

Comparison of anterior colporrhaphy and vaginal mesh therapy for pelvic organ prolapse: a systematic review and meta-analysis

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<https://doi.org/10.22146/inajbcs.v57i3.19977>

ABSTRACT

Submitted: 2025-02-20
Accepted : 2025-07-22

Pelvic organ prolapse (POP) is a common pelvic disorder among women. Although it is not life-threatening, POP represents significant health concern because it can cause urinary incontinence, decrease sexual function, and impair quality of life. This systematically review was conducted to compare the effectiveness and safety of anterior colporrhaphy with vaginal mesh therapy in the management of POP. The data sources were selected for their reputation in publishing high-quality research in urology and women's health, including PubMed, Google Scholar, ScienceDirect, and the Cochrane Library, covering publications from 2014 to 2024. We included both randomized and non-randomized studies comparing anterior colporrhaphy with vaginal mesh therapy for stress urinary incontinence (SUI), ensuring a comprehensive review of the available evidence. Data were extracted on sample size, study location, surgical technique, patient satisfaction, reoperation rates, mesh erosion, pain, sexual function, operative time, length of hospital stay, and other complications. A total of 3,528 articles were collected. After removing 2,834 duplicates, 694 unique records remained. Following a quality assessment, six studies met the final inclusion criteria. Analysis of randomized controlled trials and cohort studies revealed no significant differences between the two procedures in terms of erosion rates, SUI incidence, reoperation rates, or patient satisfaction. These findings highlight the importance for urogynecologists to carefully consider patient identification, selection, comorbidities, and the choice of POP repair procedure.

ABSTRAK

Prolaps organ panggul (POP) adalah kelainan panggul yang umum terjadi pada wanita. Meskipun tidak mengancam jiwa, POP dapat menjadi masalah kesehatan yang serius karena dapat menyebabkan inkontinensia urin, menurunnya fungsi seksual, dan menurunkan kualitas hidup. Tinjauan sistematis ini dilakukan untuk membandingkan efektivitas dan keamanan *anterior colporrhaphy* dengan terapi *vaginal mesh* dalam penanganan POP. Sumber data dipilih berdasarkan reputasinya dalam mempublikasikan penelitian berkualitas tinggi di bidang urologi dan kesehatan wanita, meliputi PubMed, Google Scholar, ScienceDirect, dan Cochrane Library, dengan cakupan publikasi dari tahun 2014 hingga 2024. Kami memasukkan baik studi acak maupun non-acak yang membandingkan *anterior colporrhaphy* dengan terapi *vaginal mesh* untuk inkontinensia urin stres (SUI), guna memastikan tinjauan komprehensif terhadap bukti yang tersedia. Data yang dikumpulkan mencakup jumlah sampel, lokasi penelitian, teknik operasi, kepuasan pasien, angka reoperasi, erosi mesh, nyeri, fungsi seksual, waktu operasi, lama rawat inap, dan komplikasi lainnya. Sebanyak 3.528 artikel dikumpulkan. Setelah menghapus 2.834 duplikasi artikel, tersisa 694 artikel unik. Setelah melalui penilaian kualitas, enam studi memenuhi kriteria inklusi akhir. Analisis uji acak terkontrol dan studi kohort menunjukkan tidak terdapat perbedaan bermakna antara kedua prosedur dalam hal angka erosi, kejadian SUI, angka reoperasi, maupun kepuasan pasien. Temuan ini menekankan pentingnya bagi ahli uroginekologi untuk mempertimbangkan dengan cermat identifikasi pasien, pemilihan pasien, komorbiditas, serta pemilihan prosedur perbaikan POP yang akan dilakukan.

Keywords:
stress urinary
incontinence;
anterior colporrhaphy;
vaginal mesh;
pelvic organ prolapse

INTRODUCTION

Pelvic organ prolapse (POP) is a common pelvic disorder in women.¹ It is a significant concern as it can lead to urinary incontinence, decreased sexual function, and impacting quality of life although it is not life threatening.^{2,3} Pelvic organ prolapse is the prolapse of the anterior, posterior, and/or apical portion of the vagina, accompanied by protrusion of one or more pelvic organs (e.g., the rectum, uterus, bladder, vaginal cuff after hysterectomy, or small intestine) into the vagina. The loss of structural support to the pelvic organs causes pathological changes that impact a woman's quality of life. The POP occurs due to damage or injury to the supporting structures of the pelvic floor or its contents, such as muscles, connective tissue, and nerves.⁴

Management of POP can be conservative (perineal rehabilitation or pessary use) or surgical (with 80-90% performed vaginally).⁵⁻⁷ In the treatment of POP, currently there are several surgical procedures that have been developed. Anterior colporrhaphy and paravaginal defect repair are two standard procedures. The paravaginal defect repair technique involves identifying and repairing damaged points in the pelvic floor.⁸ The concept of anterior colporrhaphy focuses on repairing central defects by folding the bladder beneath the pubovaginal muscular/adventitial layer and trimming the weakened vaginal epithelium.⁸

A meta-analysis showed that surgeries using mesh demonstrated

better anatomical outcomes postoperatively than non-mesh surgeries for cystocele, with no difference in functional outcomes.⁹ The mesh method has been reported to cause many complications, such as chronic pain, dyspareunia and vaginal mesh exposure that affects patient satisfaction.^{10,11} Compared to mesh procedures, anterior colporrhaphy also presents challenges for urogynecologists concerning postoperative recurrence rates.⁶ Up to 40% of patients after anterior colporrhaphy may experience POP.¹²

The paucity of studies comparing the use of anterior colporrhaphy and vaginal mesh in POP cases creates difficulties for urogynecologists in determining the most appropriate procedure in each case. Currently, there is still a significant gap in the understanding of stress urinary incontinence (SUI) using vaginal gauze and anterior colporrhaphy due to the lack of comprehensive studies. This systematic review aimed to compare the effectiveness and safety of anterior colporrhaphy with vaginal mesh therapy in the management of POP. This review is expected to provide comprehensive insight to physicians in selecting the appropriate surgical option according to the anatomical abnormalities and clinical presentation of each patient.

