

Laparoscopic mesh rectopexy for complete rectal prolapse in children: a new simplified technique

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Abstract

Purpose Rectal prolapse in children without underlying conditions is usually a self-limiting problem and requires no surgical treatment. For children with persistent rectal prolapse, a variety of surgical procedures have been described with success. Recently, there are many reports addressing the successful use of different laparoscopic approaches for complete rectal prolapse. We present a novel simplified laparoscopic technique for management of those patients. The aim of this study is to evaluate the results that can be achieved by using this technique in management of persistent complete rectal prolapse in children.

Methods We reviewed the reports of 680 patients with primary complete and partial rectal prolapse over the period from August 2000 to August 2008. Fifty-two patients with complete primary rectal prolapse refractory to medical treatment for 2 years underwent a novel simplified technique for laparoscopic mesh rectopexy.

Results Conservative management was successful with no recurrences in 628 patients (92.4%) while 52 (7.6%) patients did not respond to conservative management at a median follow-up period of 2 years. They were 35 males and 17 females. Their ages ranged from 2 to 14 years (mean 6). All patients were subjected to laparoscopic mesh rectopexy successfully without any conversion. The mean duration of surgery was 40 min. No intraoperative

complications were reported, but one patient developed postoperative constipation that responded well to conservative treatment. The mean postoperative hospitalization was 2 days. Two cases were lost to follow-up, while the others were available for 36 months. There was no recurrence.

Conclusion Laparoscopy mesh rectopexy is safe, rapid, effective technique. It improved functional outcome without recurrence. It is associated with minimal postoperative pain and short hospital stay with excellent cosmeses.

Keywords Laparoscopy · Rectal prolapse · Mesh rectopexy · Rectosigmoid redundancy

Introduction

Rectal prolapse is a relatively common condition in children. The peak incidence is between 1 and 3 years of age. It was first highlighted by Lockhart-Mummery in 1939. He attributed it to malnutrition and careless nursing but also acknowledged diarrheal and wasting illnesses as contributing factors. Almost all patients have a history of constipation (75%), which stretches the pelvic floor and the anal sphincter mechanism, predisposing them to rectal prolapse. Rectal prolapse occurs most commonly in children younger than 4 years, with the highest incidence in the first year of life after which it becomes increasingly infrequent. It is slightly more common in boys than in girls [1]. Prolapse can be either partial or complete. In complete rectal prolapse, the full thickness of the rectum is involved and 5 cm or more protrudes and the prolapse is distinguished by the circular folds of mucosa [2]. Rectal prolapse in children is a self-limiting condition in infancy. The majority of cases of rectal prolapse respond well to conservative management;

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however, surgery is occasionally required in cases that are intractable to conservative treatment. Significant controversy exists regarding the surgical management of complete rectal prolapse [3]. Several less invasive operations have been described, including the Thiersch procedure combined with stool softeners, and sclerotherapy with 5% phenol, 30% saline solution or 5% ethanolamine oleate injected into the retrorectal space [4, 5]. Recently, there are many reports addressing the success of different laparoscopic approaches for the treatment of complete rectal prolapse [6]. We present a novel simplified laparoscopic technique for management of persistent complete rectal prolapse in children. The aim of this study is to evaluate the results that can be achieved by using this technique in management of persistent complete rectal prolapse in children.

