

Retrospective Study

Laparoscopic ventral mesh rectopexy for complete rectal prolapse: A retrospective study evaluating outcomes in North Indian population

Abhijit Chandra, Saket Kumar, Ajeet Pratap Maurya, Vishal Gupta, Vivek Gupta, Rahul

Abhijit Chandra, Saket Kumar, Ajeet Pratap Maurya, Vishal Gupta, Vivek Gupta, Rahul, Department of Surgical Gastroenterology, King George's Medical University, Lucknow 226003, Uttar Pradesh, India

Author contributions: Chandra A, Kumar S, Maurya AP and Gupta V contributed to planning and/or conducting the study; Chandra A, Kumar S, Maurya AP, Gupta V and Gupta V contributed to critical revision of the manuscript; Chandra A, Kumar S, Maurya AP and Rahul performed and/or assisted the surgical procedure, contributed to drafting the manuscript and literature review.

Institutional review board statement: Ethics Committee, Institutional Review Board, King George's Medical University, Lucknow, India.

Informed consent statement: All involved persons gave their informed consent prior to study inclusion.

Conflict-of-interest statement: The authors declare no conflicts of interest.

Data sharing statement: No additional data are available.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Correspondence to: Abhijit Chandra, MCh, Professor, Department of Surgical Gastroenterology, King George's Medical University, Shah Meena Road, Lucknow 226003, Uttar Pradesh, India. abhijitchandra@hotmail.com
Telephone: +91-522-2740068
Fax: +91-522-2256116

Received: June 29, 2015

Peer-review started: July 4, 2015

First decision: September 22, 2015

Revised: February 3, 2016

Accepted: February 23, 2016

Article in press: February 24, 2016

Published online: April 27, 2016

Abstract

AIM: To analyze the outcomes of laparoscopic ventral mesh rectopexy in the management of complete rectal prolapse (CRP) in North Indian patients with inherent bulky and redundant colon.

METHODS: The study was conducted at a tertiary health care center of North India. Between January 2010 and October 2014, 15 patients who underwent laparoscopic ventral mesh repair for CRP, were evaluated in the present study. Perioperative outcomes, improvement in bowel dysfunction or appearance of new complications were documented from the hospital records maintained prospectively.

RESULTS: Fifteen patients (9 female) with a median age of 50 years (range, 15-68) were included in the study. The median operative time was 200 min (range, 180-350 min) and the median post-operative stay was 4 d (range, 3-21 d). No operative mortality occurred. One patient with inadvertent small bowel injury required laparotomy on post-operative day 2. At a median follow-up of 22 mo (range, 4-54 mo), no prolapse recurrence was reported. No mesh-related complication was encountered. Wexner constipation score improved significantly from the preoperative value of 17 (range, 5-24) to 6 (range, 0-23) ($P < 0.001$) and the fecal incontinence severity index score from 24 (range, 0-53)

to 2 (range, 0-53) ($P = 0.007$). No *de novo* constipation or fecal incontinence was recorded during the follow-up. On personal conversation, all patients expressed satisfaction with the outcome of their treatment.

CONCLUSION: Our experience indicates that laparoscopic ventral mesh rectopexy is an effective surgical option for CRP in North Indian patients having a bulky redundant colon.

Key words: Redundant sigmoid; Constipation; Complete rectal prolapse; Ventral rectopexy; Indian population

© **The Author(s) 2016.** Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: Laparoscopic ventral rectopexy is a new modality for surgical correction of full thickness rectal prolapse. Avoiding a circumferential mobilization of rectum and reperitonealization of the mesh decreases the complications of rectal denervation. Authors have emphasized the results of laparoscopic ventral rectopexy on bulky and redundant sigmoid which is prevalent in Indian population. Patients were studied for a median duration of 22 mo. There were a few post-operative complications which were easily managed. Marked improvement in constipation and incontinence scores were reported. No *de novo* or worsening of existing constipation was recorded in any of the patients. In this study, no recurrence was evident during the follow-up.