MATERIAL AND METHODS

Advanced search techniques were employed to ensure a comprehensive search for potentially relevant articles (PROSPERO number CRD42024563745).

Our search spanned across PubMed, Science Direct, Cochrane Library, and Google Scholar, focusing on studies related to anterior colporrhaphy and vaginal mesh for POP in the past 10 years (2014-2024). This literature search was conducted from August 2024 to September 2024, using Advanced Search based on keywords combined with medical subjects headings (MeSH) synonyms. The PICOS (population, intervention, comparison, outcome, and studies) framework was applied to establish our inclusion and exclusion criteria. (i) Population: patients diagnosed with POP, (ii) Intervention: vaginal mesh, (iii) Comparator: anterior colporrhaphy, (iv) Outcomes: satisfaction, incidence of erosion, stress urinary incontinence, reoperative post-surgery (v) Study design: RCT and cohort studies.

All journals in this article were obtained from electronic databases and stored at Rayyan.ai, then further screened. Four independent reviewers conducted the selection based on title and abstract screening, followed by full-text selection based on eligibility criteria. If any conflicts were identified during article selection, they were discussed with all authors. After the entire population passed the selection stage, the sample was obtained for this study. The suitability of the title, abstract, accessibility, and eligibility criteria was determined.

The literature characteristic data were collected, including study design, sample size, research location,

characteristics of subjects, intervention applied, and results and findings. Our data synthesis was based on the PRISMA 2020 flow diagram, a gold standard for updated systematic reviews, ensuring transparency and rigor in our process (FIGURE 1).

The risk of bias for each study was assessed using the Cochrane Risk of Bias 2 (ROB 2) tool for randomized controlled trials research and Joanna Briggs Institute (JBI) for cohort research. This tool has several domains, such as randomization process, deviations from intended interventions, missing outcome data, measurement the outcome, selection of the reported resulted and overall bias. Each domain is rated as “low risk,” “unclear risk,” and “high risk” of bias (FIGURE 2).

The assessment of bias was conducted by assessing of a critical appraisal of the checklist provided by JBI. The assessment was conducted using a three-tier system, categorizing responses as ‘yes’, ‘no’, ‘unclear’, or ‘not applicable’ for each question. The result of this assessment was presented in the form of a table, with the following categories: “High quality” for scores of 70% or higher, “Medium quality” for scores between 50% and 70%, and “Low quality” for scores below 50% (TABLE 1). Data were analyzed using quantitative analysis methods using Review Manager. Researchers draw conclusions based on results obtained from the synthesis and analysis process (TABLE 2).

