

Abdominal rectopexy for rectal prolapse. Meta-analysis of literature

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Abstract. Objective: Laparoscopic rectopexy to treat full-thickness rectal prolapse has proven short-term benefits, but there are little long-term follow-up and functional outcome data available. Using meta-analytical techniques, this study was designed to evaluate long term results of open and laparoscopic abdominal procedures to treat full-thickness rectal prolapse in adults. **Methods:** A literature review was performed using the National Library of Medicine's Pubmed Database; all articles reporting on abdominal rectopexy with a follow up longer than 16 months were considered. The primary end point was recurrence of rectal prolapse and the secondary end points were incontinence and constipation improvement. A random effect model was used to aggregate the studies reporting these outcomes, and heterogeneity was assessed. **Results:** Eight comparative studies, consisting of a total of 467 patients (275 open and 192 laparoscopic) were included. Analysis of data suggested that there is no significant difference in recurrence, incontinence and constipation improvement between laparoscopic abdominal rectopexy and open abdominal rectopexy. **Conclusions:** Laparoscopic abdominal rectopexy is a safe and feasible procedure, which may compare equally with the open technique with regards to recurrence, incontinence and constipation. However large-scale randomized trials, with comparative, strong methodology are still needed to find out outcome measures accurately.

Key words: Rectal Prolapse; Rectopexy; Follow up; Outcomes; Literature Review.

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.^{1,2}

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.¹⁻³

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.^{3,4}

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.^{3,4}

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.⁵⁻⁷ 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.⁷⁻⁹ 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.⁷⁻⁹

In this prospective study we presented our experience with patients presenting with rectal prolapse surgically treated with ventral rectopexy with biomesh. In addition a review of literature was performed to point out the surgical strategies and outcomes for the treatment of rectal prolapse.

ABDOMINAL APPROACHES

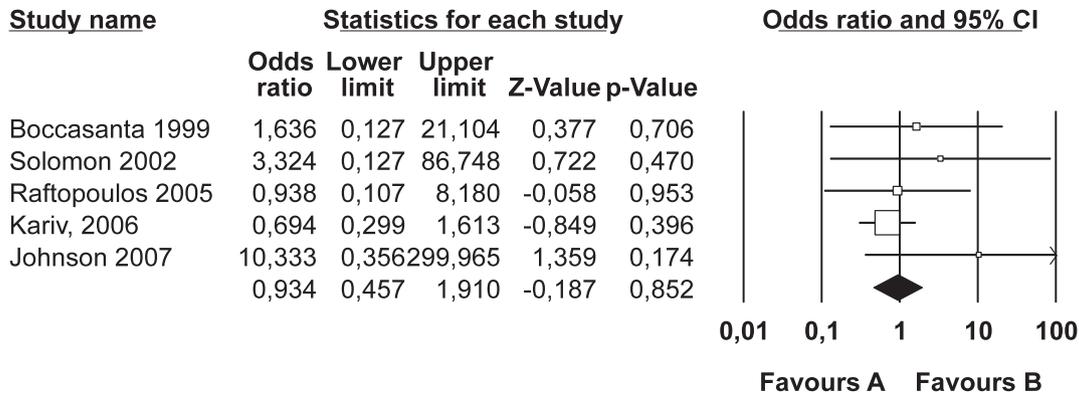
Many transabdominal techniques have been proposed for rectal prolapse. These procedures require fixation of the rectum to the sacrum, by either a suture or mesh. An anterior resection or sigmoid colectomy is often added to the procedure.^{1,9}

Suture rectopexy consists of rectum fixation to presacral fascia by interrupted sutures. In the Wells procedure after the rectal mobilisation 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 360° rectopexy. The Orr-Loygue rectopexy consists of anterolateral rectum fixation with double mesh.^{1,9}

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.⁵

Regarding 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. Regarding the results of resection and rectopexy in literature, mortality rate ranges between 0% and 6.7% with an associated recurrence rate of 0%-5%. 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.^{1,5-9}

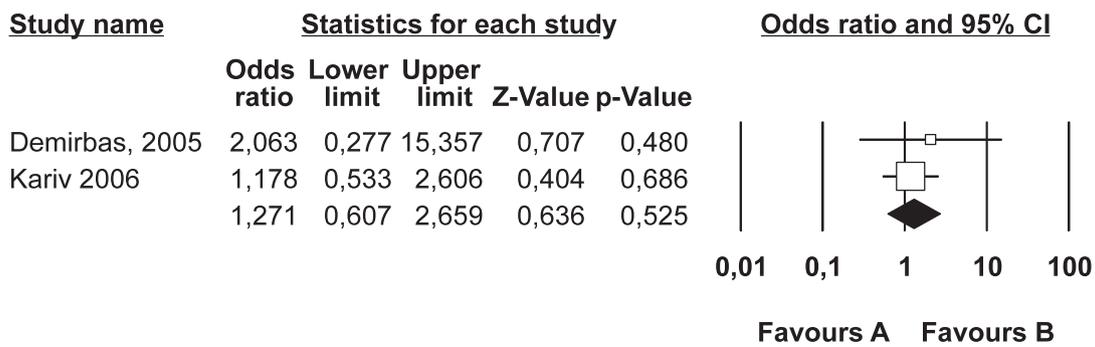
Meta Analysis



Meta Analysis

Figure 1 – 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.

