Original article

Surgical strategies for full-thickness rectal prolapse: a retrospective study and review of literature

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Abstract: Purpose**:** Treatment of rectal prolapse is extremely challenging; both perineal and abdominal approaches have shown significant limitations: considerable incidence of postoperative constipation after both laparotomic or laparoscopic rectopexies; long operative time and anastomotic leakage risk after resection-rectopexy; Delorme transrectal excision requires surgical skills and is associated with high anal stenosis and recurrence rate; finally, levatorplasty is often ineffective. Methods**:** We retrospectively reviewed our experience of the period 2004-2009: 89 constipated patients with rectal prolapse were treated using transperineal procedures in 28 cases and through transabdominal approaches in 61 cases. Furthermore, a literature review was performed using the National Library of Medicine's Pubmed Database; articles reporting on treatment of rectocele both with transperineal procedures and abdominal rectopexy were examined. Results**:** Out of 89 constipated patients, 16 underwent Delorme procedure with a mortality rate of 1.4% morbidity of 5.2% and recurrence rate at 5 years of 9.2%; 12 patients underwent Altemeier procedure with similar results but lower recurrence rate (1% at 5 years). Sixty-one patients underwent abdominal rectopexy with mesh: 25 patients were treated according to Orr Loygue technique with similar results but lower recurrence rate (2.5% at 5 years) and 36 were operated on according to Wells technique with similar mortality and recurrence rate but postoperative defecation impairment in 20% of patients. Conclusions**:** In summary, predicting which patient will benefit from surgical intervention remains a challenge. An effective method of patient selection based on an accurate morpho-functional assessment and patient performance status examination would optimize the outcome. In our experience, basically, we use transanal/perineal procedures to treat rectocele, and rectal prolapse in elderly, high risk patients and abdominal operations to treat of rectal prolapse and enterocele in young patients.

Keywords: Rectal prolapse; Transperineal procedure; Rectocele; Enterocele; Rectopexy

INTRODUCTION

Rectal prolapse is defined as a protrusion of the rectum beyond the anus. Full-thickness rectal prolapse should be distinguished from mucosal prolapse in which there is protrusion of only the rectal or anal mucosa.[1-3]

Aetiological factors include lax and anatomic condition of the muscles of the pelvic floor and anal canal, abnormally deep pouch of Douglas, weakness of both internal and external sphincters, lack of normal mesorectum and finally weakness of lateral ligaments.[3-6]

Constipation is associated with prolapse in 30% to 70% of patients, with chronic straining, sensation of anorectal blockade, need of digital evacuation. In addition 60% of patients have coexisting incontinence due to the stretching of the anal sphincters caused by the prolapse and due to the impaired rectal compliance.

Regardless of the therapy chosen, matching the surgical selection, i.e. physical examination, defecatory history, endoscopy, manometry and colonic transit studies, is essential for the correct management of the patients.[5-6]

A complete colonoscopy is useful to test for organic colonic pathologies anorectal manometry and defecating proctography to confirm rectal prolapse and to test for outlet dysfunction or associated rectocele. A colonic transit study can be helpful for those patients who give a history of severe constipation and in whom the surgeon may be considering a resection-rectopexy.

Regarding the treatment, patients who gain no relief from dietary modification and biofeedback therapy should be offered surgery.

Surgical therapy is aimed to correcting the prolapse, restore the continence and prevent constipation or impaired evacuation with acceptable mortality and recurrence rates. There are many procedures described for the treatment of rectal prolapse, that can be divided into abdominal or perineal approaches. The perineal approaches have been reserved to the frail and elderly patients, given that general anesthesia and laparotomy can be avoided; whereas the abdominal approaches are thought to provide a more effective repair with a lower recurrence rate.

