REVIEW ARTICLE

A systematic review of reported outcomes and outcome measures in randomized trials evaluating surgical interventions for posterior vaginal prolapse to aid development of a core outcome set

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KEYWORDS: Core outcome set; Enterocele; Outcome variation; Pelvic organ prolapse; Posterior vaginal wall prolapse; Rectocele

SYNOPSIS: This systematic review evaluated the variation in reported outcomes and outcome measures for posterior vaginal wall prolapse interventions.

ABSTRACT

Background: Recent systematic reviews have demonstrated wide variations on outcome measure selection and outcome reporting in trials on surgical treatments for anterior, apical and mesh prolapse surgery. A systematic review of reported outcomes and outcome measures in posterior compartment vaginal prolapse interventions is highly warranted in the process of developing core outcome sets.

Objective: To evaluate outcome and outcome measures reporting in posterior prolapse surgical trials.

Search strategy: We searched MEDLINE, EMBASE and the Cochrane Central Register of Controlled Trials (CENTRAL)

Selection criteria: Randomized trials evaluating the efficacy and safety of different surgical interventions for posterior compartment vaginal prolapse.

Data collection and analysis: Two researchers independently assessed studies for inclusion, evaluated methodological quality, and extracted relevant data. Methodological quality, outcome reporting quality and publication characteristics were evaluated.

Main results: Twenty-seven interventional and four follow-up trials were included. Seventeen studies enrolled patients with posterior compartment surgery as the sole procedure and 14 with multicompartment procedures. Eighty-three reported outcomes and 45 outcome measures were identified. The most frequently reported outcomes were blood loss (20 studies, 74%), pain (18 studies, 66%) and infection (16 studies, 59%).

Conclusions: Wide variations in reported outcomes and outcome measures were found. Until a core outcome set is established, we propose an interim core outcome set that could include the three most commonly reported outcomes of the following domains: hospitalization; intraoperative, postoperative urinary, gastrointestinal, vaginal and sexual outcomes; clinical effectiveness

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1 INTRODUCTION

Different surgical approaches have been described for the repair of posterior compartment prolapse including transvaginal (e.g. posterior colporrhaphy [PCR] and site-specific fascial defect repair [SSDR]), transanal, transperineal, abdominal, and laparoscopic approaches. The choice of procedure depends on the surgeon's preference and experience, patient preference, type of defect, symptomatology, and whether there is an indication or plan for concomitant surgical procedures.

High quality meta-analyses are lacking due to trial heterogeneity [1,2]. Controversy exists on the efficacy of the interventions due to this heterogeneity and variation in outcome measures utilized in different studies. A Cochrane review from 2018 concluded that transvaginal repair may be more effective than transanal repair at preventing recurrence, but there is a lack of evidence regarding complications [2]. The review highlighted this range of outcomes and the lack of evidence to allow comparisons of surgical treatments for posterior prolapse in terms of effectiveness, safety, and adverse effects, and recommended improvements in the design of future trials [2].

The aim of the present study was to develop an inventory and systematically evaluate the outcomes and outcome measures reported in randomized controlled trials (RCTs) investigating posterior wall prolapse interventions.

2 MATERIALS AND METHODS

This systematic review was a project undertaken by CHORUS—an International Collaboration for Harmonising Outcomes, Research, and Standards in Urogynaecology and Women's Health (http://i-chorus.org). It was registered with the Prospective Register of Systematic Reviews (PROSPERO) under CRD42017062456. As this was a review study, ethical approval was not required.

The search strategy was based on PRISMA guidance [3]. We searched the Cochrane, EMBASE, PubMed/Medline, and Scopus databases from inception until September 2018. The MeSH terms used were pelvic organ prolapse, rectocele, enterocele, colporrhaphy, posterior vaginal repair, mesh, perineorrhaphy, perineal repair, plication, and site-specific

repair (vaginal, transanal, or transperineal). The selection was restricted to English language publications and the inclusion criteria were RCTs on pelvic organ prolapse. Exclusion criteria were ecological studies, retrospective studies, nonrandomized studies, case reports, and studies that did not include surgical intervention for posterior repair or studies that did not describe inclusion of posterior repair.

Selection of studies and outcome quality scores using the scoring system from the MOMENT (Management of Otitis Media with Effusion in Children with Cleft Palate) study [4] were undertaken by two researchers and any disagreements were resolved by consensus or input from the senior author. MOMENT scoring consists of one point for each statement: presence of a primary outcome; definition of the primary outcome for reproducible measures; presence of secondary outcomes; its definition for reproducible measures; rationale behind the definition of outcomes; and whether the methods that were used are designed to improve appropriately the quality of measures. Studies that evaluated the outcomes of an initial intervention in the same population after a period of time were included as follow-up studies, whereas those outcomes that were reported in both the primary and follow-up study were documented only once.

The methodological quality of the selected studies was evaluated using the Jadad score [5]. This is a five-point scale that scores one point for each statement (randomization; adequate randomization; blinded trial; adequate blinding; detailed description for withdrawals and drop-outs or not). Journal impact factor was reported according to Thomson Reuters' (NY, USA) citation for gynecology and obstetrics. Type of publication journal (general medicine, specialized medicine, or subspecialized medicine) and the use of validated questionnaires or funding were also listed.

The selected studies were divided into two groups. The first group included studies evaluating posterior vaginal repair alone. The second group included studies of multicompartimental surgery for prolapse including posterior vaginal repair.