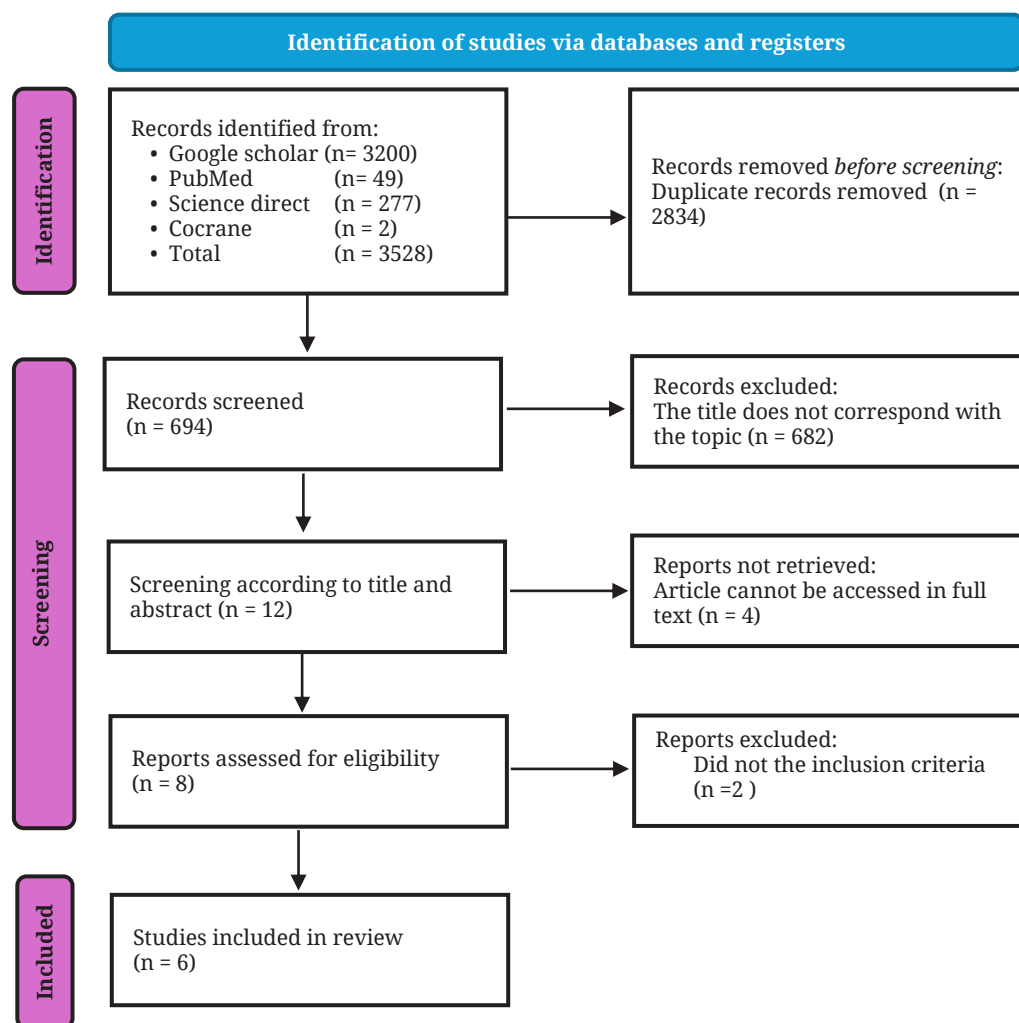


FIGURE 1. PRISMA flow chart

Data were analyzed narratively and quantitatively using meta-analysis. Meta-analysis was performed using Review Manager (RevMan) 5.4 (Cochrane Collaboration, Oxford, UK) with a 95% confidence interval (CI). Pooled risk ratios were used to calculate the outcomes of erosion, satisfaction, stress urinary incontinence, and reoperative procedures in anterior colporrhaphy and vaginal mesh. In addition, pooled mean differences (MD) were used to calculate the outcomes in PHD. Random Effects Model (REM) and Fixed Effects Model (FIM) were used based on heterogeneity ($I^2 > 50\%$ was defined as high heterogeneity, I^2 25-50%

was defined as low heterogeneity, and I^2 0-25% indicated no heterogeneity) based on the Cochrane Handbook of systematic reviews of interventions. Potential bias may occur due to variations in surgical technique and surgeon expertise. This can be addressed by implementing standardized surgical protocols, using validated outcome measures, and ensuring that surgeons receive adequate training and experience.

RESULTS

The article search process was conducted in September 2024, and therefore, the journals included in

the research spanned 2014 to 2024. Articles retrieved through database search engines using PICO keywords were downloaded into the Mendeley library. A flow diagram describing the study selection process is shown in FIGURE 1. A total of 3,528 research articles were found. After eliminating duplicates, 2834 duplicate journals were identified. Following the merging of duplicates, there were 694 unique journals remaining. The sorting of articles continued manually based on title and abstract selection. Articles that met the inclusion criteria summed up to 12 journals. The author reviewed the remaining articles comprehensively and excluded those whose research subjects were unsuitable, did not address one of the variables of this research (vaginal mesh and colporrhaphy anterior), or scored less than 60% in the JBI questionnaire regarding journal

quality. After reviewing the overall journal quality, six articles met the final inclusion criteria. The characteristics of these articles are listed in TABLE 1. The obtained journals consisted of 3 cohort articles and three randomized control trial (RCT) articles discussing the comparison of vaginal mesh and anterior colporrhaphy. We conducted an analysis based on grouping research methods to minimize research bias.

The risk of bias assessment was conducted using the Cochrane ROB 2 tool. The risk of bias assessment was performed by two reviewers independently. Any differences in assessment were discussed with the other author. The results are presented in FIGURE 2. There are several possible risks of bias, including intervention bias, and measurement bias that were not explained in the study.

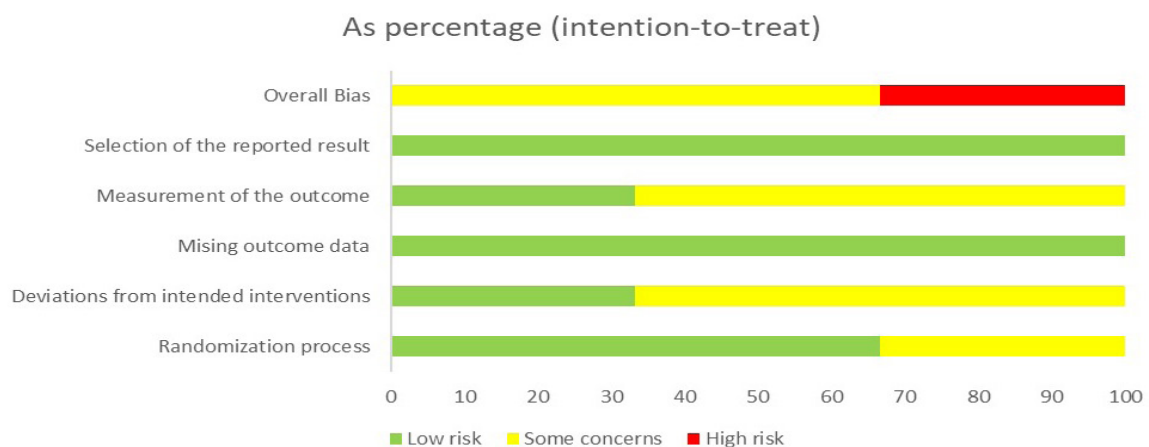


FIGURE 2. ROB 2 Graph of Included Studies

TABLE 1. JBI Score of included studies

Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Score (%)
Balzaro <i>et al.</i> , ¹³	V	V	V	X	X	V	V	X	V	V	V	72.7
Cassagne <i>et al.</i> , ⁶	V	V	V	X	X	V	V	V	V	V	V	81.8
Curtiss <i>et al.</i> , ¹⁴	V	V	V	V	X	V	V	V	V	V	V	90.9

The parameters analyzed included erosion, SUI, post-surgery reoperation, and patient satisfaction following the procedure. The analysis results in the RCT study showed no significant difference in the incidence of erosion in the two research groups (FIGURE 3).

Similar results were also obtained in the cohort group analysis that there was no significant difference in satisfaction, SUI, and reoperation in each POP group that received vaginal mesh and anterior colporrhaphy therapy.