More recently, laparoscopic surgery has emerged as an effective tool for the treatment of rectal prolapse because no specimen is removed and no anastomosis is required. Previous trials have suggested that laparoscopic surgery has many short term advantages over open surgery, including less pain and scarring, shorter hospital stay and faster recovery. In this retrospective study we reviewed our experience with 89 constipated patients presenting with rectal prolapse surgically treated using both transperineal and open abdominal approaches. In addition a review of literature was performed to point out the surgical strategies and outcomes for the treatment of rectal prolapse.

MATERIALS AND METHODS

Between January 2004 and December 2009, 89 constipated patients after medical treatment failure, were evaluated and surgically treated at the Division of General Surgery of the Department of Surgery, Tor Vergata University Hospital, Rome. All the patients underwent a pre-treatment evaluation, which included history of previous gynaecological, urological, or ano-rectal surgery and symptoms, clinical examination, anorectal manometry, anoscopy, colonic transit test and defecography. In some cases transanal ultrasound, pelvic MR, colpo-entero-defecography and colonoscopy were performed in order to evaluate concomitant bowel diseases.

Anorectal manometry was performed at rest, after voluntary contraction (ie, the maximal voluntary increase above the resting tone) and during straining. At defecography, resting state, voluntary and maximum contraction of the sphincter and pelvic floor muscles, and straining during defecation were recorded. Rectal emptying was also assessed. X-ray films were taken in each position and dynamic assessment of the defecation was also obtained.

All patients were operated on by the same senior surgeon (G.M.). Written informed consent had been obtained from all the subjects after a full explanation of the procedure.

Regarding the surgical technique both perineal (Delorme and Altemeier procedures) and abdominal approaches (Wells and Orr Loygue procedures) were used according

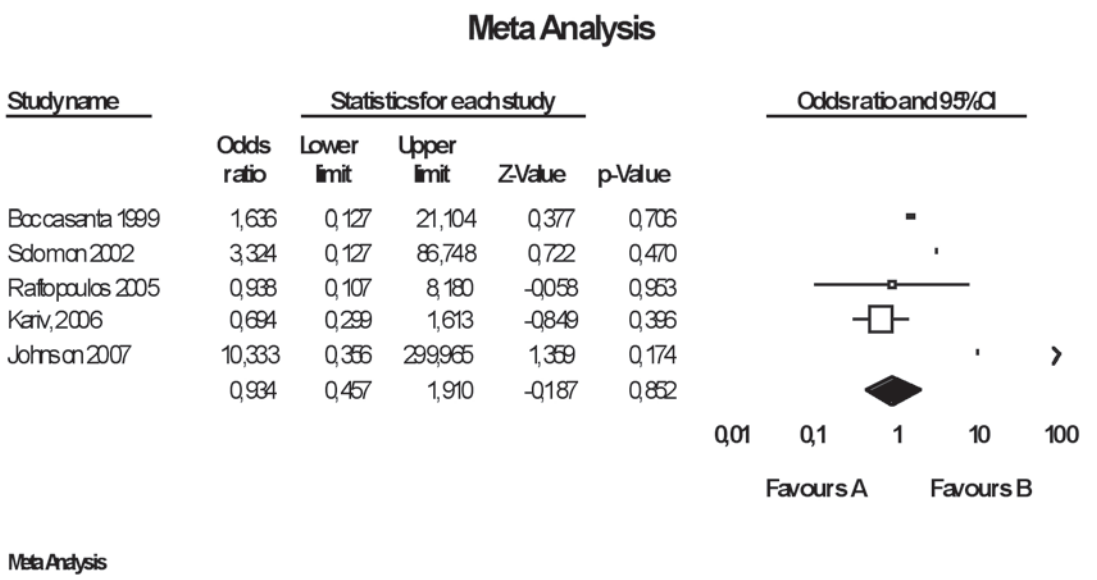

Fig. 1a – Meta-analysis of trials comparing open and laparoscopic approach. Forest plot of recurrence. Random model. Salked 2004 and Baker 1999 have been excluded because of lack of data.

to the clinical presentation and performance status of each patient.