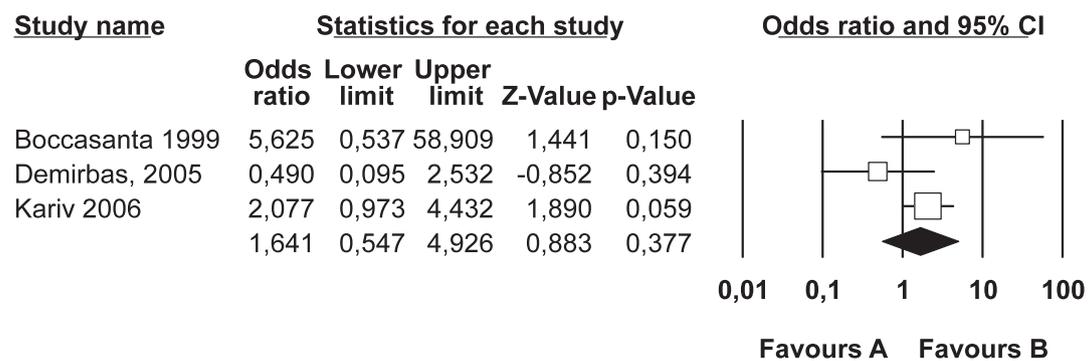
Meta Analysis



Meta Analysis

Figure 2 – 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.

Meta Analysis



Meta Analysis

Figure 3 – 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.

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. The only theme that seems clear from literature is that post-operative 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. Besides, 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. The left colon and rectum receive retrograde innervations through the lateral ligaments; thus, lateral ligament division during rectopexy has been suggested to denervate the rectum, causing postoperative constipation. 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.

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.^{9-12.}

LAPAROSCOPIC VERSUS OPEN SURGERY: META-ANALISYS OF LITERATURE

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.

In the meta-analysis, both randomized and nonrandomized trials comparing open and laparoscopic rectopexy with a follow up longer than 16 months have been included. Any technique for abdominal repair of rectal prolapse has been considered i.e. resection and rectopexy either with suture or mesh.

Seventeen trials on open and laparoscopic rectopexy, including more than 1000 patients, were obtained from the database. Eight comparative studies, 13-20 published between 1997 and 2007, matched the inclusion criteria, comparing laparoscopic and open rectopexy, with a follow up longer than 16 months.

The quality of the included studies was assessed on study design, allocation concealment and blinding of participants both investigators and observers for randomized trials, mean outcome measures, statistical examination, length of follow up. These trials included three retrospective, four prospective nonrandomized and one prospective randomized blinded study.

A total of 467 patients, of which 275 (58.8 percent) underwent open rectopexy and 192 (41.2 percent) laparoscopic rectopexy, were included in the final analysis. The largest study was based on 172 patients the smallest on 18 patients. The year of study, number of patients and study design, are demonstrated in table 1.

Incidence of recurrence, incontinence improvement and constipation improvement after the intervention and length of follow up.⁶¹⁻⁶⁸

Figure 1 demonstrates the outcome for meta-analysis for recurrence. All the studies except for Baker¹⁹ et al and Salked et al²⁰ reported the incidence of recurrence and there was significant heterogeneity among trials (Q = 4.99, p < 0.05).

The median follow-up time of the studies ranged from 16 to 49 months. 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 2 demonstrates the outcome of meta-analysis for incontinence. Baker et al.¹⁹, Boccasanta et al.¹⁸ and Salked et al.²⁰ did not reported the incidence of patients with continence improvement after the intervention. Jonhson and Solomon reported grouped data not suitable for meta-analysis.

The two remaining studies were compared. There was no significant heterogeneity among trials (Q <1, p> 0.05).

The median follow-up time of the studies was 59 and 24 months. Meta-analysis showed no statistical significant difference regarding incontinence between open rectopexy and laparoscopic rectopexy (OR, 1.271; 95 percent CI,

TABLE 1. – Results of OPEN versus LAPAROSCOPIC APPROACH.