Patients and methods

A retrospective analysis of 680 cases of complete rectal prolapse referred to Al-Azhar University Hospitals and some private hospitals from August 2000 to August 2008 were listed and evaluated. End point was recurrence of prolapse requiring manual reduction under sedation or an anesthetic. All children received an initial period of conservative treatment in the form of stool softener and one or more interventions, such as injection sclerotherapy, Thiersch procedure and linear cauterization. Cases with recurrent rectal prolapse after suture rectopexy were subjected to surgery from the start ($n = 3$). Fifty-two cases with complete persistent rectal prolapse that did not respond to conservative management were subjected to laparoscopic mesh rectopexy. A decision to operate is based on age of patient, duration of conservative management, and frequency of recurrent prolapse (>2 episodes requiring manual reduction) along with symptoms of pain, rectal bleeding, and recurrent prolapse. Preoperative evaluation included physical examination, routine laboratory investigations, plain X-ray, barium enema, proctoscopy, colonoscopy and defecography. Fifty-two cases were selected. The inclusion criteria included: cases with prolonged presentation needing manual reduction of their rectal prolapse, recurrent or persistent prolapse after previous trials of injection sclerotherapy or surgery. Exclusion criteria included: patients with intractable constipation with prolonged total colonic transit time, patients with cystic fibrosis and patients with rectal polyps (secondary rectal prolapse).

Operative details

The technique was approved by the Ethical Committee of our hospital. All parents signed a written detailed informed

consent. All patients were subjected to colonic preparation by twice daily warm saline enema (20 ml/kg) for 3 days preoperatively. They received one dose of cefalosporin, 50 mg/kg in the morning of surgery. After induction of general endotracheal tube anesthesia, the patient was placed in the Trendelenburg's position. A 5-mm trocar was inserted at the umbilicus by open Hasson's technique. Through this port, pneumoperitoneum was created to 10–12 mmHg then, a 5-mm scope 30° was used to visualize the abdomen and the pelvis. Two 3-mm accessory trocars were inserted under direct vision on the lateral edge of the right rectus muscle, one just above the level of umbilicus while the other 3 cm below. A third 3-mm accessory trocar was inserted on the lateral border of the left rectus muscle 3 cm above the level of the umbilicus. Figure 1 shows the port sites.

Laparoscopic procedure was started by complete visualization of the abdomen and pelvis. Then, the rectum and rectosigmoid junction were manipulated to assess and diagnose the redundancy of the rectosigmoid and the laxity of the pelvis. Then, the rectum was grasped and pulled up taut with a non-traumatizing Babcock forceps. The peritoneum on the right side of the rectum was opened from the promontory of the sacrum down to pelvic floor, and the rectum was mobilized sufficiently without opening the left peritoneum covering (Figs. 2, 3). Neither the division of lateral ligaments of the rectum nor the circumferential dissection of the rectum was done. The mesh was tailored, inserted into the abdomen through the main umbilical port. It was then, snugly placed in the retrorectal space created by blunt dissection and fixed with few suture of 2/0 prolene to the sacral promontory and posterior wall of the rectum after pulling it up taut (Fig. 4). The right lateral peritoneal incision was closed. The redundancy of the rectosigmoid colon was solved by straightening it out along the left lateral parietal peritoneum and fixed with 3–4 stitches in a smooth curve (Fig. 5). Postoperatively, lactulose was