TABLE 2. Research characteristics

Author and year	Study design	Sample		Events/outcome		Result
		Anterior colporrhaphy	Vaginal mesh	Anterior colporrhaphy	Vaginal mesh	
Balzaro, 2017 ¹³	Cohort	25 patients	48 patients	<ul style="list-style-type: none"> • Satisfaction: 10 patients • SUI: 6 patients • Reoperative procedure: 6 patients 	<ul style="list-style-type: none"> • Satisfaction :33 patients • SUI: 9 patients • Reoperative procedure: 9 patients 	<ul style="list-style-type: none"> • The level of personal satisfaction of patients was high in all groups. There was no difference in the results of this procedure. • While the complication rate was found to be higher in the mesh group ($p < 0.05$), which explains the lower subjective satisfaction of these patients.
Cassagne, 2023 ⁶	Cohort	42 patients	48 patients	<ul style="list-style-type: none"> • Satisfaction: 36 patients • SUI: 3 patients • Reoperative procedure: 3 	<ul style="list-style-type: none"> • Satisfaction: 35 patients • SUI: 3 patients • Reoperative procedure: 3 	<ul style="list-style-type: none"> • There was no difference in satisfaction, reoperation, and stress urinary incontinence after 1 yr between the two groups ($p = 0.9789$).
Curtiss and Duckett, 2018 ¹⁴	Cohort	52 patients	52 patients	<ul style="list-style-type: none"> • Satisfaction: 35 patients • Reoperative procedure: 1 patient 	<ul style="list-style-type: none"> • Satisfaction: 38 patients • Reoperative procedure: 2 patients 	<ul style="list-style-type: none"> • In the mesh group, more women reported that they were “much better” or “very much better” (69 vs 40%; $p = 0.02$). • There was an 11.6% mesh erosion rate at follow-up. • Two women in the mesh group required surgical excision of eroded mesh in the operating room (4%). • Reoperation rates for the combination of de novo stress incontinence, recurrent prolapse, and mesh exposure were similar in each group (33% mesh vs 32% native tissue).

Note. SUI: stress urinary incontinence

TABLE 1. Cont.

Author and year	Study design	Sample		Events/outcome		Results
		Anterior colporrhaphy	Vaginal mesh	Anterior colporrhaphy	Vaginal mesh	
Minassia, 2014 ¹⁵	RCT	34 patients	33 patients	• Erosion: 12 patients	• Erosion: 11 patients	<ul style="list-style-type: none"> • Anterior colporrhaphy with 910 mesh polyglactin and abdominal paravaginal defect repair had similar success rates at 2 yr follow-up • Patient satisfaction was 88% for the vaginal group and 73% for the abdominal group, p= 0.11. • Objective failure rates for both procedures were 33–35%.
Rudnicki, 2015 ¹⁶	RCT	82 patients	78 patients	• Erosion :40 patients	• Erosion: 6 patients	<ul style="list-style-type: none"> • Objective anatomical healing was demonstrated by POP-Q of 88.1 and 91.4%, in the mesh group at 1 and 3-year follow-up, respectively, compared to colporrhaphy group of 39.9 and 41.2%. • No differences were found in PFIQ-7, PFDI-20, and POP/PISQ-12 scores.
Tamanini, 2015 ¹⁷	RCT	50 patients	42 patients	• Erosion :18 patients	• Erosion :10 patients	<ul style="list-style-type: none"> • At baseline there was no significant difference in the polypropylene mesh (PM) group (45) and the control group (anterior colporrhaphy) without PM (50). But there was a significant increase in the mesh group at 24 mo follow-up. • There was no difference in the 2 healing criteria at the prolapse stage. 7 patients (16%) in the mesh group experienced minor mesh-related complications and asymptomatic exposure

Note. POP-Q: pelvic organ prolapse quantification; PISQ-7: pelvic floor impact questionnaire; PFDI-20: pelvic floor distress inventory; POP/PISQ-12: pelvic organ prolapse/urinary incontinence sexual questionnaire.