Patients were clinically assessed at the first follow up visit up to 7 days after the operation. Subsequently they were followed up every 15 days for the first 2 months and then at 6, 12, 24 and 36 months

Demographic data, faecal continence and complications were recorded. Degree of continence was scored according to the Wexner continence score. The quality of life was evaluated using SF-36 questionnaire. During follow up visits all patients were submitted to clinical examination of the perineum, rectum and vagina, digital exploration and anoscopy.

RESULTS

Twenty-eight patients were treated using transperineal procedures and 61 through transabdominal approaches.

Sixteen patients (10 males 6 females, average age 72 years, range 58-94) underwent Delorme procedure with a mortality rate of 1.4%, morbidity of 5.2% and recurrence rate at 5 years of 9.2%. No constipation worsening was recorded. Continence improvement was recorded in 47% of patients. The follow up ranged between 6 and 60 months.

Twelve patients (4 males 8 females average age 63 years range 48-79) underwent Altemeier procedure with a mortality rate of 1.9%, morbidity of 6% and recurrence rate at 5 years of 1%. No constipation worsening was recorded. The follow up ranged between 6 and 60 months.

Sixty-one patients underwent abdominal rectopexy with mesh. Twenty-five patients (16 males 9 females, average age 46 years, range 38-79) were treated according to Orr Loygue technique with a mortality rate of 2%, morbidity of 6.2% and recurrence rate at 5 years of 2.5%. Constipation was cured in 61% of patients in absence of worsening. Continence improvement was recorded in 58% of patients. The follow up ranged between 5 and 57 months.

Thirty-six patients (20 males 16 females, average age 61 years, range 52-86) were operated on according to Wells technique. The mortality was 3%, the morbidity 8% and recurrence rate at 5 years of 3%. Constipation worsening was recorded in 6 patients. Continence improvement was recorded in 55% of patients. The follow up ranged between 7 and 55 months.

DISCUSSION

The management of rectal prolapse is still a challenge with no clear predominant treatment of choice. The procedures described for the treatment of rectal prolapse can be divided into abdominal or perineal approaches.

Perineal approaches

Perineal procedures for rectal prolapse include the

TABLE 1 – Results reported in literature of suture rectopexy

Authors	Year	N Pts	Procedure	Continence improvement %	Constipation improvement %	Recurrence N (%)	Follow-up (months)
Carter[10]	1983	32	SR	NS	NS	1 (3)	144
Novell[11]	1994	32	SR	15 (+)	31(-)	1 (3)	47
Graf[12]	1996	53	SR	36(+); 12(-)	30(+); 27(-)	5 (9)	97
Khanna[13]	1996	65	SR	75(+)	83(+)	0	65
Briel[14]	1997	24	SR	67(+)	NS	0	67
Llyanage[15]	2009	81(70)	SR+ resection	81(+)		5 (7)	2-47*