Fig. 1 Sites of ports

Fig. 2 Right lateral peritoneal incision

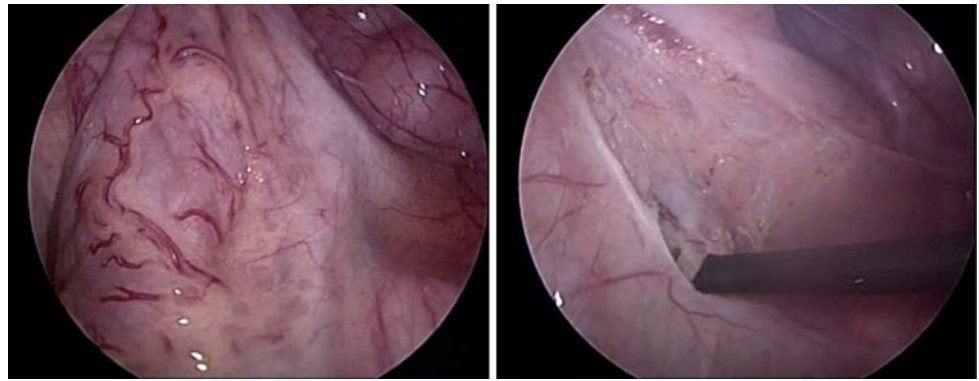


Fig. 3 Retrorectal dissection

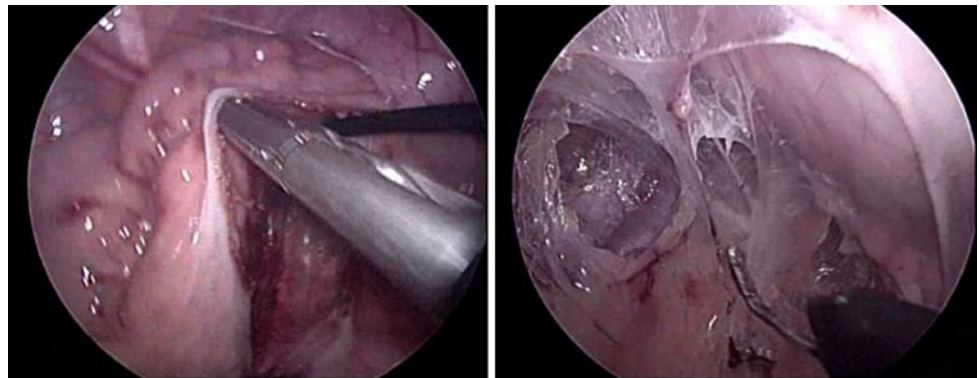


Fig. 4 Retrorectal fixation of the mesh

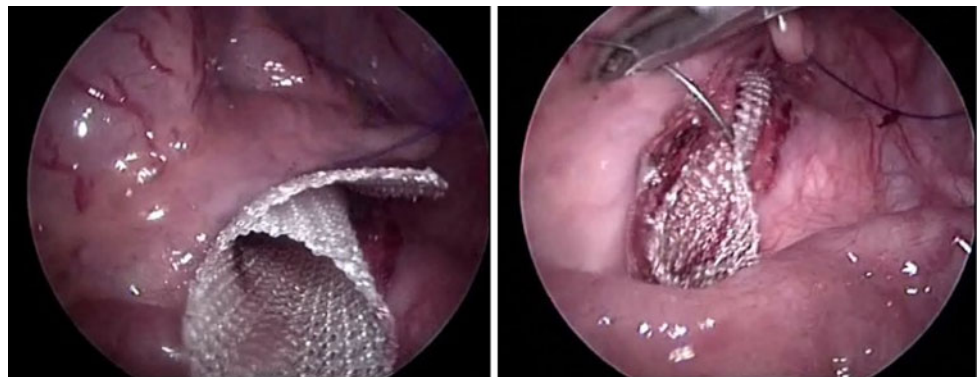
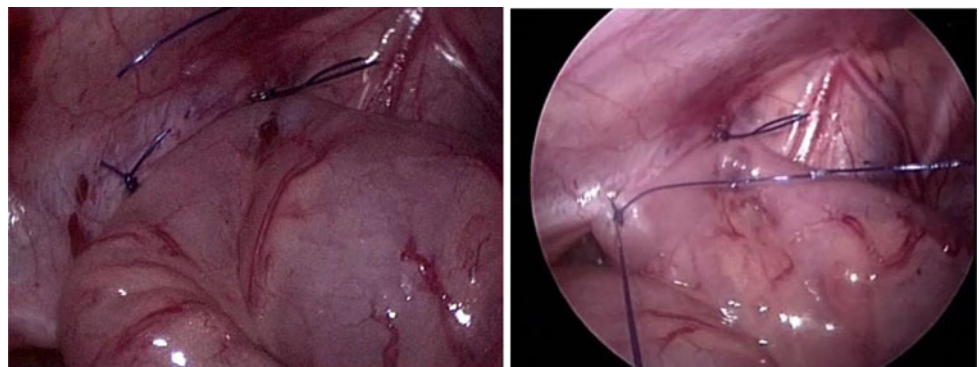


Fig. 5 Fixation of the rectosigmoid to the left lateral parietal peritoneum



prescribed for 1 month to soften the stools. The patients were discharged after the onset of spontaneous bowel movements and start of oral feeding in the evening of operation.