Chandra A, Kumar S, Maurya AP, Gupta V, Gupta V, Rahul. Laparoscopic ventral mesh rectopexy for complete rectal prolapse: A retrospective study evaluating outcomes in North Indian population. *World J Gastrointest Surg* 2016; 8(4): 321-325 Available from: URL: <http://www.wjgnet.com/1948-9366/full/v8/i4/321.htm> DOI: <http://dx.doi.org/10.4240/wjgs.v8.i4.321>

INTRODUCTION

Complete rectal prolapse (CRP) is defined as circumferential and full-thickness protrusion of the rectum out of the anal verge. Surgical techniques described for CRP include anterior resection, rectopexy, or combined resection-rectopexy^[1]. Recently, minimally invasive technique for prolapse surgery has gained wide acceptance because of advantages like decreased operative pain, faster recovery and early discharge^[2]. Different laparoscopic techniques described are sutureless rectopexy, proctosigmoidectomy, and mesh rectopexy. In 2004, D'Hoore *et al*^[3] reported the long-term results of laparoscopic mesh ventral rectopexy (LMVR) with equivalent success rates and improved functional outcomes. Ventral rectopexy avoids the complications related to circumferential mobilization of rectum (*de novo* constipation) and colonic resection (anastomotic leak)^[4]. Data suggest LMVR without posterior rectal mobilization as the surgical procedure of choice for rectal prolapse as well as associated pelvic

organ prolapse^[5]. North Indian population being a predominantly vegetarian one is peculiar in having very bulky sigmoid colon. This also accounts for high incidence of sigmoid volvulus in this population. The aim of our study was to analyze the results of LMVR for complete prolapse in this patient group.

MATERIALS AND METHODS

Patients

Approval was obtained from the institutional ethics committee for performing the study. Informed consent was taken from all the patients before surgery, explaining them the benefits and procedure-related complications in detail. Only patients with CRP, confirmed on clinical examination and defecography were included in the study. Between January 2010 and October 2014, 25 patients with CRP were managed surgically, out of which 15 underwent LMVR. Primary objective of the study was anatomical correction of prolapse and secondary objective was evaluation of functional outcomes.

Pre-operative assessment

All patients were examined clinically, both in lying down and squatting position. If prolapse was not evident in resting position, patients were asked to "bear down" in squatting position. Barium enema examination was done in all patients to assess colon redundancy. Preoperative flexible sigmoidoscopy/colonoscopy was done to exclude organic disease. Data gathered from the prospectively maintained records included patient age, sex, duration of symptoms, associated other pelvic organ prolapse and presence of incontinence or constipation. Any previous surgical intervention for prolapse was recorded. Fecal incontinence was assessed using fecal incontinence severity index (FISI) and constipation by Wexner scoring^[6,7]. Patients with FISI score of more than 8 were considered to be incontinent whereas constipation was defined as Wexner score of more than 5. Objective assessment of patient satisfaction level following the procedure was done using a disease specific personal questionnaire (supplementary material).

Procedure

The surgery was performed under general anesthesia with patient in steep Trendelenburg position. The surgical technique was adopted from the original description by D'Hoore *et al*^[8]. Usually 4 ports were created. Supra-umbilical port was used as camera port. The retcosigmoid junction was identified and retracted to the left. A "J shaped" peritoneal incision was given extending from the sacral promontory to the anterior peritoneal reflection distally. Right hypogastric nerve and ureter were identified and safeguarded. With combined blunt and sharp dissection, a wide plane was developed in the Rectovaginal/rectovesical space. Any posterior rectal mobilization or lateral dissection was avoided at this stage. A strip of Prolene mesh (Ethicon Endosurgery, Blue Ash, Ohio, United States), trimmed to 3 cm × 17 cm,

was prepared and inserted into the pelvic cavity. One end of mesh was fixed to the anterior surface of the distal most part of the rectum using polypropylene sutures. Similarly, it was fixed to the lateral borders of the rectum. Care was taken to avoid full thickness bite into the rectal wall in order to prevent mesh contamination. Finally, the proximal end of mesh was fixed to the sacral promontory using Tackers (Covidien, Dublin, Ireland). Proximal traction on the rectum was avoided while fixing the mesh. In females, the distal part of the mesh was also fixed to the posterior vaginal fornix allowing the correction of a vaginal vault prolapse as well. The peritoneum was then re-approximated to completely cover the mesh. This also resulted in a refashioned, shallow pouch of Douglas.