Correlations of quality of outcomes (MOMENT score) with methodological quality (Jadad score) and journal impact factor were undertaken using univariate analysis

(nonparametric correlation Spearman's rho). Multivariate linear regression assessed MOMENT score (dependent variable) against type of journal, commercial funding, and use of validated questionnaires. SPSS statistical software version 25 (IBM Corp, Released 2017, Armonk, NY, USA) was used for data analysis. $P<0.05$ was considered statistically significant.

3 RESULTS

A total of 448 eligible abstracts were identified and screened and 43 met the inclusion criteria (Figure 1). After duplicates had been excluded, we identified 31 trials including 27 primary interventional RCTs and four follow-up studies [6-36]. Seventeen studies were included in the posterior repair group (14 first studies and 3 follow-up studies) and 14 in the multicompartmental group (13 first studies and one follow-up study). Table 1 shows the interventions evaluated in each trial, MOMENT score, and type of mesh used.

The quality of the studies in terms of methodology of randomization and outcome reporting (MOMENT score) is described by domain in Table 2. Most studies (n=11, 79%) that investigated posterior compartment prolapse as part of perineal floor repair techniques had a high quality of outcome reporting (5 or 6). In contrast, this was observed in only half of the studies that investigated posterior compartment prolapse only (n=8, 47%). Half of the studies included complete reporting of the randomization and blinding process (n=14, 45%). Nine studies were published in general medical journals, 11 in specialized medical journals, and 11 in subspecialized medical journals. Only four studies had commercial funding. Nineteen studies used validated questionnaires. We identified 83 different outcomes (Table 3) and 45 outcome measures (Table 4). The outcomes most commonly reported were blood loss (20 studies, 74%), pain (18 studies, 66%), and infection (16 studies, 59%). The most frequent outcomes for the posterior only intervention group were infection (9 studies, 64%), blood loss (8 studies, 57%), and dyspareunia (8 studies, 57%). For the multicompartmental group, the most common outcomes were blood loss (12 studies, 92%), pain (12 studies, 92%), and operative time (8 studies, 61%).

Gastrointestinal tract outcomes were more frequently reported in the posterior surgery group, as expected for rectocele interventions. Besides constipation, which was equally reported in both groups (3 times), fecal incontinence, digitation, and sensation of incomplete evacuation were more frequently reported in the posterior group (9 studies, 4 studies, and 5 studies, respectively) compared with the multicompartmental group (4 studies, 1 study, and no study, respectively).

Pain was reported twice as frequently in the multicompartmental group compared with the posterior repair group (12 and 6 studies, respectively). Urinary outcomes were more extensively reported in the multicompartmental group (11 studies, 84%) compared with the posterior group (5 studies, 35%). Urinary incontinence was reported in five studies in the multicompartmental group (38%) and in just one study in the posterior group (7%).

Sexual function outcomes were reported more extensively in the posterior group studies. Dyspareunia was reported in eight out of 14 studies (57%) in contrast to four studies out of 13 in the multicompartmental group (30%) and was assessed using five different outcome measures. Being “sexually active” and sexual function were reported more frequently in the posterior group (4 studies, 28% and 6 studies, 42%) compared with the multicompartmental trials (1 study, 7% and 2 studies, 15%, respectively).

Mesh or graft materials were used in 12 studies (44%) and exposure of the synthetic material was the most relevant reported outcome (seven RCTs in total, and in five from the posterior group). Effectiveness of the procedures was measured by patient interview and questionnaires (e.g. Patient Global Index of Improvement, Patient Global Index of Satisfaction, Quality recovery) and Likert scales. It was similar in both groups, but the posterior group included more reports on patient satisfaction (6 studies, 43%) compared with the multicompartimental group (4 studies, 30%). Recurrence of prolapse and anatomical efficacy (failure/success) were both reported in five posterior studies (35%). The same outcomes were reported in 4 (30%) and 3 (30%) multicompartmental studies, respectively.

Bleeding was quantified by six different measures and change in hemoglobin/hematocrit was the most common objective outcome measure for blood loss, reported in five of the studies.

Univariate analysis demonstrated no correlation of outcome reporting with quality of studies (P=0.103) or journal impact factor (P=0.725). Multivariate linear regression also resulted in no correlation when type of journal, funding, and use of validated questionnaires were added to the comparison (Table 5).

4 DISCUSSION

This systematic review aimed to evaluate the selection and reporting of outcomes and the use of outcome measures in RCTs evaluating surgical treatments for posterior vaginal prolapse. We demonstrated a wide variation in outcomes, as expected, and to a similar degree as our systematic reviews on other prolapse interventions [37–39]. Intraoperative and postoperative outcomes were the domains extensively documented. Gastrointestinal outcomes were the most extensively reported outcomes. We found many different instruments that measured commonly reported outcomes (i.e. dyspareunia).

Our results suggest that the widely variable outcomes reported in RCTs and the variation in how they are measured result in a lack of comparable outcomes and studies. Outcome measurements are inconsistent; for example, blood loss was quantified using six different measures. Furthermore, subjective measurements such as doctor judgement of blood on pad and surgery records make the outcomes incomparable. Outcomes may not be given importance owing to the variety of measures used. In general, the instrument of measurement is chosen according to the primary outcome of the study [40], adding to the heterogeneity of outcomes.