N Pts: number of patients; SR: suture rectopexy; NS: not stated;* weeks

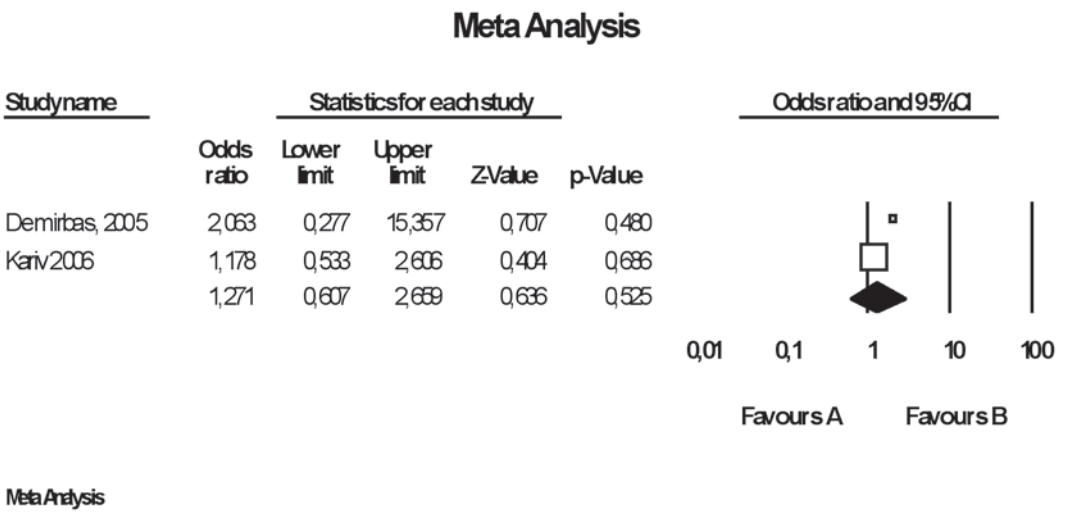

Fig. 1b – Meta-analysis of trials comparing open and laparoscopic approach. Forest plot of incontinence Random model. Salked 2004, Baker 1997, Boccasanta 1999, have been excluded because of lack of data. Johnson 2007, Solomon 2002 reported data in a way not suitable for meta-analysis.

STARR, the Delorme and the Altemeier operations. They are indicated in case of old, high risk patients presenting with II III degree prolapse.

The STARR procedure consists of transanal resection of the distal rectum by double stapler. According to the indications of SICCR it should be performed in extremely selected patients with low rectoceles up to 3 cm, small and low fascial defects in absence of enterocele, sigmoidocele, puborectalis dyssinergia and motility disorders.[7] Although some clinical series reported improvement rate over 80% after STARR procedure, different authors reported serious complications such as rectal bleeding, sepsis, rectovaginal fistula, urgency and faecal incontinence.[8]

The Delorme procedure includes mucosal stripping of the rectum, followed by plication of the muscle layers. It is indicated in high risk elderly patients presenting with prolapse up to 3-4 cm in absence of diverticulosis.

In line with our results, in literature mortality ranges between 0% and 4% and recurrence ranges between 4% and 38%. Continence improvement up to 67% has been reported in absence of postoperative constipation worsening. Factors associated with failure of the Delorme procedure include faecal incontinence, chronic diarrhoea, and major perineal descent (>9 cm on straining).[9]

The Altemeier procedure, or perineal rectosigmoidectomy, is a full-thickness resection of the rectum with coloanal anastomosis. It is indicated in high risk elderly patients presenting with II III degree prolapse and II degree sigmoidocele. Similar to our series, the reported overall mortality rates ranged from 0% to 5% and recurrence rates

Table 2 – Results reported in literature of mesh rectopexy

Authors	Year	Procedure	N Pts	Continence improvement %	Constipation improvement %	Recurrence N (%)	Follow-up (months)
Penfold[16]	1972	Post Mesh	101	22	NS	3 (2.97)	48
Morgan[17]	1972	Post Mesh	150	42	58	3 (2)	36
Notaras[18]	1973	Post Mesh	19	NS	NS	0	84
Launer[19]	1982	Ripstein	54	41	0 (10 worsening)	6 (11.1)	64
Holmstrom[20]	1986	Ripstein	108	37	0 (17 worsening)	4 (3.7)	83
Roberts[21]	1988	Ripstein	135	78	69	13 (9.6)	41
Novell[22]	1994	Post Mesh	31	3	0 (48 worsening)	2 (6.4)	47
Keighley[23]	1984	Post Mesh	100	64	NS	0	24
Tjandra[24]	1993	Ripstein	142	18	0	10/142	50
Galili[25]	1997	Post Mesh	37	NS	NS	1 (2.7)	44
Yakut[7]	1998	Post Mesh	48	NS	0	0	38
Aitola[26]	1999	Post Mesh	96	26	24	6 (6.2)	78
Schultz[27]	2000	Ripstein	69	20 (10 worsening)	37 (8 worsening)	1 (1.4)	82
Mollen[28]	2000	Post Mesh	18	NS	0	0	42
Winde[29]	1993	Ripstein-Corman	47	23	17	0	51

Post: posterior; NS: not stated.