Follow-up and post-operative assessment

Anorectal function was assessed 3, 6 and 12 mo postoperatively using the FISI and Wexner constipation score. Patient examined clinically at 3 and 6 mo. At 12 mo and later follow-up was done with telephonic interview using personal questionnaire.

Statistical analysis

Statistical analysis was done by a biomedical statistician. Mann-Whitney *U*-test was applied for unpaired data and Wilcoxon signed rank test was used for the analysis of paired data (two-sided *p*-test).

RESULTS

Demographics

Fifteen patients with CRP (6 men and 9 women) with a median age of 50 years (range, 15-68 years) underwent this procedure. Two patients had recurrent prolapse following failed previous surgery (one Theirsch's procedure and one mesh posterior rectopexy). Median duration of symptoms was 10 years (range, 0.5-40 years). Median duration of follow-up was 22 mo (range, 4-54 mo).

Clinicopathologic features

Five out of 15 patients had incontinence with median FISI score 24 (range, 0-53). Four patients had constipation with median Wexner score 17 (range, 5-24). Two patients had vaginal vault prolapse. Solitary rectal ulcer with anemia was present in two patients. Redundant colon was evident in 13 out of 15 patients on contrast enema examination.

Surgical result

The surgery was performed laparoscopically in all patients. Median surgical time was 200 min (range, 180-350 min). No intra-operative blood transfusion was required. Median length of hospital stay was 4 d (range, 3-21 d). Iatrogenic bowel injury requiring re-exploration resulted in prolonged hospital stay (21 d) in one case.

Morbidity and mortality

There was no perioperative mortality. One patient with

inadvertent small bowel injury required re-exploration on second postoperative day. One patient had transient urinary retention and two had surgical site infection, which was managed conservatively. No mesh-related complication was reported.

Surgical outcomes

At median follow-up of 22 mo, Wexner score declined to 6 (range, 0-23) from the preoperative value of 17 (range, 5-24) ($P < 0.001$) and the FISI score to 2 (range, 0-53) from 24 (range, 0-53) ($P = 0.007$). Recurrent prolapse was not reported in any of our patients. On personal questionnaire, patients were satisfied with the procedure. No new-onset constipation or fecal incontinence developed in any patient.

DISCUSSION

The goal of surgery in rectal prolapse is the correction of the anatomical defect, improvement of bowel function and prevention of *de novo* functional problems. Various abdominal and perineal procedures have been described for management of rectal prolapse, with later procedures now reserved only for high-risk patients who cannot withstand major abdominal surgery^[9]. However, long-term recurrences and the rate of persistent incontinence are higher than in abdominal procedures. Abdominal approach is now considered the standard of care and is used whenever feasible^[10]. Abdominal procedures imply sutured or mesh rectopexy, colonic resection or a combined resection-rectopexy technique. Conventionally these have been done through open approach and more recently by minimally invasive means. In a randomized controlled study, laparoscopic rectopexy was found to have less operative pain, rapid recovery and shorter post-operative hospital stay. Also the surgical complications were significantly lower in comparison to open procedures^[5]. Laparoscopic approach is now considered the standard approach and is routinely recommended in all cases. Abdominal procedures involving sigmoid resection with or without rectopexy have a reported recurrence rates of 2% to 5%. This technique also carries risk of anastomotic leak and chances of incontinence following bowel resection, particularly in elderly individuals^[11].

Conventionally, mesh rectopexy involved circumferential mobilization of the rectum up to pelvic floor with mesh placed ventrally or posteriorly. Complete rectal mobilization has been associated with autonomic nerve damage and disturbed rectosigmoid motility leading to *de novo* or worsening of existing constipation^[12].

