Surgical Endoscopy (2019) 33:1075–1079
https://doi.org/10.1007/s00464-018-6357-z

Outcomes of laparoscopic management of multicompartmental pelvic organ prolapse

J. C. Martín del Olmo[1,4] · M. Toledano[1] · M. L. Martín Esteban[1] · M. A. Montenegro[1] · J. R. Gómez[1] · P. Concejo[1] · M. Rodríguez de Castro[2] · F. del Rio[3]

Received: 28 May 2018 / Accepted: 6 July 2018 / Published online: 11 July 2018

Abstract

Background Pelvic organ prolapse (POP) is an increasing medical problem with complex diagnostics and controversial surgical management. It causes a series of dysfunctions in the gynecological, urinary, and anorectal organs. Numerous procedures have been proposed to treat these conditions, but in recent years, ventral mesh rectocolposacropexy (VMRCS) has emerged as the procedure of choice for the surgical treatment of POP, especially by a laparoscopic approach. This surgical technique limits the risk of autonomic nerve damage, and the colpopexy allows the correction of concomitant prolapse of the middle compartment. However, symptoms derived from anterior compartment prolapse remain a major morbidity and sometimes require an additional procedure. The aim of this study is to evaluate the results of laparoscopic prosthetic rectocolposacropexy (LRCS) and colposacropexy (LCS) procedures performed to manage combined multicompartmental POP.

Methods Between November 2008 and December 2017, 38 patients with symptomatic POP underwent rectocolposacropexy (RCS) or colposacropexy (CS) by a laparoscopic approach. Demographics, mortality, morbidity, hospital stay, and functional outcomes were retrospectively analyzed.

Results The median operating time was 200 min (IQR 160–220). Additional simultaneous surgery for POP was performed in nine cases: five suburethral slings and four hysterectomies were performed. No mortality was recorded. The conversion rate was 7.89%. There were two intraoperative complications (5.26%): one enterotomy and one urinary bladder tear. Late complications occurred in 5.26% of cases. After a mean follow-up of 20 months, constipation was completely resolved or improved in 83.33% of patients, urinary stress incontinence was resolved or improved in 52.94%, and gynecological symptomatology was resolved or improved in 93.75%. The recurrence rate was 5.26%.

Conclusions Laparoscopic mesh rectocolposacropexy and colposacropexy are safe and effective techniques associated with very low morbidity. In the medium term, they provide good results for POP and associated symptoms, but urinary symptomology has a worse outcome.

Keywords Rectocolposacropexy · Colposacropexy · Laparoscopic rectopexy · Pelvic organ prolapse

The pelvic floor is one of the most complex anatomical structures of the human body. Its main function is to maintain an equilibrium between strain forces (mainly increased intraabdominal pressure) and retention forces (fascial and muscular pelvic supports). When this equilibrium is broken, prolapse develops [1, 2].

The prevalence of pelvic organ prolapse (POP) increases with age, parity, obesity, and previous hysterectomy [3, 4] and is currently estimated to be between 10 and 24% [4, 5]. In addition, approximately 15–18% of hysterectomy patients will develop a pelvic prolapse, and uterovaginal prolapse is the most common indication for hysterectomy in postmenopausal women [6].

Currently, POP is an increasing medical problem in Western countries, especially due to two factors: the aging of the

✉ J. C. Martín del Olmo
jcmolmo@gmail.com

1 Department of General Surgery, Medina del Campo Hospital, Valladolid, Spain

2 Department of Obstetrics and Gynecology, Medina del Campo Hospital, Valladolid, Spain

3 Department of Urology, Medina del Campo Hospital, Valladolid, Spain

4 Madrid, Spain

population and increased migration from countries with poor health systems and high rates of parity. Additionally, new tendencies in the management of vaginal birth that encourage a prolonged second stage of labor will favor the development of pelvic floor pathology [7].

POP causes serious morbidity, and patients seek treatment to relieve pelvic pain, chronic constipation, obstructed defecation, and fecal and urinary incontinence [2, 8–10].

The clinical picture is determined by the affected compartment and the severity of the problem, but frequently, occult symptoms such as stress urinary incontinence are present [4, 5, 9].