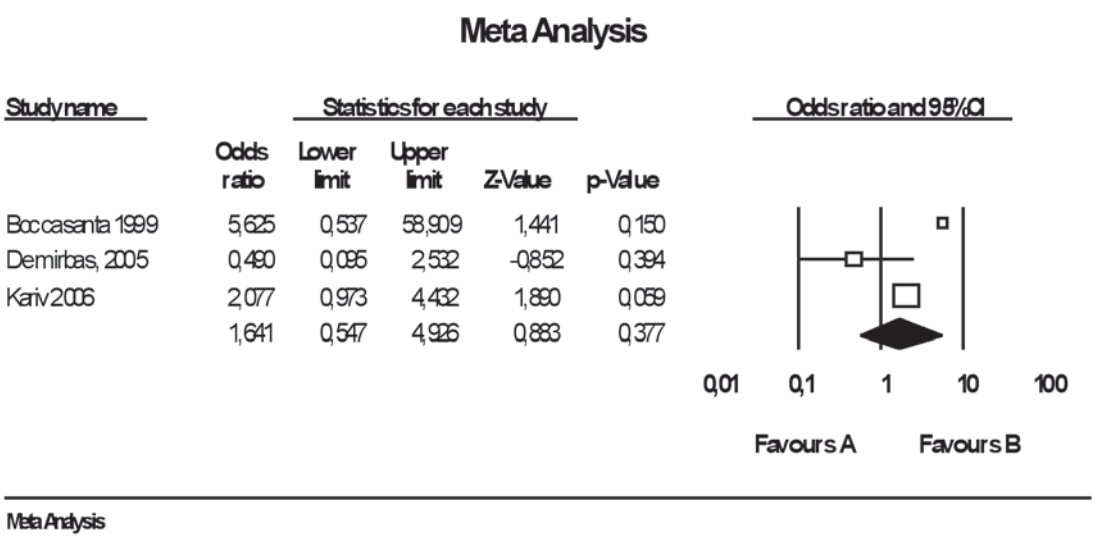

Fig. 1c – Meta-analysis of trials comparing open and laparoscopic approach. Forest plot of constipation. Random model. Salked 2004, Baker 1999, Raftopoulos 2005, have been excluded because of lack of data. Johnson 2007, Solomon 2002 reported data in a way not suitable for meta-analysis.

from 0% to 16%[9]. The postoperative course is generally uneventful. Potential complications include anastomotic bleeding, pelvic sepsis and, although uncommon, anastomotic dehiscence. This procedure can be combined with plication of the levator ani muscle, to reduce continence impairment reported up to 90%. Since recurrence probably reflects inadequate resection, care must be taken to mobilize the entire redundant rectum and to perform the anastomosis within the pelvis.

Abdominal approaches

Many transabdominal techniques have been proposed for rectal prolapse. These procedures require fixation of the rectum to the sacrum, by either a suture or mesh. An anterior resection or sigmoid colectomy is often added to the procedure. Suture rectopexy consists of rectum fixation to presacral fascia by interrupted sutures. In the Wells procedure after the rectal mobilization a mesh is inserted between the sacrum and the rectum and fixed to sacral promontory and lateral rectal wall. The Ripstein procedure is an anterior 360º rectopexy. The Orr-Loygue rectopexy consists of anterolateral rectum fixation with double mesh. The results of suture and mesh rectopexy in literature are shoed in table 1[10-15] and 2.[16-29]

The addition of sigmoid resection to rectopexy (Frykman Goldberg procedure) combines the advantages of mobilisation of the rectum, sigmoid resection and rectum fixation. Most series used resection plus suture rectopexy. Besides this, few authors performed resection plus posterior mesh rectopexy.[7,30-35]

Concerning the results of Wells procedure in literature, mortality rates ranged from 0% to 3% and recurrence rates were reported between 0% and 6%. Improvement in continence occurred up to 75%, but there was a variable response of constipation.[7,16-19,22,23,25,26,28] Accordingly in our series we reported constipation worsening in 20% of patients and recurrence rate at 5 years of 3%. Besides this, continence improvement was recorded in 55% of patients.