D'Hoore *et al.*^[3,8] in 2004 described "nerve-sparing ventral rectopexy" as a procedure for rectal prolapse. The uniqueness of laparoscopic ventral rectopexy lies in the fact that mobilization is restricted to anterior rectum thus leaving the autonomic innervation intact^[3,8]. Currently, this technique has gained widespread acceptance and has been proposed by many the "standard of care" for management of pelvic organ prolapse^[2,13]. The combined benefits of laparoscopic approach and ventral rectopexy have made the procedure safe and effective with minimal

post-operative functional disturbance.

Several studies have reported a recurrence rate of about 5% following LMVR. Most recurrences occur within the first 2-3 years^[2,3]. The risk of recurrence is similar to that reported for other abdominal procedures (2% to 9%)^[14]. In the present study, no recurrence was found.

Ventral mesh rectopexy has been found to be associated with lower incidence of new-onset and greater improvement in pre-existing constipation as compared to the procedures that include posterior rectal dissection. Three randomized trials have shown an improvement in constipation by avoiding lateral and posterior dissection^[15-17]. Also, studies that have included the fecal incontinence data have shown improved symptoms following the LMVR. The incidence of new-onset fecal incontinence after LMVR has also been reported to be low^[3,5,18]. The results suggest that complications following LMVR are mostly minor. Our functional results are very similar to these studies. Pre-existing constipation improved in 80% of cases and no patient developed *de novo* constipation.

Previously, rectopexy surgery was thought to cause kinking of redundant sigmoid colon over the fixed rectum, resulting in worsening of preexisting or *de novo* constipation^[19]. For this reason, resection-rectopexy was advocated for patients with redundant sigmoid. However, D'Hoore *et al.*^[3] showed that the denervation of rectum resulting from its circumferential mobilization led to most of the post-rectopexy functional problems. Similarly, redundant sigmoid was present in 13 out of 15 patients in the present study, still all patients had improved constipation scores in the follow-up and none reported a new-onset constipation.

The mesh-related complications were of concern for us initially and were explained to the patients as well. However, in the present study we found the procedure to be safe. No mesh-related complication: Infections, erosions, or perforation was documented. Covering the mesh with the peritoneum prevented small bowel adhesion. The patients were not evaluated for postoperative dyspareunia/sexual dysfunction in this study.

There is a growing consensus that rectal prolapse is a component of a multi-compartment pelvic floor dysfunction^[20,21]. Thirty-five percent of prolapse cases have concomitant urinary incontinence, and another 15% complain of significant genital prolapse^[22]. During ventral mesh rectopexy, fixing the posterior vaginal fornix to the lower most part of mesh provides additional support to the pelvic floor. This suspends the middle compartment resulting in correction of the existing or impending genital prolapse^[3,4]. A posterior rectopexy, on the other hand just supports the posterior compartment. The distal fixation of the mesh on to the pelvic floor allows repair of large rectocele. It also results in a shallow, suspended pouch of Douglas, thus correcting associated enterocele or sigmoidocele automatically. Sparing of the rectal autonomic nerves appears to improve the outcome of surgery for constipation. Our findings indicate an

excellent improvement in fecal incontinence scores in the follow-up.

The Indian population is predominantly vegetarian having high residue fiber as a major component of their diet. The sigmoid colon is particularly bulky and often redundant in this part of the world, which makes it prone to volvulus also. There is thus a concern whether ventral rectopexy would be as effective in the treatment of CRP in this subset of patients as an alternative of resection rectopexy. Our study is the first report of ventral rectopexy, reinforcing the safety and efficacy of this procedure in the group of patients with bulky, redundant sigmoid colon.

In conclusion, laparoscopic ventral rectopexy appears to be a safe and effective surgical option for full-thickness rectal prolapse, especially in Indian patients with bulky and redundant sigmoid colon. However, in view of small sample size short follow-up, this needs to be validated in larger study with longer follow-up. Prospective randomized trials are warranted for level I evidence.

COMMENTS

Background

Laparoscopic ventral rectopexy is a new modality for the treatment of full thickness rectal prolapse. Avoiding a circumferential mobilization of rectum and reperitonealization of the mesh decreases the complications of rectal denervation.