The current findings are consistent with our recent systematic reviews of other pelvic floor disorders (perineal [41], anterior [37], mesh [38], apical [39]). Inherent causes of these variations are expected to feature in all such trials and may be secondary to the lack of standardization of surgical techniques, surgical routes, different materials, and/or different specialties (gynecology, urogynecology, colorectal surgery) performing the surgical

procedures for posterior compartment prolapse, in addition to inherent causes that may apply to all trials, such as research priorities, underreporting of adverse events, overreporting of success outcomes, and surgeon's preference or expertise in specific procedures.

Some of the selected trials involved a nonsurgical primary outcome (use of vaginal dilators, vaginal packing, catheterization). However, the patients underwent vaginal posterior prolapse surgical treatment and outcomes related to the procedure were included.

Hospitalization outcomes were more often reported in trials evaluating multicompartmental procedures. Costs were reported in three multicompartmental trials and none of the trials on the posterior compartment. This may be related to a special interest in costs and complications related to major and more expensive surgical treatment, as well as a multiple approach (vaginal, abdominal, and laparoscopic).

Statistical analysis showed no correlation between type of journal, funding, and use of validated questionnaires with the quality of the included studies. This may be related to the difficulty in identifying how studies should be grouped or the small number of purely posterior vaginal wall intervention trials. As these types of surgery are undertaken by different specialists (gynaecologists, urogynaecologists, urologists, colorectal surgeons), variations of surgical techniques and practices, as well as target readership and varied specialty journals, may add to inherent heterogeneity of the research methodologies and the style of the publishing journal., The above reasons may influence and contribute to a wider variation of reported outcomes, as the research priorities may be different if the trials are conducted by different specialists.

To our knowledge this is the first systematic review evaluating outcome reporting and outcome measure variations in RCTs on posterior vaginal prolapse. We applied a standardized methodology and two assessors evaluated the quality of the RCTs independently. We acknowledge some limitations: including only randomized controlled trials and English language studies inevitably resulted in missed reported outcomes and

measures from different types of studies and languages. However, the inclusion of additional studies would only accentuate our findings and possibly introduce taxonomy and terminology conflicts secondary to translation issues. Taxonomy, classifications, and grouping of outcomes in domains and themes was challenging in some cases, as was found in our systematic reviews of other pelvic floor disorders. When an outcome is described in different ways (dyspareunia and pain during intercourse) it is unknown whether a clinically important outcome is eventually overreported or underreported (depending on the outcome measure as well) and this should be taken into consideration during classification of outcomes.

We found a small number of trials on rectocele repair only. Therefore, we decided to include multicompartmental studies in our analysis to capture a more comprehensive series of outcomes and outcome measures for the development of the inventory and a more rigorous evaluation. The majority of studies on multicompartmental interventions would inevitably increase the number of outcomes and outcome measures not necessarily specific to the posterior compartment.

The extensive variation in outcomes and outcome measures limits the value of the trials for synthesis of original research to provide robust evidence through meta-analyses. Our systematic reviews in other prolapse compartments or pelvic floor disorders showed similar findings; for example, a wide variation in questionnaires and outcome measures were found in cystocele and apical prolapse surgical treatment trials.

Development of a core outcome set would result in more consistent reporting of outcomes and choice of outcome measures. Effectiveness comparisons and reduced outcome reporting selection bias would be facilitated [40,42,43].

This is the first step toward development of a core outcome set based on Delphi surveys and consensus meetings for posterior vaginal wall prolapse interventions. When the prevalence of the considered clinical situation or treatment is low and when the variables are many, defining a priori the outcomes and the outcome measures is a crucial requirement [2]. It has been suggested that questionnaires could be divided into groups

of specific questions to measure one domain of outcome (i.e. urinary incontinence, sexual function) instead of measuring general quality of life [42].

We propose an interim core outcome set that could include the three most commonly reported outcomes in each domain, until consensus is achieved: (1) hospitalization (operative time, hospital stay, reoperation); (2) intraoperative (blood loss, blood transfusion, bladder/ureteral/urethral injury); (3) postoperative (infection/abscess, pain, hematoma); (4) urinary outcomes (urinary incontinence, urinary tract infection, urinary retention); (5) gastrointestinal (fecal incontinence, constipation, straining); (6) clinical effectiveness (patient satisfaction, recurrence, efficacy); (7) vaginal outcomes (vaginal stenosis, vaginal bulge, pelvic pressure); (8) sexual (dyspareunia, sexual function, de novo dyspareunia).

The specific defect of the posterior vaginal wall (rectocele, enterocele, sigmoidocele, perineocele, associated apical defect, occult rectal prolapse, intussusception) should be reported, together with the associated functional disorders and the diagnostic modalities used (e.g. pelvic examination, neurologic examination, imaging).

In conclusion, outcome reporting and choice of outcome measures should be harmonized to ensure that future trials provide results that contribute to high-quality meta-analyses, improve our evidence base, and result in better clinical care.

AUTHOR CONTRIBUTIONS

TRML: data collection, data analysis, manuscript writing, and final approval. VP: data analysis, manuscript editing, critical review, and final approval. CMD, AE: article search, data collection, data tabulation, and final approval. JMH, CB, GF, CNN: manuscript editing, critical review, and final approval. LB: data analysis, critical review, and final approval. MP: data collection, critical review, and final approval. SKD: project development, data tabulation, manuscript writing, manuscript editing, critical review, and final approval.

CONFLICTS OF INTEREST

The authors have no conflicts of interest

REFERENCES

[1] Page MJ, McKenzie JE, Kirkham J, et al. Bias due to selective inclusion and reporting of outcomes and analyses in systematic reviews of randomized trials of healthcare interventions. Cochrane Database Syst Rev. 2014;(10):MR000035.