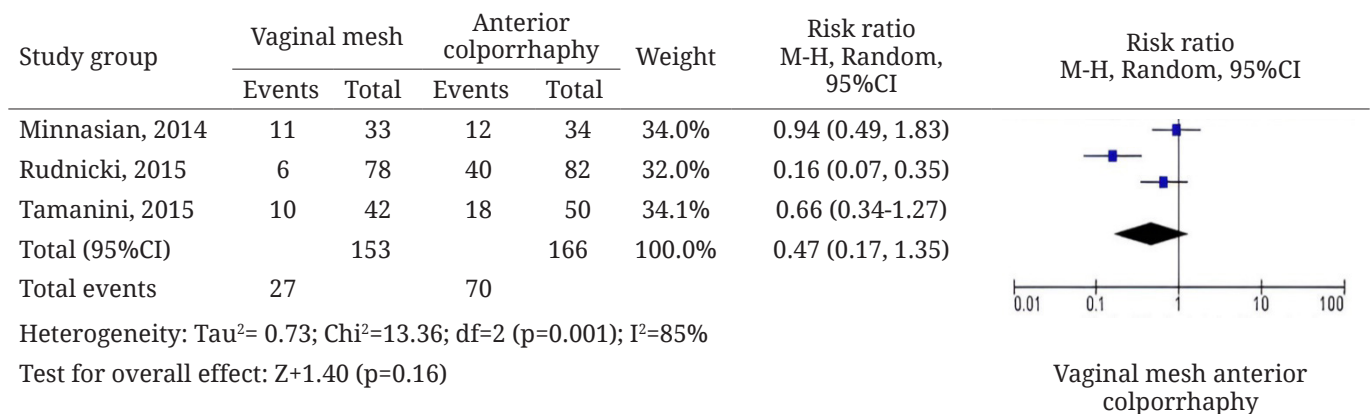


FIGURE 3. Erosion

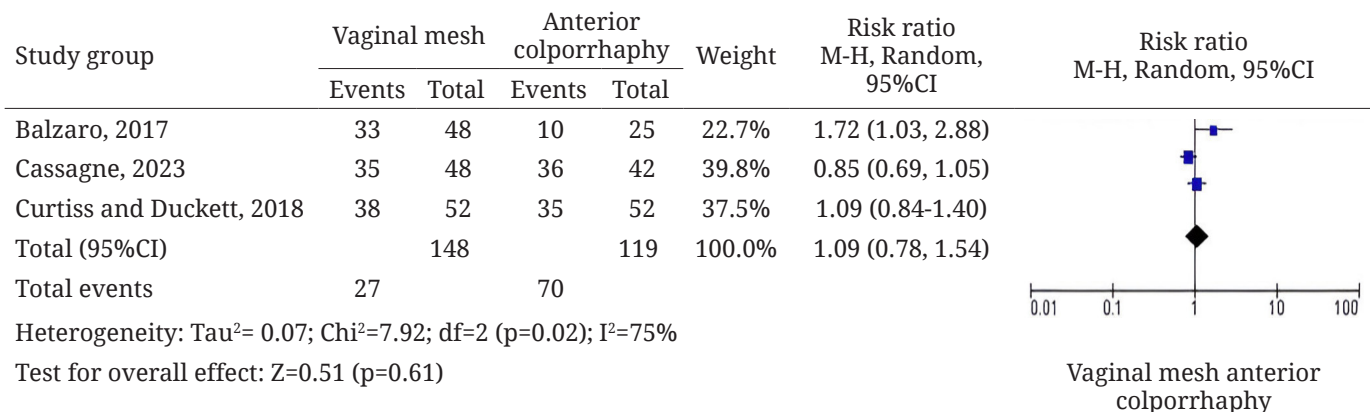


FIGURE 4. Satisfaction

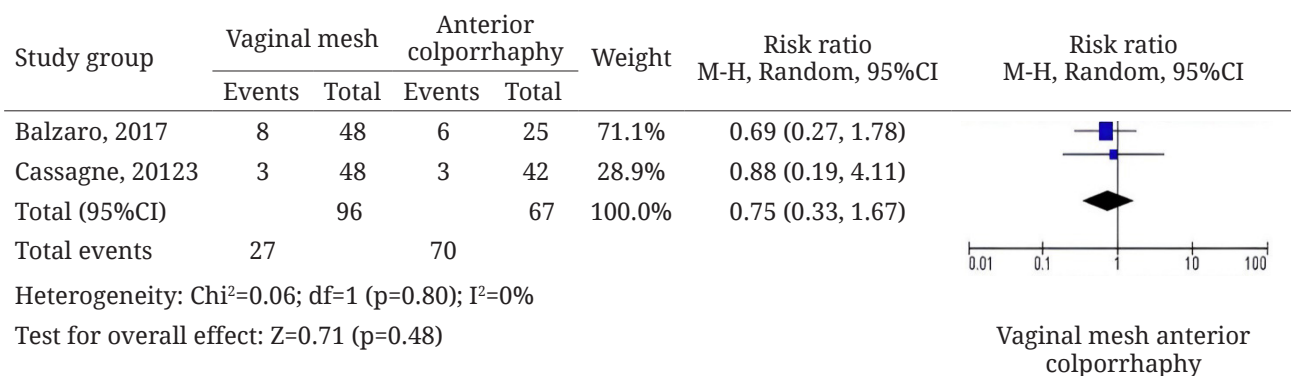


FIGURE 5. Stress urinary incontinence

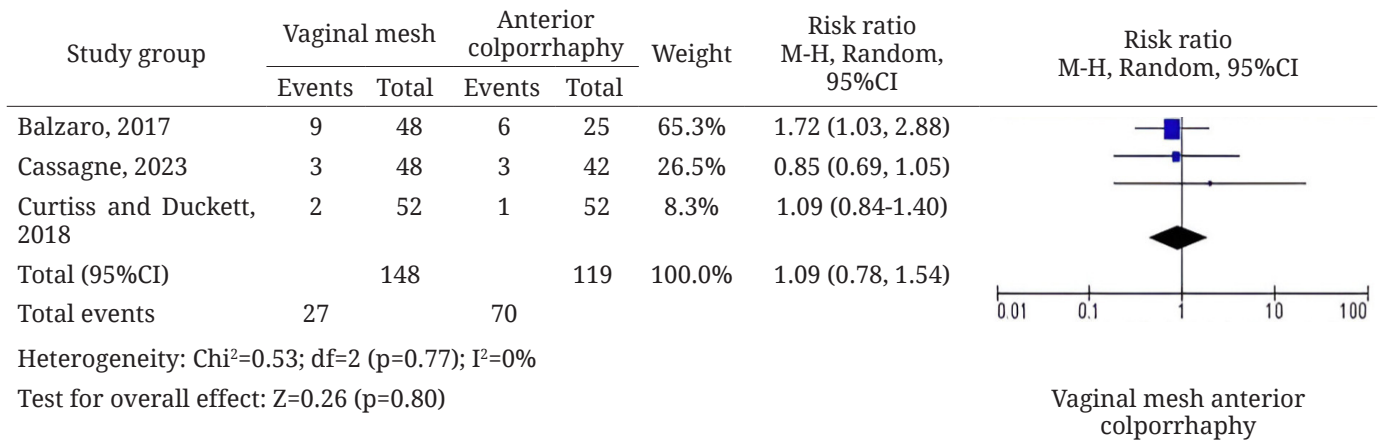


FIGURE 6. Reoperative procedure

DISCUSSION

Vaginal mesh

Improving anatomical outcomes compared to native tissue repair as well as enhancing tissue integrity that may be biomechanically and biochemically compromised are the goals of mesh. Initially, surgical mesh was designed for hernia repair. Due to its success in hernia surgery, PPL mesh is now being used in the pelvic floor of women with condition such as SUI. This mesh can be implanted either transabdominally or transvaginally. Transvaginal mesh implantation is known to have many advantages, namely reducing prolapse, reducing prolapse recurrence, and reducing reoperation rates compared to native tissue repair within 1-3 yr. However, because it has an erosion rate of 8%, the safety of using mesh as a transvaginal POP repair procedure is questionable.¹⁸