The treatment of POP is still controversial, and over time, it has been approached by gynecologists, urologists, and surgeons in different ways. In recent years, the creation of a unifying concept of pelvic floor function has led to a new approach to the problem. Numerous procedures have been proposed to treat pelvic floor conditions.

However, since the original report of D'Hoore and Penninckx [11] in 2006, ventral mesh rectopexy has emerged as the best procedure for the management of POP, and its use has increased progressively. Although initially designed for the treatment of rectal prolapse, it has been progressively introduced for the management of POP and has been combined with colposacropexy when necessary. The technique can be performed by either an open or laparoscopic approach and is based on correcting the descent of the posterior and middle compartments while reinforcing the vaginal septum and elevating the pelvic floor, with the goal of correcting the pelvic anatomy and preserving bowel, bladder, and sexual function [2, 8].

In this study, we evaluated the results of laparoscopic rectocolposacropexy/colposacropexy for the management of multicompartmental pelvic floor defects.

Materials and methods

A retrospective study of 38 patients with symptomatic multicompartmental POP treated by a laparoscopic approach between November 2008 and December 2017 was conducted. Demographics, associated comorbidities, imaging results, mortality, morbidity, hospital stay, and functional outcomes were retrospectively analyzed.

The patients were clinically evaluated by a multidisciplinary team (gynecologist, urologist, and surgeons) and stratified according to POP-Q classification [12]. Functional studies included bowel endoscopy, CT, dynamic MRI, urodynamic tests, and, in some cases, anorectal manometry. In all patients, at least two compartments were affected.

Informed consent was obtained prior to the surgery. The surgical technique was based on the initial description of D'Horee and Penninckx [11]. Synthetic inverted Y-shaped meshes were routinely employed: 26 macro-porous polypropylene (Ultrapro, Ethicon Inc., Johnson & Johnson, Hamburg, Germany) and 12 PVDF (Dyna-Mesh®-PR soft, FEG Textiltechnik, Aachen, Germany) meshes were used. The choice of the mesh depended on individual surgeon preference.

In the follow-up, the surgical results were classified as relieved, unchanged, and worsened (i.e., the surgery induced new symptoms). Follow-up assessments were performed at the outpatient clinic at 3, 6, and 12 months postoperatively and then annually at the patient's request.

Statistical analysis was performed with the SPSS statistical package (SPSS, Inc., Chicago, IL, USA).

Results

A total of 38 female patients with multicompartmental POP were included in the study. Thirty-two patients underwent laparoscopic rectocolposacropexy (LRCS), and six underwent laparoscopic colposacropexy (LCS). The median age was 71 years (IQR 65–77) (Table 1). The American Society of Anesthesiology (ASA) score was II–III in 89.5% of the cases. The median operating time was 200 min (IQR 160–220). Three cases were converted to open surgery (7.9%) because of severe abdominal adhesions due to previous abdominal surgery. The median postoperative hospital stay was 3 days (IQR 3–4). Major intraoperative complications occurred in 5.26% of the patients and included one case of iatrogenic small bowel injury and one urinary bladder tear that was resolved intraoperatively. There was no postoperative mortality. Later complications occurred in 5.26% of the patients and included one trocar site incisional hernia and

Table 1 Demographic and operative data

	Number	%
Median age	71 (IQR 65–77)	
ASA II–III		
II	28	73.7
III	6	10.5
Previous hysterectomy	21	55.26
Previous POP surgery	10	26.3
POP-Q classification		
II	10	26.3
III	18	47.4
IV	10	26.3
Median operative time	200 (IQR 160–220)	
Median hospital stay	3 (IQR 3–4)	
Conversion	3	7.9
Intraoperative complications	2	5.26
Late complications	2	5.26

one case of mesh erosion of the vaginal wall. The latter case required two partial transvaginal mesh resections, and there was no recurrence after 24 months. The mean duration of follow-up was 20 months (IQR 12–44.5). Seventeen patients (44.73%) had a history of pelvic or abdominal surgery, ten of which were for POP (26.3%), and twenty-one patients had undergone hysterectomy (55.26%). Seven additional simultaneous surgeries were performed: laparoscopic hysterectomy (2), inguinal hernia repair (2), abdominal wall hernia repair (2), and adnexectomy (1). In five cases (13.15%), a simultaneous urologic procedure (suburethral sling) was performed by the urology team.