Research frontiers

Redundant sigmoid colon has been considered an indication of resection rectopexy in the past. The authors have emphasized the results of laparoscopic ventral rectopexy on bulky and redundant sigmoid which is prevalent in Indian population.

Innovations and breakthroughs

Patients were followed-up for a median duration of 22 mo. There were a few post-operative complications which were easily managed. Marked improvement in constipation and incontinence scores were reported. No *de novo* or worsening of existing constipation was recorded in any of the patients. In this study, no recurrence was evident during the follow-up. This was similar to other researchers who have practiced laparoscopy ventral rectopexy. The fact that this procedure was equally effective in redundant sigmoid and loaded colon among Indian population has not been reported till date.

Applications

Laparoscopic ventral rectopexy appears to be a safe and effective surgical option for complete rectal prolapse. This needs validation with a larger cohort or a randomized study in Indian population.

Terminology

CRP: Complete rectal prolapse; FIS: Fecal incontinence severity index; LMVR: Laparoscopic mesh ventral rectopexy.

Peer-review

This is an interesting paper focusing the outcomes of laparoscopic ventral mesh rectopexy in the treatment of complete rectal prolapse in North Indian population with inherent bulky and redundant colon.

REFERENCES

- 1 Senapati A, Gray RG, Middleton LJ, Harding J, Hills RK, Armitage NC, Buckley L, Northover JM. PROSPER: a randomised comparison of surgical treatments for rectal prolapse. *Colorectal Dis* 2013; **15**:

- 858-868 [PMID: 23461778 DOI: 10.1111/codi.12177]
- 2 **Formijne Jonkers HA**, Poierré N, Draaisma WA, Broeders IA, Consten EC. Laparoscopic ventral rectopexy for rectal prolapse and symptomatic rectocele: an analysis of 245 consecutive patients. *Colorectal Dis* 2013; **15**: 695-699 [PMID: 23406289 DOI: 10.1111/codi.12113]
 - 3 **D'Hoore A**, Cadoni R, Penninckx F. Long-term outcome of laparoscopic ventral rectopexy for total rectal prolapse. *Br J Surg* 2004; **91**: 1500-1505 [PMID: 15499644 DOI: 10.1002/bjs.4779]
 - 4 **Boons P**, Collinson R, Cunningham C, Lindsey I. Laparoscopic ventral rectopexy for external rectal prolapse improves constipation and avoids de novo constipation. *Colorectal Dis* 2010; **12**: 526-532 [PMID: 19486104 DOI: 10.1111/j.1463-1318.2009.01859.x]
 - 5 **Slawik S**, Soulsby R, Carter H, Payne H, Dixon AR. Laparoscopic ventral rectopexy, posterior colporrhaphy and vaginal sacrocolpopexy for the treatment of recto-genital prolapse and mechanical outlet obstruction. *Colorectal Dis* 2008; **10**: 138-143 [PMID: 17498206 DOI: 10.1111/j.1463-1318.2007.01259.x]
 - 6 **Agachan F**, Chen T, Pfeifer J, Reissman P, Wexner SD. A constipation scoring system to simplify evaluation and management of constipated patients. *Dis Colon Rectum* 1996; **39**: 681-685 [PMID: 8646957]
 - 7 **Rockwood TH**, Church JM, Fleshman JW, Kane RL, Mavrantonis C, Thorson AG, Wexner SD, Bliss D, Lowry AC. Patient and surgeon ranking of the severity of symptoms associated with fecal incontinence: the fecal incontinence severity index. *Dis Colon Rectum* 1999; **42**: 1525-1532 [PMID: 10613469]
 - 8 **D'Hoore A**, Penninckx F. Laparoscopic ventral recto(colpo)pexy for rectal prolapse: surgical technique and outcome for 109 patients. *Surg Endosc* 2006; **20**: 1919-1923 [PMID: 17031741]
 - 9 **Melton GB**, Kwaan MR. Rectal prolapse. *Surg Clin North Am* 2013; **93**: 187-198 [PMID: 23177071 DOI: 10.1016/j.suc.2012.09.010]
 - 10 **Tou S**, Brown SR, Malik AI, Nelson RL. Surgery for complete rectal prolapse in adults. *Cochrane Database Syst Rev* 2008; (4): CD001758 [PMID: 18843623 DOI: 10.1002/14651858.CD001758.pub2]
 - 11 **Fleming FJ**, Kim MJ, Gunzler D, Messing S, Monson JR, Speranza JR. It's the procedure not the patient: the operative approach is independently associated with an increased risk of complications after rectal prolapse repair. *Colorectal Dis* 2012; **14**: 362-368 [PMID: 21692964 DOI: 10.1111/j.1463-1318.2011.02616.x]
 - 12 **Bachoo P**, Brazzelli M, Grant A. Surgery for complete rectal prolapse in adults. *Cochrane Database Syst Rev* 2000; (2): CD001758 [PMID: 10796817]
 - 13 **Wijffels N**, Cunningham C, Dixon A, Greenslade G, Lindsey I. Laparoscopic ventral rectopexy for external rectal prolapse is safe and effective in the elderly. Does this make perineal procedures obsolete? *Colorectal Dis* 2011; **13**: 561-566 [PMID: 20184638 DOI: 10.1111/j.1463-1318.2010.02242.x]
 - 14 **Varma M**, Rafferty J, Buie WD. Practice parameters for the management of rectal prolapse. *Dis Colon Rectum* 2011; **54**: 1339-1346 [PMID: 21979176 DOI: 10.1097/DCR.0b013e3182310f75]
 - 15 **Mollen RM**, Kuijpers JH, van Hoek F. Effects of rectal mobilization and lateral ligaments division on colonic and anorectal function. *Dis Colon Rectum* 2000; **43**: 1283-1287 [PMID: 11005498]
 - 16 **Selvaggi F**, Scotto di Carlo E, Silvestri A, festa L, Peigari V. Surgical treatment of rectal prolapse: a randomised study. *Br J Surg* 1993; **80** Suppl: S89 (Abstract)
 - 17 **Speakman CT**, Madden MV, Nicholls RJ, Kamm MA. Lateral ligament division during rectopexy causes constipation but prevents recurrence: results of a prospective randomized study. *Br J Surg* 1991; **78**: 1431-1433 [PMID: 1773316]
 - 18 **Silvis R**, Gooszen HG, van Essen A, de Kruif AT, Janssen LW. Abdominal rectovaginopexy: modified technique to treat constipation. *Dis Colon Rectum* 1999; **42**: 82-88 [PMID: 10211525]
 - 19 **O'Brien DP**. Rectal prolapse. *Clin Colon Rectal Surg* 2007; **20**: 125-132 [PMID: 20011387 DOI: 10.1055/s-2007-977491]
 - 20 **Samaranayake CB**, Luo C, Plank AW, Merrie AE, Plank LD, Bissett IP. Systematic review on ventral rectopexy for rectal prolapse and intussusception. *Colorectal Dis* 2010; **12**: 504-512 [PMID: 19438880 DOI: 10.1111/j.1463-1318.2009.01934.x]
 - 21 **Mercer-Jones MA**, D'Hoore A, Dixon AR, Lehur P, Lindsey I, Mellgren A, Stevenson AR. Consensus on ventral rectopexy: report of a panel of experts. *Colorectal Dis* 2014; **16**: 82-88 [PMID: 24034860 DOI: 10.1111/codi.12415]
 - 22 **Brown RA**, Ellis CN. Ventral mesh rectopexy: procedure of choice for the surgical treatment of pelvic organ prolapse? *Dis Colon Rectum* 2014; **57**: 1442-1445 [PMID: 25380012 DOI: 10.1097/DCR.0000000000000247]

P- Reviewer: Brown RA, Konishi T
S- Editor: Ji FF **L- Editor:** A **E- Editor:** Li D





Published by **Baishideng Publishing Group Inc**

8226 Regency Drive, Pleasanton, CA 94588, USA

Telephone: +1-925-223-8242

Fax: +1-925-223-8243

E-mail: bpgoffice@wjgnet.com

Help Desk: <http://www.wjgnet.com/esps/helpdesk.aspx>

<http://www.wjgnet.com>