[2] Mowat A, Maher D, Baessler K, Christmann-Schmid C, Haya N, Maher C. Surgery for women with posterior compartment prolapse. Cochrane Database Syst Rev 2018;3:CD012975.

[3] Liberati A, Altman DG, Tetzlaff J et al. The Prisma statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. BMJ. 2009 Jul 21;339:b2700 PMID [19622552] doi: 10.1136/bmj.b2700

[4] Harman NL, Bruce IA, Callery P, et al. MOMENT--Management of Otitis Media with Effusion in Cleft Palate: protocol for a systematic review of the literature and identification of a core outcome set using a Delphi survey. Trials. 2013;14:70.

[5] Kennelley J. Methodological approach to assessing the evidence. Reducing racial and ethnic disparities in reproductive and perinatal outcomes the evidence from population-based interventions. New York, NY: Springer; 2011: 7–20.

[6] Antosh DD, Gutman RE, Park AJ et al. Vaginal dilators for prevention of dyspareunia after prolapse surgery: a randomized controlled trial. Obstet Gynecol. 2013 Jun;121(6):1273-80 PMID [23812462] DOI: 10.1097/AOG.0b013e3182932ce2

[7] Ballard AC, Parker-Autry CY, Markland AD, Varner RE, Huisingh C, Richter HE. Bowel preparation before vaginal prolapse surgery: a randomized controlled trial. Obstet Gynecol. 2014 Feb;123(2 Pt 1):232-8 PMID [24402594] DOI: 10.1097/AOG.0000000000000081

[8] Carey M, Higgs P, Goh J et al. Vaginal repair with mesh versus colporrhaphy for prolapse: a randomized controlled trial. BJOG. 2009 Sep;116(10):1380-6 PMID [19583714] DOI: 10.1111/j.1471-0528.2009.02254.x

[9] Dahlgren E, Kjølhede P. Long-term outcome of porcine skin graft in surgical treatment of recurrent pelvic organ prolapse. An open-randomized controlled multicenter study. Acta Obstet Gynecol Scand. 2011 Dec;90(12):1393-401. PMID [21895613] DOI:10.1111/j.1600-0412.2011.01270.x

[10] Eftekhar T, Sohrabi M, Haghollahi F, Shariat M, Miri E. Comparison effect of physiotherapy with surgery on sexual function in patients with pelvic floor disorder: a randomized clinical trial. Iran J Reprod Med. 2014 Jan;12(1):7-14 PMID [24799856]

[11] Farid M, Madbouly KM, Hussein A, Mahdy T, Moneim HA, Omar W. Randomized controlled trial between perineal and anal repairs of rectocele in obstructed defecation. World J Surg. 2010 Apr;34(4):822-9 PMID [20091310] DOI: 10.1007/s00268-010-0390-y

[12] Khalil I, Itani SE, Naja Z et al. Nerve stimulator-guided pudendal nerve block vc general anestesia for postoperative pain management after anterior and posterior vaginal wall repair: a prospective randomized trial. J Clin Anesth. 2016 ov;34:668-75 PMID [27687468] DOI: 10.1016/j.jclinane.2016.07.024

[13] Ellis CN. Anterior levatorplasty for the treatment of chronic anal fissures in females with a rectocele: a randomized, controlled trial. Dis Colon Rectum. 2004 Jul;47(7):1170-3 PMID [15148646] DOI: 10.1007/s10350-004-0549-4

[14] Nieminen K, Hiltunen KM, Laitinen J, Oksala J, Heinonen PK. Transanal or vaginal approach to rectocele repair: a prospective, randomized pilot study. Dis Colon Rectum. 2004 Oct;47(10):1636-42 PMID [15540292]

[15] Paraiso MF, Barber MD, Muir TW, Walters MD. Rectocele repair: a randomized trial od three surgical techniques including graft augmentation. Am J Obstet Gynecol. 2006 Dec;195(6):1762-71 PID [17132479]

[16] Gustillo Ashby AM, Paraiso MF, Jelovsek JE, Walters MD, Barber MD. Bowel symptoms 1 year after surgery for prolapse: further analysis of a randomized trial of rectocele repair. Am J Obstet Gynecol. 2007 Jul;197(1):76.e1-5 PMID [17618766] DOI: 10.1016/j.ajog.2007.02.045

[17] Sand PK, Koduri S, Lobel RW et al. Prospective randomized trial of polyglactin 910 mesh to prevent recurrence of cystoceles and rectoceles. Am J Obstet Gynecol. 2001 Jun;184(7):1357-62; discussion 1362-4 PMID [11408853]

[18] Shi Y, Yu Y, Zhang X, Li Y. Transvaginal mesh and transanal resection to treat outlet obstruction constipation caused by rectocele. Med Sci Monit. 2017 Feb 1;23:598-605 PMID [28146137]

[19] Sung VW, Rardin CR, Raker CA, Lasala CA, Myers DL. Porcine subintestinal submucosal graft augmentation for rectocele repair: a randomized controlled trial. Obstet Gynecol. 2012 Jan;119(1):125-33 PMID [22183220] DOI: 10.1097/AOG.0b013e31823d407e

[20] Sung VW, Rardin CR, Raker CA, LaSala CA, Myers DL. Changes in bowel symptoms 1 year after rectocele repair. Am J Obstet Gynecol. 2012 Nov;207(5):423.e1-5 PMID [22835490] DOI: 10.1016/j.ajog.2012.06.054