Preoperatively, 18 patients (47.36%) reported constipation (Table 2). After a mean follow-up of 12 months, 15 (83.33%) of these patients reported improvement, whereas 3 (16.66%) experienced persistent constipation. New-onset constipation was reported by 10% of patients (two cases). Five patients (13.15%) reported fecal incontinence before surgery; three of them reported complete postoperative relief (60%). Of 20 patients with urinary symptomatology (17 with stress urinary incontinence (SUI) and 3 with urinary obstruction), 11 (55%) showed symptomatic improvement.

Thirty-two patients (84.21%) had gynecological symptomatology in the preoperative evaluation, mainly vaginal vault bulging and pelvic pressure. These symptoms were successfully corrected in 93.75% (30 cases). Two cases of symptomatic recurrence were recorded (5.26%). Both cases underwent reoperation using the lateral suspension technique (LST) [13].

Discussion

POP is a dynamic disorder that can affect the three compartments of the pelvic floor in an isolated or multicompartmental way [5, 8]. Single-compartment prolapse is rare, and disorders such as enterocele and vaginal prolapse are common, especially in patients who have undergone hysterectomy [6, 14, 15]. Our data, in which more than 50% of the patients had undergone hysterectomy, confirm that hysterectomy is a predisposing factor for POP.

Table 2 Postoperative outcomes (median follow-up of 20 months)

	Preoperative	Postoperative Complete or partial relief
Constipation	18 (47.36%)	15 (83.33%)
Fecal incontinence	5 (13.15%)	3 (60%)
SUI	17 (44.73%)	9 (52.94%)
Urinary obstruction	3 (7.89%)	2 (66.66%)
Gynecological symptomatology	32 (84.21%)	30 (93.75%)
New-onset constipation	–	2 (10%)
Symptomatic recurrence	–	2 (5.26%)

In our cohort, 18 patients had combined symptoms of two compartments, and another 20 had symptomatology related to three compartments. Regardless of the reason for the initial evaluation, which is frequently urogynecological symptoms (42.10% in our cohort), a high prevalence of occult posterior compartment pathology has been noted [9, 16, 17]; such pathology can be easily overlooked unless each compartment is examined [5]. Moreover, multiple studies have shown that a unicompartmental approach can worsen existing symptoms and/or induce new symptoms in the untreated compartment, mainly defecatory issues [8, 18, 19]. Therefore, like other authors [2, 9], we routinely perform a multicompartmental assessment before surgical repair.

The surgical management of POP has been approached using different techniques. Currently, the perianal and abdominal approaches are still subject to clinical debate, but there is agreement that POP patients require a restorative procedure [20]. The final goal of the technique must be to correct the anatomical defect and ameliorate or resolve the clinical symptomatology without collateral effects [2, 4]. Ventral mesh recto/colposacropexy (VMRCS) seems to best achieve these objectives [21], even more so when it is performed using a minimally invasive technique [1, 22, 23]. The ventral positioning of the mesh helps to reinforce the rectovaginal wall, support the perineal body, and prevent the invagination of the anterior rectal wall, maintaining the physiological axis of the vagina [2, 24].

Our data support this concept, showing significant improvements in multicompartmental symptomatology: 78.26% of patients showed improvement in defecatory function, 55% showed improvements in urinary symptomatology, and 93.75% showed improvements in symptoms related to the first compartment.

A matter of great concern is new-onset constipation, which has been reported in between 0 and 20% of cases and can affect up to 50% of patients after different rectopexy procedures [25–28]. This undesirable problem has been proposed to be secondary to rectal mobilization and lateral ligament division, which can lead to autonomic nerve injury and bowel dysmotility [21, 29]; however, these technical problems are avoided in the D'Hoore procedure [30]. Nonetheless, this phenomenon is still reported in different studies at rates between 5 and 10% [9, 31].

We recorded a 10% incidence of this adverse outcome, with three additional cases of persistent constipation. On the other hand, several studies report worsening of fecal incontinence [3, 9]. In our cohort of a total of five patients with preoperative fecal incontinence, in three patients, the problem was solved, one developed new-onset constipation and other an obstructed defecation, data similar to those reported in the literature [5, 8, 32]. We do not have registered new-onset

fecal incontinence cases, which have been reported with a prevalence of 16.5% [19].