Trial	Year	Study type	Type PTS	N PT S	Continence improvement N	Constipation improvement N	Recurrence N (%)	Follow-up (months)
JOHNSON ¹³	200	Prosp	OPEN	5	GD	GD	1/5	17*
	7	NR	LPS	15	GD	GD	0	
KARIV ¹⁴	200	Prosp	OPEN	86	19/56	30/56	11/86	59*
	6	NR	LPS	86	17/56	20/56	15/86	
DEMIRBAS ¹⁵	200	Prosp	OPEN	17	3/11	4/11	0	36
	5	NR	LPS	23	2/13	7/13	0	16
RAFTOPOULOS ¹⁶	200	Retrosp	OPEN	105	NS	NS	9/105	49
	5	Retrosp	LPS	11	NS	NS	1/11	
SOLOMON ¹⁷	200	Prosp	OPEN	19			1/19	23**
	2	RB	LPS	20			0	
BOCCASANTA ¹⁸	199	Prosp	OPEN	13	NS	5/13	2/13	37*
	2	NR	LPS	10		1/10	1/10	26
BAKER ¹⁹	199	Retrosp	OPEN	10	NS	NS	NS	27*
	7		LPS	8				26
SALKED ²⁰	200	Retrosp	OPEN	20	NS	NS	NS	NS
	7	Cohort	LPS	19				

NS: not stated; Retrospec: retrospective; Prosp: prospective; NR: not randomized; LPS: laparoscopic; GD: Grouped Data; RB: Randomied Blinded; *: mean values; **: median values

0.607-2.659; Z value = 0.636; P = 0.525) using random effect modelling.

Figure 3 demonstrates the outcome of meta-analysis for constipation. Baker et al.¹⁹ and Salked et al.²⁰ did not reported the incidence of patients with constipation improvement after the intervention. Jonhson¹³ and Solomon¹⁷ reported grouped data not suitable for meta-analysis. The three remaining studies were compared.

There was significant heterogeneity among trials (Q = 4.32, p < 0.05). The median follow-up time for the studies ranged between 24 and 59 months. 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.

Finally, although multiple studies have small sample size, graphic exploration of the results with funnel plots of the primary and secondary outcomes did not demonstrate any evidence of publication bias.

DISCUSSION

The management of rectal prolapse is still a challenge with no clear predominant treatment of choice. Although short term results are in favour of laparoscopic surgery, relatively little is known regarding comparison of the long-term functional results between either laparoscopic and open surgery or different surgical techniques.²¹⁻²⁸ In this large study, we meta-analyzed the long-term functional outcomes of open and laparoscopic procedures to treat rectal prolapse considering both comparative and noncomparative trials with a follow up longer than 16 months.

Three meta-analysis of comparative studies open versus laparoscopic surgery for rectal prolapse have been published in literature.^{6,27,28} The results of these meta-analysis suggested 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.^{6,21-28}

Recurrence after surgery for rectal prolapse is a key measure of successful long term outcome.⁶ The rate of recurrence varies in literature according to the type of repair, the length of follow up and the definition of relapse. Most studies showed that the recurrence rates for rectal prolapse after either laparoscopic or open surgery are lower than 10% and similar.²¹⁻²⁸ Accordingly, our meta-analysis of studies, comparing open and laparoscopic procedures, showed no statistically significant difference in recurrence between the two approaches (P = 0.852).

Constipation is a major functional problem for patients with rectal prolapse with conflicting results both for open and laparoscopic procedures.⁶ The only theme that seems clear from literature is that postoperative constipation after rectopexy is not completely understood and previous comparisons between laparoscopic and open surgery failed to reveal significant long-term functional differences between the two groups.^{6,21-28}

Actually, the constipation may be obstructive (bowel intussusception into the rectum, enterocele, puborectalis dysynergia) or secondary to colonic dysmotility. Besides, postoperative constipation may be due to colonic dysmotility from denervation, division of the lateral rectal ligaments, and sigmoid kinking secondary to rectal mobilization.^{62,70} 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.⁶ Furthermore, rectal resection was associated to rectopexy according to the theory that removal of the redundant sigmoid colon could result in less kinking at the rectosigmoid angle and thus improvement of transit into the rectum.^{5,6} Other advantages include avoiding torsion or volvulus of the redundant sigmoid colon and achieving a straighter course and less mobility of the left colon.

Nonetheless, in literature, the addition of sigmoid resection is associated with variable results in terms of postoperative constipation.^{5,6,23} The procedure seems well suited to patients with a long redundant sigmoid and a long history of constipation.²⁴

Besides, according to the previous meta-analyses,^{6,27,28} our quantitative analysis of trials comparing laparoscopic and open surgery failed to reveal significant constipation differences between the two groups (P = 0.377).

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. Continence is restored after surgery for a high percentage of patients with rectal prolapse.²⁶ In our quantitative analysis most of the studies reported an improvement in continence after the operation that was statistically significant after laparoscopic surgery and open mesh rectopexies. Finally, according to previous results^{6,27,28} no difference was obtained in continence from the meta-analysis of trials comparing open and laparoscopic surgery.

CONCLUSIONS

In summary, predicting which patient, presenting with 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 by Nelson in the recent Cochrane database System review on rectal prolapse, it is impossible to identify a gold standard of treatment.⁶

Ventral rectopexy using biological mesh for internal rectal prolapse has come out as safe and effective procedure in ameliorating symptoms of obstructed defecation and faecal incontinence. Laparoscopic ventral rectopexy allows for reduced hospital stay and convalescence and should be considered the gold standard in colorectal centres.

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