[21] Withagen MI, Milani AL, den Boon J, Vervest HA, Vierhout ME. Trocar-guided mesh compared with conventional vaginal repair in recurrent prolapse: a randomized controlled trial. Obstet Gynecol. 2011 Feb;117(2 Pt 1):242-50 PMID [21252735] DOI: 10.1097/AOG.0b013e318203e6a5

[22] Milani AL, Withagen MI, The HS, Nedelcu-vander Wijk I, Vierhout ME. Sexual function following trocar0guided mesh or vaginal native tissue repair in recurrent prolapse: a randomized controlled trial. J Sex Med. 2011 Oct;8(10):2944-53 PMID [21797984] DOI: 10.1111/j.1743-6109.2011.02392.x

[23] Benson JT, Lucente V, McClellan E. Vaginal versus abdominal reconstructive surgery for the treatment of pelvic support defects: a prospective randomized study with long-term outcome evaluation. Am J OBstet Gynecol. 1996 Dec;175(6):1418-21; discussion 1421-2. PMID [8987919]

[24] Glavind K, Mørup L, Madsen H, Glavind J. A prospective, randomized, controlled trial comparing 3 hour and 24 hour postoperative removal of bladder catheter and vaginal pack following vaginal prolapse surgery. Acta Obstet Gynecol Scand. 2007;86(9):1122-5 PMID [17712655] DOI: 10.1080/00016340701505317

[25] Glazener C, Breeman S, Elders A et al. Mesh, graft, or standard repair for women having primary transvaginal anterior or posterior compartment prolapse surgery: two parallel-group, multicenter, randomized, controlled trials (PROSPECT). Lancet. 2017 Jan 28;389(10067):381-392 PMID [28010989] DOI: 10.1016/S0140-6736(16)31596-3

[26] Glazener C, Breeman S, Elders A et al. Clinical effectiveness and cost-effectiveness of surgical options for the management of anterior and/or posterior vaginal wall prolapse: two randomized controlled trials within a comprehensive

cohort study – results from the PROSPECT Study. Health Technol Assess. 2016 Dec;20(95):1-452 PMID [28052810] DOI: 10.3310/hta20950

[27] Henn EW, Nondabula T, Juul L. Effect of vaginal infiltration with ornipressin or saline on intraoperative blood loss during vaginal prolapse surgery: a randomised controlled trial. Int Urogynecol J. 2016 Mar;27(3):407-12 PMID [26294207] DOI: 10.1007/s00192-015-2821-7

[28] Iglesia CB, Sokol AI, Sokol ER et al. Vaginal mesh for prolapse: a randomized controlled trial. Obstet Gynecol. 2010 Aug;116(1 Pt 1):293-303 PMID [20664388] DOI: 10.1097/AOG.0b013e3181e7d7f8

[29] Mahuvrata P, Glazener C, Boachie C, Allahdin S, Bain C. A randomized controlled trial evaluating the use of polyglactin (Vycril) mesh, polydioxanone (PDS) or polyglactin (Vicryl) sutures for pelvic organ prolapse surgery: outcomes at 2 years. J OBstet Gynaecol. 2011 Jul;31(5):429-35 PMID [21627429] DOI: 10.3109/01443615.2011.576282

[30] McNanley A, Perevich M, Glantz C, Duecy EE, Flynn MK, Buchsbaum G. Bowel function after minimally invasive urogynecologic surgery: a prospective randomized controlled trial. Female Pelvic Med Reconstr Surg. 2012 Mar-Apr;18(2):82-5 PMID [22453316] DOI: 10.1097/SPV.0b013e3182455529

[31] Patel M, O'Sullivan DM, LaSala CA. Constipation symptoms before and after vaginal and abdominal pelvic reconstructive surgery. Int Urogynecol J. 2011 Nov;22(11):1413-9 PMID [21732100] DOI: 10.1007/s00192-011-1489-x

[32] Pauls RN, Crisp CC, Oakley SH et al. Effects of dexamethasone on quality of recovery following vaginal surgery: a randomized trial. Am J Obstet Gynecol. 2015 Nov;213(5):718.e1-7 PMID [26032041] DOI: 10.1016/j.ajog.2015.05.061

[33] Segal JL, Owens G, Silva WA, Kleeman SD, Pauls R, Karram MM. A randomized trial of local anesthesia with intravenous sedation vs general anesthesia for the vaginal correction of pelvic organ prolapse. Int Urogynecol J Pelvic Floor Dysfunct. 2007 Jul;18(7):807-12 PMID [17120172] DOI: 10.1007/s00192-006-0242-3

[34] Silveira SRB, Haddad JM, de Jármi-Di Bella ZI et al. Multicenter, randomized trial comparing native vaginal tissue repair and synthetic mesh repair for genital prolapse surgical treatment. Int Urogynecol J. 2015 Mar;26(3):335-42 PMID [25199496] DOI: 10.1007/s00192-014-2501-z

[35] Thiagamoorthy G, Khalil A, Cardozo L, Srikrishna S, Leslie G, Robinson D. The value of vaginal packing in pelvic floor surgery: a randomized double-blind study. Int Urogynecol J. 2014 May;25(5):585-91 PMID [24310987] DOI: 10.1007/s00192-013-2264-y

[36] Westermann LB, Crisp CC, Oakley SH et al. To pack or not to pack? A randomized trial of vaginal packing after vaginal reconstructive surgery. Female Pelvic Med Reconstr Surg. 2016 Mar-Apr;22(2):111-7 PMID [26825408] DOI: 10.1097/SPV.0000000000000238

[37] Durnea CM, Pergialiotis V, Bergstrom L, Elfituri A, Duffy JMN, Doumouchtsis SK. A systematic review of outcome and outcome measure reporting in randomized trials evaluating surgical interventions for anterior compartment vaginal prolapse. A call to action to develop a core outcome set. Int Urogynecol J. 2018;29:1727-1745.