Regarding urinary function, our data show a global improvement of urinary function of 55%, similar to that reported in other studies [26, 32, 33] but inferior to data registered for van Iersel [5] with 73% good results. Some authors have advocated for simultaneous performing an anti-incontinence procedure such as Burch, mainly in cases with confirmed SUI [34]. In our cohort, those patients with confirmed preoperative SUI received an additional suburethral sling procedure with 80% good results. Another aspect of these questions is the new-onset SUI that has been reported with an incidence between 2.5 and 20% [26, 27, 32, 33]. In our cohort, it was 2.63%.

LRCS is associated with low morbidity, with rates of approximately 6–11% [22, 25, 27, 35]. In our series, no operative mortality occurred. We have registered two intraoperative complications (5.26%), a small bowel lesion and a urinary bladder tear, both resolved intraoperatively without posterior incidences. Another patient developed a trocar port hernia that required surgical repair. One mesh-related complication (2.63%) occurred: a case of mesh erosion to the posterior vaginal wall. These data are similar to the rates reported in the literature: 2–5.0% [8, 22, 32, 35]. These complications have been related to the type of mesh used, especially with synthetic meshes [2, 21, 22], and it has been postulated that this complication is less frequent with macroporous meshes [2, 22, 36]. In our case, the mesh employed was a macro-porous polypropylene type.

Global recurrence has been reported to be approximately 10% [37]. We have registered two symptomatic recurrences (5.26%) in patients with uterine preservation. In the reinterventions, mesh displacement was not confirmed. Both cases were treated with the same technique: laparoscopic hysterectomy with lateral apical suspension procedure, with good results in the short follow-up. Another two cases of asymptomatic residual rectocele (5.26%) and one cystocele (2.63%) were confirmed. These are low rates when compared with the data of single-compartment recurrence quoted by other authors that can reach an incidence of 30% [32] and similar to the data of Lauretta [24] or Van Iersel [5].

With respect to the technical aspects, we usually perform LRCS in multicompartmental POP because we are in agreement with the concept that this technique allows a more effective reconstruction of the rectovaginal wall. The synthetic polypropylene-type meshes contribute to creating a framework for a new connective tissue, with the reinforcement of this structure [11, 24].

However, in our cohort, there are six cases in which the technique performed was an LCS: two cases of anterior and middle compartment prolapse with a vaginal cuff prolapse and four cases of anterior and middle compartments prolapse treated by hysterectomy and apical vaginal sacrocolpopexy, technical option that has been validated for the management of uterine prolapse [38].

Conclusions

Laparoscopic ventral mesh recto/colpo/sacropexy are safe and effective techniques for the treatment of multicompartmental POP and have low rates of morbidity and recurrence. Their functional outcomes are excellent in terms of correcting the middle and posterior compartments but less effective in terms of treating urinary symptomatology.

Compliance with ethical standards

Disclosures Dr. Martín del Olmo, Dr. Toledano, Dra. Martín Esteban, Dra. Montenegro, Dra. Concejo, Dr. Gómez, Dra. Rodríguez de Castro, and Dr. del Río declare that they have no conflicts of interest or financial ties to disclose.