Results

Definite laparoscopic findings were present in all cases in the form of clear peritoneal reaction, redundancy of the rectosigmoid colon, lymph node enlargement in the mesentery of the rectosigmoid and laxity of the pelvic floor in some cases.

Conservative management of rectal prolapse was successful with no recurrences in 628 patients (92.4%). Fifty-two patients (7.6%) did not respond to conservative treatment at a median follow-up period of 2 years. They were 35 males and 17 females. Their ages ranged from 2 to 14 years old (mean = 6). All cases ($n = 52$) showed redundant rectosigmoid junction. Twenty cases showed laxity of the pelvic floor. Laparoscopic mesh rectopexy were completed successfully in all cases without any conversion. The mean duration of surgery was 40 min (range 30–55). No intraoperative complications were reported. Mean postoperative hospitalization was 2 days (range 1–3). The only complication was postoperative constipation in one case which responded well to conservative measurement. There was no recurrence (Figs. 6, 7).

Discussion

Rectal prolapse in children is not uncommon disease and usually is a self-limiting condition in infancy. Complete



Fig. 6 Complete rectal prolapse



Fig. 7 Post-mesh rectopexy follow up (complete cure of rectal prolapse)

rectal prolapse is the result of a complete circumferential intussusception starting 6–8 cm from the anal verge and continuing through the anal canal, everting onto the perineum. Patients with rectal prolapse have lower basal and squeeze pressures with anorectal manometry than normal control subjects [7, 8]. Surgery is indicated in rare cases with intractable rectal prolapse and may be considered in patients who are not spontaneously cured in 12–18 months of follow-up. Patients older than 4 years of age require surgery more often than younger children as stated by Koivusalo [2, 9]. There are several methods that have been used in success for treatment of recurrent rectal prolapse. The advantages of laparoscopic rectopexy include rapid return of intestinal function, early discharge from hospital, improved cosmeses, low-morbidity and a low recurrence rate. Moreover, both diagnosis and treatment of rectal prolapse can be done in the same setting [10–12]. Laparoscopy can be used in the diagnosis of the pathophysiological causes of rectal prolapse as laxity of pelvic floor, redundancy of rectosigmoid junction and intussusception. Laparoscopic full posterior rectal mobilization and fixation to the sacrum with mesh, is the corner stone for success of those operations. It gives results close to more extensive operations and may be the major component of success.

In children, multiple procedures have been advocated for the treatment of complete rectal prolapse. A cure rate of at least 90% has been reported for posterosagittal rectopexy [13], Delorme operation [14], Ekehorn's rectosacropexy and mucosal injections of phenol oil, alcohol, or Deflux [15]. Recently, there are many reports addressing success of different laparoscopic approaches for complete rectal prolapse, namely, suture rectopexy, posterior mesh rectopexy, resection rectopexy with or without mesh and levatorplasty [4]. Its main advantages include rapid return of intestinal function, early discharge from hospital, improved

cosmose, low-morbidity and a low recurrence rate. In this study, most cases respond to conservative management; however, surgery is occasionally required in cases that are intractable to conservative treatment and recurrent cases. Nelson et al. [16] treated 13 cases with rectal prolapse by full posterior rectal mobilization alone without sigmoid resection or rectopexy. They had two recurrences with a mean follow-up of 33.4 months.