[38] de Mattos Lourenco TR, Pergialiotis V, Duffy JMN, et al. A systematic review on reporting outcomes and outcome measures in synthetic mesh trials. Urgent action is needed to improve pelvic organ prolapse research. Neurourol Urodyn. 2019;38:509-524.

[39] de Mattos Lourenco TR, Pergialiotis V, Durnea C, et al. A systematic review of reported outcomes and outcome measures in randomized controlled trials on apical prolapse surgery. Int J Gynecol Obstet. 2019;145:4-11.

[40] Clarke M, Williamson P. Core outcome sets and trial registries. Trials. 2015;16:216.

[41] Pergialiotis V, Durnea C, Elfituri A, Duffy JMN, Doumouchtsis SK. Do we need a core outcome set for childbirth perineal trauma research? A systematic review of outcome reporting in randomized trials evaluating the management of childbirth trauma. BJOG. 2018;125:1522-1531.

[42] Dodd S, Clarke M, Becker L, Mavergames C, Fish R, Williamson PR. A taxonomy has been developed for outcomes in medical research to help improve knowledge discovery. J Clin Epidemiol. 2018;96:84-92.

[43] Yordanov Y, Dechartres A, Atal I, et al. Avoidable waste of research related to outcome planning and reporting in clinical trials. BMC Med. 2018;16:87.

FIGURE LEGEND

Figure 1. Flow diagram of included studies.

TABLE 1 Description of the studies included in the review.

Author	Mesh/Graft	Intervention 1	Intervention 2	Intervention 3
Posterior				
Antosh 2013 [6]		Use of dilators postoperative	Nonuse of dilators postoperative	
Ballard 2014 [7]		Pre-op bowel preparation	Pre-op nonbowel preparation	
Carey 2009 [8]	Gynamesh PS (Ethicon, Sommerville, NJ, USA)	Conventional vaginal repair	Mesh vaginal repair	
Dahlgren 2011 [9]	Pelvicol (BARD, Helsingborg, Sweden)	Conventional vaginal repair	Porcine skin graft	
Eftekhar 2014 [10]		Pelvic floor muscle training	Posterior vaginal repair	
Farid 2010 [11]		Transperineal repair with levatorplasty	Transperineal repair without levatorplasty	Transanal repair
Khalil 2016 [12]		General anesthesia for vaginal repair	General anesthesia + pudendal nerve block	
Ellis 2004 [13]		Internal sphincterotomy	Anterior levatorplasty	
Nieminen 2004 [14]		Transanal rectocele repair	Vaginal rectocele repair	
Paraiso 2006 [15]	Porcine-derived graft (Fortagen, Organogenesis Inc, Canton, MA, USA)	Posterior colporrhaphy	Defect-specific posterior repair	Graft augmentation
Gustilo-Ashby	-	-	-	-

2007[a] [16]				
Sand 2001 [17]	Polyglactin 910	Conventional vaginal repair	Vaginal repair with mesh	
Shi 2017 [18]	Polytetrafluoroethylene mesh	Transvaginal mesh repair	Stapled transanal rectal resection	
Sung 2012 [19]	Porcine subintestinal submucosal (SIS) graft (SurgiSIS, Cook, Biotech)	Graft augmented posterior colporrhaphy	Conventional posterior colporrhaphy	
Sung 2013[a] [20]	-	-	-	
Withagen 2011 [21]	Prolift (Ethicon, Sommerville, NJ, USA)	Anterior and posterior colporrhaphy	Transvaginal mesh repair	
Milani 2011[a] [22]	-	-	-	
Multicompartment				
Benson 1996 [23]		Vaginal repair	Abdominal surgery	
Galvind 2007 [24]		3h catheterization and vaginal tampon	24h catheterization and vaginal tampon	
Glazener 2017 [25]	Nonabsorbable type 1 monofilament macroporous polypropylene mesh	Native tissue repair	Mesh repair	Biological graft
Glazener 2017[a] [26]	-	-	-	-
Henn 2016 [27]		Vaginal vasoconstrictor infiltration	Vaginal saline infiltration	
Iglesia 2010 [28]	Prolift (Ethicon, Sommerville, NJ, USA)	Conventional colporrhaphy or uterosacral ligament suspension	Vaginal colpopexy with mesh	

Mahuvrata 2011[b] [29]	Vicryl mesh	Mesh repair	Native tissue repair	PDS (polydioxanone)
McNanley 2012 [30]		Docusate sodium laxative postoperative	Other laxatives postoperative	
Patel 2011[c] [31]	Not identified	Abdominal surgery + laxatives	Vaginal surgery + laxatives	Vaginal surgery
Pauls 2015 [32]		Dexamethasone prior to surgery	Placebo	
Segal 2006 [33]		Local anesthesia	General anesthesia	
Silveira 2014 [34]	Prolift (Ethicon, Sommerville, NJ, USA)	Native tissue repair	Synthetic mesh repair	
Thiagamoorthy 2013 [35]		Use of postoperative vaginal pack	No use of postoperative vaginal pack	
Westermann 2016 [36]		Use of postoperative vaginal pack	No use of postoperative vaginal pack	

[a] Follow-up of the study immediately above.