Regarding the results of resection+ rectopexy in literature, mortality rate ranges between 0% and 6.7% with an associated recurrence rate of 0%-5% (table 3).[30-35] There was an overall improvement both in continence and in constipation. Discussion about the mesh fixation, i.e. posterior or anterior approach, is still ongoing; in addition, the optimal material or suture to be used for fixation is still unclear.

Besides this, constipation is a major functional problem for patients with rectal prolapse with conflicting results and worsening of constipation reported up to 40% of patients.[9] The only theme that seems clear from literature is that postoperative constipation after rectopexy is not completely understood. Actually, the constipation may be obstructive (bowel intussusception into the rectum, enterocele, puborectalis dissynergia) or secondary to colonic dysmotility. Postoperative constipation may be due to colonic dysmotility from denervation, division of the lateral rectal ligaments, and sigmoid kinking secondary to rectal mobilization. Several authors suggested to preserve lateral ligament in order to improve both constipation and continence.[9,36] The left colon and rectum receive retrograde innervations through the lateral ligaments; thus, lateral

TABLE 3 – Results in literature of rectopexy plus resection

Authors	Year	N Pts	Procedure	Continence improvement %	Constipation improvement %	Recurrence N (%)	Follow-up (months)
Watts[30]	1985	80	SR+ Res	78	NS	2 (2.5)	48
Tjandra[31]	1993	18	SR+ Res	11	56	NS	50
Deen[32]	1994	10	SR+ Res	90	NS	0	17
Huber[33]	1995	42	SR+ Res	44	18	0	54
Kim[34]	1999	176	SR+ Res	55	42	9	98
Husa[35]	1988	48	SR+ Res	90	56	4 (8.3)	51,6

SR: suture rectopexy; Res: resection; N Pts: number of patients: NS: not stated.

Table 4 – Results of OPEN versus LAPAROSCOPIC APPROACH

Trial	Year	Study type	Type PTS	N PTS	Continence improvement N	Constipation improvement N	Recurrence N	Follow-up (months)
JOHNSON[39]	2007	Prosp NR	OPEN	5	GD	GD	1/5	17*
			LPS	15	GD	GD	0	
KARIV[40]	2006	Prosp NR	OPEN	86	19/56	30/56	11/86	59*
			LPS	86	17/56	20/56	15/86	
DEMIRBAS[41]	2005	Prosp NR	OPEN	17	3/11	411	0	36
			LPS	23	2/13	7/13	0	16
RAFTOPOULOS[42]	2005	Retrospec	OPEN	105	NS	NS	9/105	49
			LPS	11	NS	NS	1/11	
SOLOMON[43]	2002	Prosp RB	OPEN	19	NS	NS	1/19	23**
			LPS	20	NS	NS	0	
BOCCASANTA[44]	1999	Prosp NR	OPEN	13	NS	5/13	2/13	37*
			LPS	10	NS	1/10	1/10	26
BAKER[45]	1997	Retrospec	OPEN	10	NS	NS	NS	27
			LPS	8	NS	NS	NS	
SALKED[46]	2004	Retrospec Cohort	OPEN	20	NS	NS	NS	NS
			LPS	19				

NS: not stated; Retrospec: retrospective; Prosp: prospective; NR: not randomized; LPS: laparoscopic; GD: Grouped Data; RB: Randomized Blinded

ligament division during rectopexy has been suggested to denervate the rectum, causing postoperative constipation.[9] Accordingly, Nelson and coworkers in a recent Cochrane review on 12 trials and 380 patients, reported that division, rather than preservation, of the lateral ligaments was associated with less recurrent prolapse but higher post-operative constipation rate.[36]