References

1. Sagar PM, Thekkinkattil DK, Heath RM, Woodfield J, Gonsalves S, Landon CR (2008) Feasibility and functional outcome of laparoscopic sacrocolpopexy for combined vaginal and rectal prolapse. Disease Colon Rectum 51:1414–1420
2. Enríquez-Navascues JM, Elósegui JL, Apeztegui FJ, Placer C, Borda N, Irazusta M, Múgica JA, Murgpitio J (2009) Ventral rectal sacropexy (colpo-perineal) in the treatment of rectal and rectogenital prolapse. Cir Esp 86(5):283–298
3. Samuelsson EC, Victor FT, Tibblin G, Svärdsudd KF (1999) Signs of genital prolapse in a Swedish population of women 20 to 59 years of age and possible related factors. Am J Obstet Gynecol 180:299–305
4. Barber MD (2016) Pelvic organ prolapse. BMJ 354:i3853
5. van Iersel JJ, de Witte CJ, Verheijen PM, Broeders IA, Lenters E, Consten EC, Schraffordt Koops SE (2016) Robot-assisted sacrocolporectopexy for multicompartment prolapse of the pelvic floor: a prospective cohort study evaluating functional and sexual outcome. Dis Colon Rectum 59(10):968–974
6. Whiteman MK, Hillis SD, Jamieson DJ, Morrow B, Podgornik MN, Brett KM, Marchbanks PA (2008) Inpatient hysterectomy surveillance in the United States, 2000–2004. Am J Obstet Gynecol 198(1):e1–e7 (**Epub Nov 5, 2007**)
7. Caudwell-Hall J, Kamisan Atan I, Martin A, Guzman Rojas R, Langer S, Shek K, Dietz HP (2017) Intrapartum predictors of maternal levator ani injury. Acta Obstet Gynecol Scand 96(4):426–431 (**Epub Mar 10, 2017**).
8. Lim M, Sagar PM, Gonsalves S, Thekkinkattil D, Landon C (2007) Surgical management of pelvic organ prolapse in females: functional outcome of mesh sacrocolpopexy and rectopexy as a combined procedure. Dis Colon Rectum 50:1412–1421
9. Mellgren A, Johansson C, Dolk A, Anzén B, Bremmer S, Nilsson BY, Holmström B (1994) Enterocele demonstrated by defecography is associated with other pelvic floor disorders. Int J Colorectal Dis 9:121–124
10. Mellgren A, Bremmer S, Johansson C, Dolk A, Udén R, Ahlbäck SO, Holmström B (1994) Defecography: results of investigations in 2816 patients. Dis Colon Rectum 37:1133–1141