[b] Fourth intervention: Vicryl mesh.

[c] Fourth intervention: abdominal surgery.

TABLE 2 Quality of included studies.

Author	MOMENT score	Jadad score	Impact factor	Journal type	Commercial funding	Validated questionnaires
Posterior						
Antosh 2013 [6]	6	3	4.78	s	n	y
Ballard 2014 [7]	5	5	2.17	g	n	y
Carey 2009 [8]	5	3	4.64	s	y	y
Dahlgren 2011 [9]	3	3	2.2	s	n	n
Eftekhar 2014 [10]	3	3	N/A	s	n	y
Farid 2010 [11]	3	5	3.24	ss	n	n
Khalil 2016 [12]	5	5	1.64	s	n	n
Ellis 2004 [13]	1	2	3.73	ss	n	y
Nieminen 2004 [14]	3	3	3.73	ss	n	n
Paraiso 2006 [15]	4	5	4.34	g	y	y
Gustilo-Ashby 2007 [16]	6	5	4.45	g	y	y
Sand 2001 [17]	4	3	2.72	s	n	N/A
Shi 2017 [18]	3	2	N/A	g	n	n
Sung 2012 [19]	3	5	5.32	g	n	y
Sung 2013 [20]	5	5	4.78	s	n	n
Withagen 2011 [21]	6	5	5.34	s	n	y
Milani 2011 [22]	6	3	3.67	ss	n	y
Multicompartment						
Benson 1996 [23]	3	3	N/A	s	n	n
Galvind 2007 [24]	2	3	1.94	g	n	N/A
Glazener 2017 [25]	6	4	N/A	g	n	Y
Glazener 2017 [26]	6	3	N/A	g	n	y
Henn 2016 [27]	6	5	1.83	ss	n	N/A
Iglesia 2010 [28]	6	5	4.98	s	n	y
Mahuvrata 2011 [29]	5	5	0.75	g	n	y
McNanley 2012 [30]	6	3	0.42	ss	n	y
Patel 2011 [31]	3	5	2.39	ss	n	y
Pauls 2015 [32]	5	5	5.23	s	n	y
Segal 2006 [33]	5	3	2.38	ss	n	n
Silveira 2014 [34]	5	3	2.17	ss	y	y

Thiagamoorthy 2013 [35]	6	5	2.45	ss	n	N/A
Westermann 2016 [36]	5	4	1.49	ss	n	y

Abbreviations: g, general medical journal; s, specialized medical journal; ss, subspecialized medical journal, n, no; y, yes; N/A, not applicable.

TABLE 3 Reported outcomes.

Outcomes	Posterior compartment procedures (No. trials)	Multicompartment procedures (No. trials)
Hospitalization		
Operative time	7	8
Hospital stay	4	6
Reoperation	2	4
Readmission/Emergency room evaluation	2	2
Costs	0	3
Recovery time	1	1
Intraoperative		
Blood loss	8	12
Blood transfusion	4	6
Bladder/ureteral/urethral injury	4	3
Bowel/rectal injury	5	2
Hemorrhage	3	2
Enterotomy	0	2
Type of analgesia/additional anesthesia	0	2
Nerve injury	1	1
Anaphylactic reaction	1	0
Conversion to laparotomy	1	0
Intraoperative pulse rate	0	1
Intraoperative blood pressure	0	1
Surgeon impression of surgical field	1	0
Postoperative		
Infection/abscess	10	8
Pain	6	12

Hematoma	5	4
Wound issues	4	4
Catheterization	2	4
Fever	1	3
Cystotomy	1	2
Death	1	2
Phlebitis/thrombosis	0	3
Nausea/vomiting	1	2
Fistula	1	1
Vaginal bleeding	0	2
Anemia	0	1
Cuff cellulitis	0	1
Necrotizing fasciitis	1	0
Seroma	1	0
Vaginal pack bother	0	1
Urinary		
Stress urinary incontinence/urinary incontinence	1	5
Urinary tract infection	2	4
Urinary retention	2	1
Voiding difficulty	0	1
Gastrointestinal		
Fecal incontinence	9	4
Constipation	3	3
Straining	5	1
Digitation	4	1
Ileus	2	3
Incomplete evacuation feeling	5	0

Bowel obstruction	1	2
Difficult defecation	1	2
Size of rectocele	3	0
Colon transit time/time to bowel movement	1	1
Diarrhea	1	1
Gas incontinence	2	0
Painful defecation	1	1
Rectal bleeding	1	1
Splinting	2	0
Use of laxatives/coloclyster	2	0
Bloating	0	1
De novo defecatory symptoms	1	0
Improved defecation	0	1
Stomach cramps	0	1
Stool type	0	1
Tenesmus	1	0
Clinical effectiveness		
Patient satisfaction	6	4
Recurrence POP	5	4
Efficacy (success/failure)	5	3
Quality of Life	3	3
Reoperation for prolapse	2	2
Time to recurrence	1	1
Surgeon satisfaction	1	0
Vaginal/prolapse		
Vaginal stenosis/caliber	5	2
Vaginal bulge	3	1
Pelvic pressure/heaviness	2	0

Pessary use	0	2
Others		
Neuropathy/paresthesia/neural pain	2	4
Myocardial infarction	1	1
Pulmonary complications/embolism	1	1
Sexual		
Dyspareunia	8	4
Sexual function	6	2
De novo dyspareunia	5	0
Sexually active	4	1
Mesh related		
Mesh/tape/graft exposure	5	2
Mesh erosion/extrusion/infection	4	4
Removal of mesh	1	3

TABLE 4 Outcome measures.