Laparoscopic posterior rectal mobilization from one side and fixation of the rectum to the sacrum with mesh in addition to left lateral peritoneal fixation of the redundant sigmoid colon is a novel technique that resulted in rapid operation and gives results better than extensive retrorectal dissection of the rectum and division of peritoneum on both sides. In addition, it has a high rate of success with a low mortality and morbidity. In a 46-patient series, Ashcraft et al. [13] reported a success rate of 89% for the posterosagittal operation and they speculated that posterosagittal fixation may have been inadequate in certain patients in whom rectal prolapse was more likely rectosigmoid intussusception with a high lead point. Two of their earlier patients with rectal prolapse relapsed after posterosagittal rectopexy were neurologically impaired. In adults, a higher relapse rate for surgery for rectal prolapse has been reported following perineal or transanal procedures than after transabdominal procedures [5, 12]. Although the results for adults are not comparable with those for children, they suggest that, in some patients, control of rectal prolapse requires more extensive rectal fixation than can be achieved through the transanal or posterosagittal route. All of our 52 patients who underwent surgery had circumferential full-thickness rectal prolapse. Three cases presented with recurrence after previous laparoscopic suture rectopexy in our early experience. We considered laparoscopic mesh rectopexy the procedure of choice independent of whether rectal prolapse was primary or secondary. Conservative management was successful with no recurrences in 628 patients (92.4%) while 52 (7.6%) patients did not respond to conservative management at a median follow-up period of 2 years. In healthy children with rectal prolapse without serious symptoms, our policy has been to wait at least until they are 4 years of age before commencing surgical treatment, since most cases of rectal prolapse before 4 years respond to conservative treatment [2, 9]. This study had a large number of cases along the 8-year period, as we are a referral university and some private hospitals draining overcrowded wide area of Egypt. Moreover, rectal prolapse is more common in Egypt. It may be nutritional or due to more prevalence of parasitic infestation in Egypt.

We hypothesized that laparoscopic mesh rectopexy may be a good alternative for abdominal and posterosagittal

rectopexy because it is less invasive, rapid and better cosmetic outcome. Fixation of the redundant sigmoid along the left lateral peritoneum put it in a good alignment without any angulations which in turn prevents postoperative development of constipation and prevents intussusception which prevents recurrence of prolapse. We applied our novel technique in the 52 patients that did not respond to conservative management and recurrent cases with excellent results.

Bonnard et al. [17] treated a 12-year-old boy with solitary rectal ulcer syndrome by laparoscopic rectopexy with a mesh, while Saxena et al. [18] used laparoscopic suture rectopexy (without mesh) to treat a 22-month-old girl with recurring rectum prolapse. After 18 and 24 months, both patients were free of symptoms. Okuyama et al. [19] presented three case reports and concluded that laparoscopic suture rectopexy is feasible and less invasive in children and they had one recurrence after 5 months in their follow-up, resection rectopexy was done. Functional outcome is at least equivalent to that obtained with open procedures in terms of continence, constipation and outlet obstruction [20].

Antao et al. stated that a decision to operate is based on age of patient, duration of conservative management, and frequency of recurrent prolapse (>2 episodes requiring manual reduction) along with symptoms of pain, rectal bleeding, and perianal excoriation because of recurrent prolapse. Those cases presenting younger than 4 years of age and with an associated condition have a better prognosis [21].

Based on our excellent results, we strongly recommend laparoscopic mesh rectopexy and slinging the redundant rectosigmoid to the left lateral peritoneum as neither slinging alone without retrorectal dissection nor suture rectopexy only are sufficient procedures for treatment of rectal prolapse. Hernández in 2008 [22] added mesh to rectopexy in 15 cases with good results.

Redundancy is a predisposing factor for rectoanal intussusception and postoperative constipation due to kinking of the sigmoid colon over the edge of the mesh. Laparoscopy demonstrated redundancy in all cases in this study. Hsu et al. reported 12 patients without preexisting constipation that were treated: three patients had prior prolapse operations. They concluded that: (1) rectopexy can be safely done laparoscopically, (2) resection is not required in the absence of prior constipation, and (3) rectal mobilization and rectopexy does not predispose to future constipation in these selected patients [23]. In the present study, all of our 52 patients who underwent mesh rectopexy for complete rectal prolapse passed a smooth postoperative period without any recurrence at a follow-up period of 36 months. Accordingly, we considered

mesh rectopexy to be the procedure of choice independent of whether rectal prolapse was primary or secondary.