There is still a lot to learn from mesh problems.¹⁹ Exposure through the vaginal wall, infection, pain, and erosion of adjacent structures are examples of complications from mesh.²⁰ Other *in vivo* studies showed complications of vaginal mesh use include myofibroblast proliferation with fibrosis and damage to the vaginal epithelium.²¹ The study also

explained that the use of mesh can cause reduced collagen, vaginal thinning due to apoptosis, loss of contractile function, decreased mechanical integrity, and increased proteolysis.²²

Anterior colporrhaphy

Anterior colporrhaphy is a standard procedure that is often performed with the principle based on the folding of the vesicovaginal fascia in the midline with the aim of strengthening it. Colporrhaphy consists of anterior and posterior, depending on the midline of the vaginal wall.²³ The concept of anterior colporrhaphy focuses on repairing central defects by folding the bladder beneath the pubovaginal muscular/adventitial layer and trimming the weakened vaginal epithelium.⁸

Anterior colporrhaphy also presents challenges for urogynecologist concerning postoperative recurrence rates.⁶ Pelvic organ prolapse can occur in up to 40% of patients after anterior colporrhaphy.^{24,25} The high recurrence rate is caused by several factors, including differences in the steps of the anterior colporrhaphy procedure. Many important factors influence the outcome of surgery, namely each step of the AC procedure, the surgeon's experience, perioperative care and anesthesia.²³ The

surgical techniques currently used to treat anterior vaginal wall prolapse are anterior colporrhaphy and paravaginal repair. Both techniques have varying results and standardization. Among the standard surgical procedures for anterior vaginal prolapse, anterior colporrhaphy has long offered simplicity with a straightforward approach, resulting in shorter operative times. However, this procedure carries the potential for vaginal shortening and a high recurrence rate. Laparoscopic paravaginal repair is known to provide more anatomical repair of lateral defects. This procedure offers the advantages of preserving vaginal length, reducing the risk of bleeding, being minimally invasive, accelerating recovery, and providing better visualization. However, its disadvantages include potential complications, technical complexity, and longer operative times.²⁶

Use of vaginal mesh vs anterior colporrhaphy in POP patients

The use of vaginal mesh and anterior colporrhaphy in POP patients is still debated. However, our meta-analysis explains that there is no difference in the use of anterior colporrhaphy and vaginal mesh in terms of satisfaction and side effects such as SUI, erosion, and reoperation after the procedure, as described in TABLE 1.

Satisfaction

The satisfaction was assessed in three studies. It was reported in 81 of 199 patients in the colporrhaphy group and 106 of 148 patients in the mesh group. The existence of statistical heterogeneity, indicated by $I^2=75\%$, occurred due to variations in the number of samples, with few included studies. Therefore, the analysis was conducted using random

effects. The difference between the two groups in terms of satisfaction was not statistically significant (RR = 1.09; 95% CI [0.78, 1.54]; $p = 0.37$). The results of the satisfaction procedure can be seen in FIGURE 4.

The first study demonstrated that there was no statistically significant difference in patient satisfaction between patients who underwent anterior colporrhaphy and vaginal mesh surgery after one year.⁶ The study identified several factors that contributed to patient satisfaction, including the absence of dyspareunia in sexually active women post-surgery and reduced hospitalization times. This finding aligns with prior research, which demonstrated comparable levels of dyspareunia in cases of SUI following anterior colporrhaphy and vaginal mesh procedures.²⁷ Another study revealed that patient satisfaction, as measured by the Patient Global Impression of Improvement (PGI-I) score, was “very much better” or “much better” in 68.8% of cases in the vaginal mesh group and 40% in the anterior colporrhaphy group.¹⁴ However, the study also demonstrated a relatively high rate of maintenance activity, with 40% and 46% of patients in the vaginal mesh and anterior colporrhaphy groups, respectively. Contrary to the findings of previous studies, research conducted by Balzarro *et al.*¹³ revealed low levels of satisfaction in both groups. This discrepancy can be attributed to the high complication rate observed in patients, with 15.8% in the anterior colporrhaphy group and 29.2% in the vaginal mesh group experiencing complications within one month of surgery.

Erosion

The incidence of erosion in POP surgeries was evaluated across three

studies included in the meta-analysis. Among the participants, erosion was observed in 70 out of 166 patients (42.2%) in the colporrhaphy group and 27 out of 153 patients (17.6%) in the mesh group. The pooled risk ratio (RR) for erosion was 0.47 (95% CI [0.17, 1.35]; $p = 0.16$), indicating that the difference in erosion rates between the two groups was not statistically significant. The existence of statistical heterogeneity, as indicated by $I^2=85\%$, occurred due to differences in the variation of the number of samples between studies. This finding was corroborated through the execution of a sensitivity analysis, which involved the exclusion of the Rudnicki study¹⁶. Consequently, the heterogeneity was reduced to 0%, prompting the analysis to be conducted using random effects. Analysis of patient erosion was conducted in three RCTs. The first, conducted by Minassian *et al.*,¹⁵ showed no difference after two years of follow-up. Both procedures had the same target failure rate of around 33-35%, most of which were asymptomatic. This study is consistent with the findings of Tamanini *et al.*,¹⁷ which demonstrated that women who underwent anterior colporrhaphy for prolapse repair exhibited comparable objective enhancements with vaginal mesh. The healing rate was 76.2% in the vaginal mesh group and 64% in the anterior colporrhaphy group following a 24-month period. Interestingly of the 3 RCT studies that have been analyzed, the study by Rudnicki *et al.*,¹⁶ explained that there was a significant RR of 6.34 [2.85, 14.11]. The study revealed that patients who underwent anterior colporrhaphy were more prone to erosion. This phenomenon could be attributed to various factors, including the utilization of a specific mesh type, porcine collagen-coated mesh, which has not been previously employed in other

studies. Additionally, the duration of patient follow-up, which extended over a period of three years, might have been insufficient to elicit a significant increase in the erosion rate.