11. D'Hoore A, Cadoni R, Penninckx F (2004) Long-term outcome of laparoscopic ventral rectopexy for total rectal prolapse. Br J Surg 91:1500–1505
12. Bump RC, Mattiasson A, Bø K, Brubaker LP, DeLancey JO, Klarskov P, Shull BL, Smith AR (1996) The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol 175(1):10–17
13. Dubuisson J, Eperon I, Dällenbach P, Dubuisson JB (2013) Laparoscopic repair of vaginal vault prolapse by lateral suspension with mesh. Arch Gynecol Obstet 287(2):307–312. https://doi.org/10.1007/s00404-012-2574-1 (**Epub Sep 22, 2012**)
14. Altman D, Falconer C, Cnattingius S, Granath F (2008) Pelvic organ prolapse surgery following hysterectomy on benign indications. Am J Obstet Gynecol 198(5):e1–e6. https://doi.org/10.1016/j.ajog.2008.01.012 (**Epub Mar 20, 2008**)
15. Aigmueller T, Dungl A, Hinterholzer S, Geiss I, Riss P (2010) An estimation of the frequency of surgery for posthysterectomy vault prolapse. Int Urogynecol J 21(3):299–302. https://doi.org/10.1007/s00192-009-1033-4
16. Guzman Rojas R, Kamisan Atan I, Shek KL, Dietz HP (2016) The prevalence of abnormal posterior compartment anatomy and its association with obstructed defecation symptoms in urogynecological patients. Int Urogynecol J 27:939–944
17. Ramanah R, Ballester M, Chereau E, Bui C, Rouzier R, Daraï E (2012) Anorectal symptoms before and after laparoscopic sacrocolpoperineopexy for pelvic organ prolapse. Int Urogynecol J 23:779–783
18. Crafoord K, Sydsjö A, Johansson T, Brynhildsen J, Kjølhede P (2008) Factors associated with symptoms of pelvic floor dysfunction six years after primary operation of genital prolapse. Acta Obstet Gynecol Scand 87:910–915
19. Forsgren C, Zetterström J, Zhang A, Iliadou A, Lopez A, Altman D (2010) Anal incontinence and bowel dysfunction after sacrocolpopexy for vaginal vault prolapse. Int Urogynecol J 21:1079–1084
20. Committee on Practice Bulletins-Gynecology and the American Urogynecologic Society Practice Bulletin no. 176 (2017) Pelvic organ prolapse. Obstet Gynecol 129:e56
21. Brown RA, Ellis CN (2014) Ventral mesh rectopexy: a procedure of choice for the surgical treatment of pelvic organ prolapse? Dis Colon Rectum 57(12):1442–1445
22. Evans C, Stevenson AR, Sileri P, Mercer-Jones MA, Dixon AR, Cunningham C, Jones OM, Lindsey I (2015) A multicenter collaboration to assess the safety of laparoscopic ventral rectopexy. Dis Colon Rectum 58(8):799–807
23. Gultekin FA, Wong MT, Podevin J, Barussaud ML, Boutami M, Lehur PA, Meurette G (2015) Safety of laparoscopic ventral rectopexy in the elderly: results from a nationwide database. Dis Colon Rectum 58(3):339–343
24. Lauretta A, Bellomo RE, Galanti F, Tonizzo CA, Infantino A (2012) Laparoscopic low ventral rectocolpopexy (LLVR) for rectal and rectogenital prolapse: surgical technique and functional results. Tech Coloproctol 16(6):477–483
25. Watadani Y, Vogler SA, Warshaw JS, Sueda T, Lowry AC, Madoff RD, Mellgren A (2013) Sacrocolpopexy with rectopexy for pelvic floor prolapse improves bowel function and quality of life. Dis Colon Rectum 56:1415–1422
26. Ayav A, Bresler L, Brunaud L, Zarnegar R, Boissel P (2005) Surgical management of combined rectal and genital prolapse in young patients: transabdominal approach. Int J Colorectal Dis 20:173–179
27. Slawik S, Soulsby R, Carter H, Payne H, Dixon AR (2008) Laparoscopic ventral rectopexy, posterior colporrhaphy and vaginal sacrocolpopexy for the treatment of recto-genital prolapse and mechanical outlet obstruction. Colorectal Dis 10:138–143
28. Formijne Jonkers HA, Poierrié N, Draaisma WA, Broeders IA, Consten EC (2013) Laparoscopic ventral rectopexy for rectal prolapse and symptomatic rectocele: an analysis of 245 consecutive patients. Colorectal Dis 15(6):695–699
29. Gurland B (2014) Ventral mesh rectopexy: is this the new standard for surgical treatment of pelvic organ prolapse? Dis Colon Rectum 57(12):1446–1447
30. Varma M, Rafferty J, Buie WD (2011) Practice parameters for the management of rectal prolapse.; standards practice task force of american society of colon and rectal surgeons. Dis Colon Rectum 54(11):1339–1346
31. Luber KM, Boero S, Choe JY (2001) The demographics of pelvic floor disorders: current observations and future projections. Am J Obstet Gynecol 184:1496–1501
32. Sullivan ES, Longaker CJ, Lee PY (2001) Total pelvic mesh repair: a ten-year experience. Dis Colon Rectum 44:857–863
33. Silvis R, Gooszen HG, Kahraman T, Groenendijk AG, Lock MT, Italiaander MV, Janssen LW (1998) Novel approach to combined defaecation and micturition disorders with rectovaginovesicopexy. Br J Surg 85:813–817
34. Brubaker L, Cundiff GW, Fine P, Nygaard I, Richter HE, Visco AG, Zyczynski H, Brown MB, Weber AM, Pelvic Floor Disorders Network (2006) Abdominal sacrocolpopexy with Burch colposuspension to reduce urinary stress incontinence. N Engl J Med 354(15):1557–1566
35. Unger CA, Paraiso MF, Jelovsek JE, Barber MD, Ridgeway B (2014) Perioperative adverse events after minimally invasive abdominal sacrocolpopexy. Am J Obstet Gynecol. https://doi.org/10.1016/j.ajog.2014.07.054 (**Epub Aug 1, 2014**)
36. Nazemi TM, Kobashi KC (2007) Complications of grafts used in female pelvic floor reconstruction: mesh erosion and extrusion. Indian J Urol 23(2):153–160
37. Cronjé HS, de Beer JA (2008) Culdocele repair in female pelvic organ prolapse. Int J Gynecol Obstet 100:262–266
38. Fairchild PS, Kamdar NS, Berger MB, Morgan DM (2016) Rates of colpopexy and colporrhaphy at the time of hysterectomy for prolapse. Am J Obstet Gynecol 214:262.e1