Outcome measures	Posterior compartment procedures (No. trials)	Multicompartment procedures (No. trials)
Patients' reported outcomes based on questionnaires/interviews		
Cleveland Clinic Continence Score		
Quality of life	1	0
Fecal incontinence	1	0
Defecatory Distress Inventory		
Quality of life	1	0
EuroQol-5 Dimensions		
Quality of life	0	1
General questionnaire/patient interview		
Patient satisfaction	1	0
Pelvic pressure/heaviness	1	0
Vaginal bulge	1	0
Urinary incontinence	1	0
Fecal incontinence	2	1
Gas incontinence	1	0
Digitation	2	0
Sexually active	2	0
Sexual function	2	0
Dyspareunia	3	0
De novo dyspareunia	2	0
Rectal bleeding	1	0
Constipation	1	1
Incomplete evacuation	2	0

Straining	1	0
International Consultation Incontinence Questionnaire		
Urinary incontinence	0	2
McGill Pain Questionnaire		
Pain	0	1
Patient assessment of constipation symptoms questionnaire		
Constipation	0	1
Straining/squeezing	0	1
Improved defecation	0	1
Pain	0	1
Bloating	0	1
Stomach cramps	0	1
Rectal bleeding	0	1
Patient Global Index of Improvement		
Quality of life	0	1
Patient satisfaction	1	0
Patient Global Index of Satisfaction		
Quality of life	0	1
Pelvic Floor Distress Inventory		
Straining	2	0
Splinting	2	0
Incomplete evacuation	2	0
Painful defecation	1	0
Fecal incontinence	2	0
Quality of life	1	0
Vaginal bulge	1	0

De novo defecatory symptoms	1	0
Obstructed defecation	1	0
Constipation	1	0
Pelvic Floor Impact Questionnaire		
Quality of life	1	1
Prolapse Symptoms Inventory and Quality of Life questionnaire		
Quality of life	1	1
Vaginal bulge	0	3
Quality of recovery-40		
Pain	0	1
Quality of life	0	1
Patient satisfaction	0	1
SF-12		
Quality of life	0	1
Urinary Distress Inventory		
Vaginal bulge	1	0
Pain	1	0
Quality of life	1	0
Urinary Impact Questionnaire		
Quality of life	2	1
Scales		
Bristol Stool Scale		
Stool type	0	1
Diagnostic Criteria Rome III		
Constipation	1	0
Visual Analogue Scale 0–10		
Pain	3	4

Visual Analogue Scale 0–100		
Patient satisfaction	1	1
Vaginal pack bother	0	1
Efficacy		
Scale 0–2		
Surgeon satisfaction	0	1
Patient satisfaction	0	1
Four-point Likert scale		
Patient satisfaction	1	0
Surgeon impression of field	1	0
Five-point Likert scale		
Patient satisfaction	0	1
Physical examination		
Wound complications	2	0
Recurrence	0	1
Effectiveness	0	1
Vaginal stricture	1	0
Sexual		
Seven-day diary of sexual intercourse		
Dyspareunia	1	0
Female Sexual Function Index		
Sexual function	1	0
Dyspareunia	1	0
Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire		
Dyspareunia	4	0
De novo dyspareunia	2	0
Sexually active	3	0

Sexual function	2	0
Quality of life	0	1
Sexual Quotient Female Version		
Sexual function	0	1
Dyspareunia	0	1
Clinical and instrumental reported outcomes		
Efficacy		
Baden-Walker scale		
Recurrence	1	0
Pelvic Organ Prolapse Quantification		
Recurrence	4	1
Success/failure	5	2
Ring pessary		
Vaginal caliber	1	0
Bleeding		
Doctor judgement		
Vaginal blood loss	0	1
Hemoglobin/hematocrit change		
Blood loss	2	3
Anemia	0	1
Pad weight		
Vaginal blood loss	0	1
Volume of blood in pouch		
Blood loss	0	1
Hemorrhage	0	1
Weight of surgical swabs		
Blood loss	0	1
Operative		

Surgery records		
Ileus	1	0
Bowel obstruction	1	0
Organ injury	4	0
Blood transfusion	1	0
Operative time	2	3
Hospital stay	0	1
Costs	0	1
Blood loss	1	2
Infection	1	0
Hemorrhage	1	0
Recovery room time	0	1
Need for additional anesthesia	0	1
Intraoperative blood pressure	0	1
Intraoperative pulse rate	0	1
Type of analgesia	0	1
Complementary measures		
Analgesic consumption		
Pain	1	3
Clavien Dindo Classification		
Adverse events	0	1
Defecography		
Size of rectocele	3	0
Colon transit time	1	0
High vaginal swab		
Infection	0	1
Manometry		
Fecal incontinence	1	0

Midstream urine/urine culture		
Urinary tract infection	0	2
Transvaginal ultrasound scan		
Hematoma	0	1
White blood cell count		
Infection	0	1

TABLE 5 Statistical analysis.

Factor	Univariate analysis		Multivariate analysis	
	Spearman's rho	*P* value	Beta	*P* value
Study quality	0.298	0.103	0.213	0.592
Journal impact factor	0.072	0.725	0.002	0.209
Type of journal	-	-	–0.047	0.934
Type of funding	-	-	0.293	0.748
Validated questionnaire	-	-	0.669	0.401

Figure 1.