Erosion is a critical complication in pelvic reconstructive surgeries, particularly when synthetic meshes are used. Previous studies, such as those by Falconer *et al.*,²⁸ emphasize that mesh-based procedures often exhibit higher erosion risks compared to traditional repairs, such as colporrhaphy, due to the integration of foreign material. Vaginal mesh is more prone to erosion than anterior colporrhaphy because of the mesh's proximity to the vaginal mucosa and the surgical intervention itself. However, these mesh-based techniques may offer superior anatomical outcomes. The current analysis challenges this notion by demonstrating no significant difference between the two approaches, although the wide confidence interval suggests insufficient statistical power or variability in the included studies.²⁸

Recent advancements in mesh design, such as lightweight and partially absorbable meshes, aim to mitigate erosion risks.⁹ Additionally, individual patient factors, including age, comorbidities, and previous surgeries, significantly influence erosion rates, underscoring the importance of personalized treatment planning. Proper patient selection and rigorous surgical training are critical to optimizing outcomes. Furthermore, patient-reported outcomes should be integrated into clinical evaluations to understand the long-term impact of these procedures better. Future research should focus on improving mesh material properties and tailoring surgical techniques to individual patient profiles to enhance safety and efficacy.

Stress urinary incontinence

The SUI was assessed in two studies. It was reported in 9 of 67 patients in the colporrhaphy group and 11 of 96 patients in the mesh group. The difference between the two groups in terms of SUI was not statistically significant (RR = 0.75; 95% CI [0.33, 1.67]; $p = 0.48$). The results of the SUI can be seen in FIGURE 5. A study by Cassagne *et al.*,⁶ found that postoperative complications and de novo SUI occurred in both groups after a 1-year follow-up.⁶ These results are similar to those of the study by Balzarro *et al.*,¹³ which found that complications in patients require special attention and can occur even after one month of surgery.

According to Altman *et al.*,²⁹ a trocar-guided gauze kit in vaginal mesh can create a trampoline-like suspension on the anterior vaginal wall, which is used to correct excessive bladder neck and urethral position, which can cause SUI. The study found higher scores for stress incontinence and a higher frequency of new events after transvaginal gauze procedures, than colporrhaphy. These results are consistent with urodynamic studies with lower maximal urethral closure pressures after transvaginal gauze use than colporrhaphy.²⁹

In another randomized urodynamic study, there was evidence to support the idea that trocar-guided anterior vaginal wall prolapse repair with transvaginal gauze was associated with a significant increase in objective de novo SUI compared with traditional surgery. A study by Ek *et al.*,³⁰ showed that postoperative SUI occurred in 11–22% of continent patients after traditional POP surgery. It was found

that trocar-guided anterior vaginal wall and bladder neck suspension was greater after transvaginal gauze surgery than with colporrhaphy, which distorted urethral pressure dynamics due to unphysiological straightening of the urethra. The greater disruption of periurethral innervation due to more extensive perioperative dissection may explain the increased SUI after trocar-guided vaginal mesh compared with traditional colporrhaphy.³⁰

Reoperative procedure

The reoperative procedure was assessed in three studies. It was reported in 10 of 119 patients in the colporrhaphy group and 14 of 148 patients in the mesh group. The difference between the two groups in terms of reoperative procedure was not statistically significant (RR = 0.91; 95% CI [0.43, 1.91]; $p = 0.37$) indicating no statistically significant difference between the two surgical approaches (FIGURE 6). The outcome of this analysis is due to the fact that the recurrence rates in the three journals showed similar statistical results.^{6,13,14} According to Sukgen, in the pre- and postoperative patient groups, no significant differences were found in VAS scores for pelvic pain. The study demonstrated that anterior mesh repair was a safe and effective operation with a high recovery rate.³¹ It is interesting to note that, in the study by Curtiss and Duckett,¹⁴ only 18% of respondents reported their own complications; the remainder reported on behalf of family or friends. This finding suggests that the awareness factor regarding complications in patients with POP who undergo surgery remains low and potentially biased in

certain age groups of respondents.

The reoperative procedure rates following POP surgeries were assessed across three studies in this meta-analysis. Reoperation was required in 10 out of 119 patients (8.4%) in the colporrhaphy group and 14 out of 148 patients (9.5%) in the mesh group. The pooled risk ratio (RR) for reoperation was 1.10 (95% CI [0.52, 2.32]; $p = 0.37$), indicating no statistically significant difference between the two surgical approaches. Furthermore, the analysis revealed no heterogeneity among the included studies ($I^2 = 0\%$; $p = 0.77$), signifying consistency in study outcomes and methodologies.

Reoperative procedures are an important clinical outcome reflecting long-term surgical success and the management of complications. Mesh-based surgeries, although often preferred for their superior anatomical correction, carry specific risks such as mesh erosion or exposure, which can necessitate reoperations. Falconer *et al.*,²⁸ highlighted that the recurrence of POP and mesh-related complications often drives the need for reoperative interventions, underscoring the complexity of comparing traditional surgical methods like colporrhaphy to newer, mesh-based techniques.

