA, Kovaliev GV, Piaev AE. Vaginal apical and anterior reconstruction using ultralight weight mesh: Two-year follow-up. J Obstet Womens Dis. 2018;67(3):55-63.

70. Kubin ND, Shkarupa DD, Shaposvalova EA, Zaytseva AO. Hybrid technique of pelvic floor reconstruction based on apical sling. Urol Vedomosti. 2017;7(C):62-3.