The reported recurrence rate reached to 6.9% at 5 years and 10.8% at 10 years. Recurrent cases can be treated by laparoscopic resection rectopexy with or without mesh [15, 17]. In the present study we do not have any recurrence at a 36-month follow-up. However, Rintala and Pakarinen prefer laparoscopic suspension of the rectum to anterior sacrum without mesh and they claimed that this approach is successful in several patients [1]. The role of constipation as an etiologic factor is controversial; only 3% of patients suffering from severe constipation have rectal prolapse [2]. Koivusalo reported two patients with postoperative constipation. They added that constipation is the only postoperative problem and is frequently worsened. It appears that patients have less constipation and incontinence if the lateral rectal ligaments can be preserved; however, this requires further analysis [9, 24]. In the present study we only have one case of postoperative constipation that responded well to conservative measurements. In our series the low number of postoperative constipation may be attributed to our new technique which divides only the right side of the peritoneum of the rectum and preserving both lateral rectal ligaments and left peritoneum of the rectum and the routine correction of rectosigmoid redundancy through left lateral fixation. Kariv et al. [25] reported a 35% incidence of constipation following laparoscopic rectopexy. Demirbas et al. [26] reported that the colonic transit times were reduced postoperatively in about 50% of patients who had suffered constipation. We reported one case of postoperative constipation responded to conservative treatment. The role of laparoscopic resection rectopexy for symptomatic rectal intussusception was assessed by Von Papen et al [27]. Sixty percent of their patients reported an overall improvement in their function after surgery and 53% of patients reported an improvement in bowel frequency and disappearance of constipation. Sixty-seven percent with incontinence before surgery showed improvement. Koivusalo et al. [9] reported a median operation time 80 min (range 62–90) for laparoscopic suture rectopexy and the median hospital time were 6 days (range 3–8). In this study, the mean duration of surgery was 40 min (range 30–55). The mean hospitalization time was 3 days. After a mean follow-up period of 36 months, no recurrence was reported. In conclusion, laparoscopic mesh rectopexy for the treatment of rectal prolapse in children is safe, rapid, effective and associated with minimal postoperative pain and short hospital stay without any recurrence.