Comparative studies have shown that paravaginal repair has superior results in complex prolapse cases, particularly in addressing lateral support issues, compared to anterior colporrhaphy. Comparable long-term efficacy in surgical outcomes between anterior colporrhaphy and paravaginal repair was demonstrated in a retrospective study at 1–2 mo, 3–6 mo, and 1 yr postoperatively, but had a significantly longer operating time in paravaginal repair. Another study showed that retropubic abdominal suspension was superior to anterior colporrhaphy in terms of reducing

reoperation and subjective healing rates. Anterior colporrhaphy with xenograft reinforcement and mesh repair was also compared in a long-term follow-up study, finding good results for anterior colporrhaphy alone, with no significant improvement in anatomical healing rates when using additional support materials.³¹

In the management of anterior vaginal wall prolapse, anterior colporrhaphy is the mainstay. This procedure is known to be more effective and relatively simple, making it preferred in the management of uncomplicated anterior wall defects. Patients with less complicated prolapses and lower risk profiles are typically more likely to choose anterior colporrhaphy. In more complex cases of additional pelvic support, the risk of recurrence is a concern. The utility of paravaginal repair is increasingly recognized in the management of more complex prolapses, including significant lateral vaginal wall ablation and recurrent prolapse. While anterior colporrhaphy alone may be inadequate, paravaginal repair is invaluable, offering robust support for recurrent or severe defects, although it is associated with increased complexity and the potential risk of longer recovery times and injury to surrounding structures. The choice between these procedures depends largely on the patient's overall health, the specific characteristics of the prolapse, and the complexity of the case. From this study we also included simple guidelines for selecting therapy between anterior colporrhaphy and vaginal mesh in pelvic organ prolapse in FIGURE 7. Each technique has its potential risks and advantages, the decision to choose the appropriate treatment for this case can be based on the nature of the vaginal wall defect and the desired surgical results.²⁶

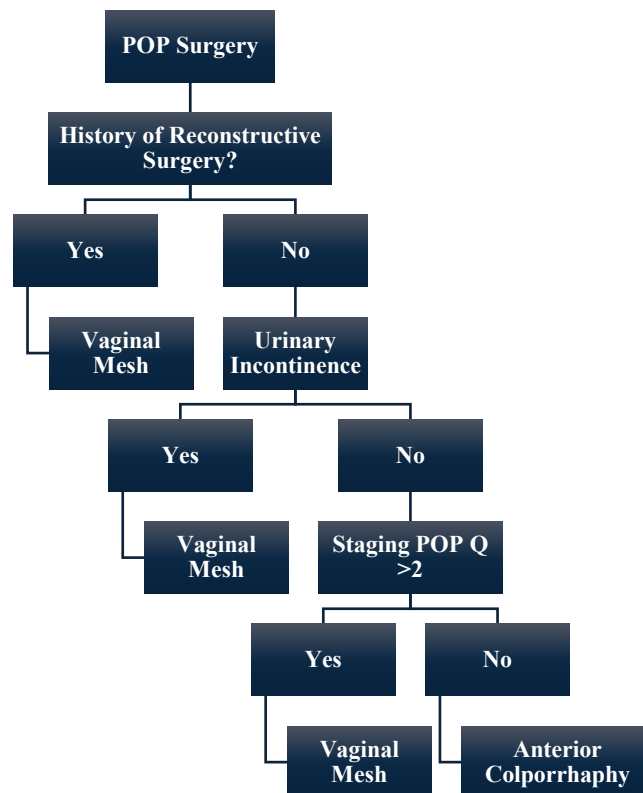


FIGURE 7. Considerations in the choice of anterior colporrhaphy or vaginal mesh repair for pelvic organ prolapse.

Based on this study, there was no significant difference in satisfaction (RR = 0.93; 95% CI [0.79, 1.09]; $p = 0.37$), incidence of erosion (RR = 2.12 (95% CI [0.74, 6.05]; $p = 0.16$), stress urinary incontinence (RR = 1.42; 95% CI [0.54, 3.73]; $p = 0.48$), and reoperative post-surgery (RR = 1.10; 95% CI [0.52, 2.32]; $p = 0.37$) in vaginal mesh and anterior colporrhaphy. A variety of factors must be considered in this study. These include the relatively small number of participants, the limited follow-up time after surgery, the clinical uniformity of POP, which differed between respondents, the different types of mesh used, the operative method, which can cause different results, and the absence of studies that included respondents with co-morbidities.

The vaginal mesh procedure is known to trigger two complications, vaginal epithelial damage and myofibroblast

proliferation with fibrosis, which is a pain mechanism. While anterior colporrhaphy still has a high recurrence rate and causes complications of early erosion and transient urinary retention.³²

Thus, it is important for a urogynecologist to pay attention to identification, patient selection and potential comorbidities and the selection of POP procedures to be performed. To further understand the long-term effects of these treatments, clinical evaluation should incorporate patient-reported outcomes. Future research should focus on improving mesh material properties and tailoring surgical techniques to individual patient profiles to enhance safety and efficacy. More comparative and effective long-term studies are urgently needed to evaluate the surgical materials and outcomes of various techniques.³³ These studies are expected to provide valuable insights

into the risk factors and relative benefits of anterior colporrhaphy compared with paravaginal repair, and may guide clinical decision-making to improve patient outcomes.

CONCLUSION

Both anterior colporrhaphy and paravaginal repair have important roles in the management of POP, each with its own advantages depending on the complexity of the prolapse. Further innovation and research focused on improving minimally invasive techniques, understanding tissue biomechanics, refining repair materials, optimizing surgical outcomes, patient care, and integrating comprehensive pelvic floor therapy are highly anticipated in the future. Clinical guidelines that focus on tailored treatment approaches based on prolapse severity and patient characteristics can emphasize both anterior colporrhaphy and paravaginal repair. Thus, in the future, clinical decision-making can involve balancing expected outcomes and risks, along with selecting the most appropriate surgical intervention based on patient preferences.

ACKNOWLEDGMENT

The authors declare no conflict of interest in relation to this.

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