The abdominal operations for rectal prolapse can all be performed laparoscopically. Laparoscopic rectopexy gained rapidly popularity given that it's simple, easy to perform and has several short term advantages, including less pain and scarring, decrease rate of wound hernias and bowel obstruction, shorter hospital stay and a more rapid recovery. Regarding the results reported in literature the mortality was 0% with recurrence rates up to 4%. The effect on continence and constipation depends on the type of operation performed.[9,36-38]

Laparoscopic versus open surgery

Three meta-analyses of comparative studies open versus laparoscopic surgery for rectal prolapse have been published in the literature. The results of these meta-analyses suggest that although the operative time is greater, laparoscopic surgery has many short term advantages over open surgery, including less pain and scarring, shorter hospital stay and faster recovery. There was no difference in recurrence rates or morbidity (the primary outcomes) between the two techniques.[36-38]

Recently, we meta-analysed the trials comparing laparoscopic versus open abdominal rectopexy (suture and mesh rectopexy with or without resection) with a focus on long term results.

Seventeen trials on open and laparoscopic rectopexy, including more than 1000 patients, were obtained from the literature research using the National Library of Medicine's Pubmed Database. Eight comparative studies, published between 1997 and 2007, matched the inclusion criteria, comparing laparoscopic and open rectopexy, with a follow up longer than 16 months. The median follow-up time of the studies ranged from 16 to 49 months (table 4).[39-46]

Our meta-analysis showed no significant difference in the recurrence rate between open rectopexy and laparoscopic rectopexy (OR, 0.934; 95 percent CI, 0.457-1.910; Z value = -0.187; $P = 0.852$) using random effect model (figure 1a).

Accordingly, most studies in literature showed that the recurrence rates for rectal prolapse after either laparoscopic or open surgery are lower than 10% and similar.[40]

Furthermore, we obtained no statistical significant difference regarding incontinence between open rectopexy and laparoscopic rectopexy (OR, 1.271; 95 percent CI, 0.607-2.659; Z value = 0.636; $P = 0.525$) using random effect modelling (figure 1b).

Actually, different mechanisms of fecal incontinence in patients with rectal prolapse have been claimed: pudendal nerve neuropathy, direct sphincter trauma from the rectal intussusception, chronic stimulation of the rectoanal inhibitory reflex, and impaired rectal sensation.[40]

Continence is restored after surgery, either open or laparoscopic, in a high percentage of patients with rectal prolapse.[9] The exact mechanism of continence restitution has not been firmly established. Suggested mechanisms include restoration of internal anal sphincter function, improved rectal compliance and anorectal sensation and finally it may be the effect of postoperative constipation that protects patients from incontinence.

Finally, our meta-analysis showed no statistical significance regarding constipation between open and laparoscopic rectopexy (OR, 1.641; 95 percent CI, 0.547-4.926; Z value = 0.833; $P = 0.377$) using random effect modelling (figure 1c).

Accordingly, previous comparisons between laparoscopic and open surgery failed to reveal significant long-term functional differences between the two groups with constipation worsening in up to 40% of patients.[9,36-38,40-46]

CONCLUSIONS

Predicting which patient presenting with rectal propose rectal prolapse and obstructed defecation will benefit from surgical intervention remains a challenge. Surgery should be considered only when conservative therapy fails and a careful patient selection is crucial to obtain a satisfactory outcome. As stated in the recent Cochrane Database System review on rectal prolapse[36], it is impossible to identify a gold standard of treatment. In our experience perineal approaches are preferred in elderly and high-risk patients and abdominal approaches are warranted in young and low-risk patients. Furthermore, laparoscopic rectopexy is associated with lower morbidity, faster convalescence and long term results similar to open approach in a referral centre for laparoscopic colorectal surgery.

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