References

1. Lockhart-Mummery JP (1939) Surgical procedures in general practice. *Br Med J* 1:345–347
2. Rintala RJ, Pakarinen M (2006) Other disorders of the anus and rectum, anorectal function. In: O'Neill J, Rowe M, Grosfeld J, Fonkalsrud E, Coran A (eds) *Pediatric surgery*, chap 102, 6th edn. Mosby, St Louis, pp 1595–1596
3. Shah A, Parikh D, Jawaheer G et al (2005) Persistent rectal prolapse in children: sclerotherapy and surgical management. *Pediatr Surg Int* 21(4):270–273
4. Senagore AJ (2003) Management of rectal prolapse: the role of laparoscopic approaches. *Semin Laparosc Surg* 10(4):197–202
5. Sander S, Vural O, Unal M (1999) Management of rectal prolapse in children. Ekehorn's rectosacropexy. *Pediatr Surg Inter* 15:111
6. Benoist S, Taffinder N, Gould S, Chang A, Darzi A (2001) Functional results two years after laparoscopic rectopexy. *Am J Surg* 182(2):168–173
7. Gourgiotis S, Baratsis S (2007) Rectal prolapse. *Int J Colorectal Dis* 22(3):231–243
8. Theuerkauf FJ Jr, Beahrs OH, Hill JR (1970) Rectal prolapse: causation and surgical treatment. *Ann Surg* 171(6):819–835
9. Koivusalo A, Pakarinen M, Rintala R (2006) Laparoscopic suture rectopexy in the treatment of persisting rectal prolapse in children: a preliminary report. *Surg Endosc* 20(6):960–963
10. Heah SM, Hartley JE, Hurley J et al (2000) Laparoscopic suture rectopexy without resection is effective treatment for full thickness rectal prolapse. *Dis Colon Rectum* 43(5):638–643
11. Lechaux D, Trebuchet G, Siproudhis L et al (2005) Laparoscopic rectopexy for full thickness rectal prolapse: a single-institution retrospective study evaluating surgical outcome. *Surg Endosc* 19(4):514–518 (Epub 2005 Mar 11)
12. Boccasanta P, Rosati R, Venturi M et al (1998) Comparison of laparoscopic rectopexy with opens technique in the treatment of complete rectal prolapse: clinical and functional results. *Surg Laparosc Endosc* 8(6):460–465
13. Ashcraft KW, Garred JL, Holder TM, Amoury RA, Sharp RJ, Murphy JP (1990) Rectal prolapse: 17-year experience with the posterior repair and suspension. *J Pediatr Surg* 25:992–995
14. Chwals WJ, Brennan LP, Weinzmann JJ et al (1990) Transanal mucosal sleeve resection for the treatment of rectal prolapse in children. *J Pediatr Surg* 25:715–718
15. Fahmy MA, Ezzelarab S (2004) Outcome of submucosal injection of different sclerosing materials for rectal prolapse in children. *Pediatr Surg Int* 20:353–356
16. Nelson R, Spitz J, Pearl RK et al (2001) What role does full rectal mobilization alone play in the treatment of rectal prolapse? *Tech Coloproctol* 5(1):33–35
17. Bonnard A, Mougenot JP, Ferkdadji L, Huot O, Aigrain Y, De Lagausie P (2003) Laparoscopic rectopexy for solitary ulcer of rectum syndrome in a child. *Surg Endosc* 17:1156–1157
18. Saxena AK, Metzelder ML, Willital GH (2004) Laparoscopic suture rectopexy for rectal prolapse in a 22-month-old child. *Surg Laparosc Endosc Percutan Tech* 14:33–34
19. Okuyama H, Yagi M, Ikegami R et al (2002) Laparoscopic rectopexy for rectal prolapse in children. *Pediatr Endosurg Innov Tech* 6(4):285–288
20. Auguste T, Dubreuil A, Bost R et al (2006) Technical and functional results after laparoscopic rectopexy to the promontory for complete rectal prolapse. Prospective study in 54 consecutive patients. *Gastroenterol Clin Biol* 30(5):659–663
21. Antao B, Bradley V, Roberts JP, Shawis R (2005) Management of rectal prolapse in children. *Dis Colon Rectum* 48(8):1620–1625

22. Hernández P, Targarona EM, Balagué C et al (2008) Laparoscopic treatment of rectal prolapse. *Cir Esp* 84(6):318–322 (article in Spanish)
23. Hsu A, Brand MI, Saclarides TJ (2007) Laparoscopic rectopexy without resection: a worthwhile treatment for rectal prolapse in patients without prior constipation. *Am Surg* 73(9):858–861
24. Madiba TE, Baig MK, Wexner SD (2005) Surgical management of rectal prolapse. *Arch Surg* 140:63–73
25. Kariv Y, Delaney Cp, Casillas S et al (2005) Long-Term outcome after laparoscopic and open surgery for rectal prolapse: a case-control study. *Pelvic Floor Digest* 2005: Pelvic. Prolapse; Surg Endosc. 21
26. Demirbas S, MI Akin, Kalemoglu M et al (2005) Comparison of laparoscopic and surgery for total rectal prolapse. *Surg Today* 35(6):446–452
27. Von Papen M, Ashari LH, Lumley JW et al (2007) Functional results of laparoscopic resection rectopexy for symptomatic rectal intussusception. *Dis Colon Rectum* 50(1):50–55