

Operative Technique

Transanal endorectal approach for the treatment of idiopathic rectal prolapse in children: Experience with the modified Delorme's procedure



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ABSTRACT

Background: Persistent or recurrent idiopathic rectal prolapse in children requires surgical intervention. Several techniques have been used to repair this problem. However, recurrence and complications continue to be a challenge in the management of this condition. Here we report our experience in using the modified Delorme's procedure to treat such patients.

Methods: We conducted a retrospective observational study of patients with idiopathic rectal prolapse who underwent the modified Delorme's procedure during 2013–2017. We analyzed the clinical characteristics of the patients and the recurrence and complication rates during a follow-up of 15–68 months.

Results: We included 14 patients. The age at operation ranged from 2 to 17 years, and the length of the prolapse was 3–15 cm. There were no intraoperative or postoperative complications. All patients achieved postoperative fecal control, and there were no recurrences.

Conclusion: The modified Delorme's procedure was effective for the treatment of idiopathic rectal prolapse. There were no recurrences or complications. Because it is a perineal technique, the procedure avoids the risk of nerve injury that exists for transabdominal methods.

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Some children suffering from rectal prolapse require surgical treatment. Many operations have been proposed [1,2]; however, the recurrence of prolapse is an unpleasant problem. The Delorme's procedure is a perineal technique described in adults [3,4]. We found three studies reporting 29 children who underwent this procedure [5–7]. We did not find descriptions of complications in these series. These data suggest that the operation is safe and useful in children with idiopathic rectal prolapse. Here we present our experience with 14 patients with idiopathic rectal prolapse treated with a modified Delorme's procedure that helped during the colorectal anastomosis.

1. Material and methods

We performed a retrospective cross-sectional study approved by our institutional review board (PRO14020665) in patients with idiopathic

rectal prolapse. We performed the procedure in three hospitals. All patients underwent the modified Delorme's procedure between 2013 and 2017. A senior surgeon performed all operations. Preoperative workup included a contrast enema, spinal magnetic resonance imaging, stool studies, and cystic fibrosis testing. We performed the Delorme's procedure modified by longitudinally suturing the muscular cuff to complete the plication. We analyzed sex, age, time and length of the prolapse, complications, and time of follow-up. We also evaluated articles from PubMed centered on children who underwent surgical treatment for rectal prolapse published up to March 2017 to determine the frequency of recurrence and complications.

2. Technique

In the operating room, the patients received bowel preparation and intravenous metronidazole and cefazolin. A urinary catheter was inserted, and the patients were placed in a prone position with the pelvis elevated. The eight hooks of a Lone-Star® retractor (Cooper Surgical, Inc.) were symmetrically positioned at the limit of the skin with the anoderm (Fig. 1). After a thorough inspection of the anal canal, the hooks were relocated 2 cm proximal to the pectinate area to protect the anal canal. Next, we placed four traction sutures with 5/0 silk at

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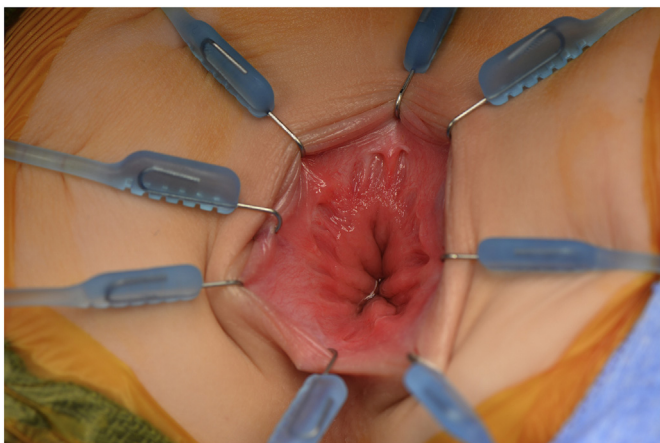


Fig. 1. The hooks are placed symmetrically at the limit of the skin to the anoderm.

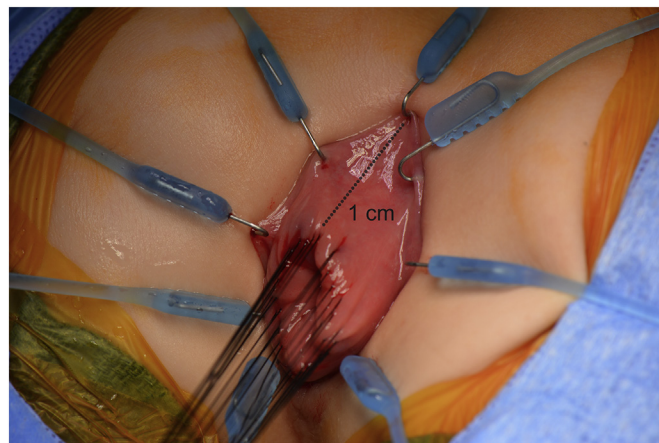


Fig. 3. Multiple traction sutures are placed circumferentially 1 cm from the hooks.

1 cm proximal to the hooks and at the 3-, 6-, 9-, and 12-o'clock positions of the rectal circumference (Fig. 2). Further, we performed numerous traction sutures in between to complete the circumference (Fig. 3). Consequently, the traction sutures were placed 3 cm above the pectinate area, which allowed us to work safely outside of the anal canal (Fig. 4). Then, we made a circumferential incision using an electrocautery with a fine needle tip. The incision on the mucosa was adjacent to the traction sutures (Fig. 5). Using blunt dissection, we performed a mucosectomy. During the mucosectomy, it was essential to identify the circular layer of the muscular cuff (Fig. 6). We continued the mucosectomy until we reached 1.5–2 times the length of the original prolapse. The next step was to create the plication of the muscular cuff. We placed longitudinal 2/0 sutures of polyglactin 910 along the sleeve. We performed four stitches at 3-, 6-, 9-, and 12-o'clock positions and, subsequently, additional four in between (Figs. 7 and 8). Plication reduces the length of the muscular cuff, which facilitates the colorectal anastomosis and the bleeding control from the perforating vessels of the rectum (Fig. 9). We performed a colorectal anastomosis using 4/0 polyglactin 910 interrupted sutures. Repositioning of the hooks on the skin facilitated the anastomosis (Fig. 10). At the end of the operation, the anastomosis was reduced into the pelvis (Fig. 11). Twenty-four hours after the operation, the patients were started on a regular diet. To produce soft stools and avoid straining, we administered oral polyethylene glycol 3350 at a dosage of 17 g daily over 4 weeks postoperatively.

3. Results

From January 2013 to June 2017, we performed the modified Delorme's procedure to treat 14 patients (11 males and 3 females) with idiopathic rectal prolapse. Age at the time of operation ranged from 2 to 17 years (mean, 7.85 years). We operated on a 2-year-old patient because 3 months before the operation, prolapse with rectal bleeding occurred daily. The manual reduction became more challenging with time and was ≤ 8 cm in length on several occasions. The patient was admitted to two different hospitals for medical management that included oral polyethylene glycol 3350, analgesics, and metronidazole as well as the use of a 50% dextrose solution on the prolapse. During the second admission, the parents requested that the patient be transferred to our hospital.

The period of rectal prolapse before the operation ranged from 3 to 60 months. The length of the prolapse ranged from 3 to 15 cm. All patients had an idiopathic form of rectal prolapse. No perioperative complications occurred. The follow-up time was 15–68 months (mean, 31 months; Table 1). None of the patients had a recurrence. All patients have voluntary bowel movements.

4. Discussion

Although not a life-threatening condition, chronic recurrent rectal prolapse is an unexpected and unpleasant event that is a great concern

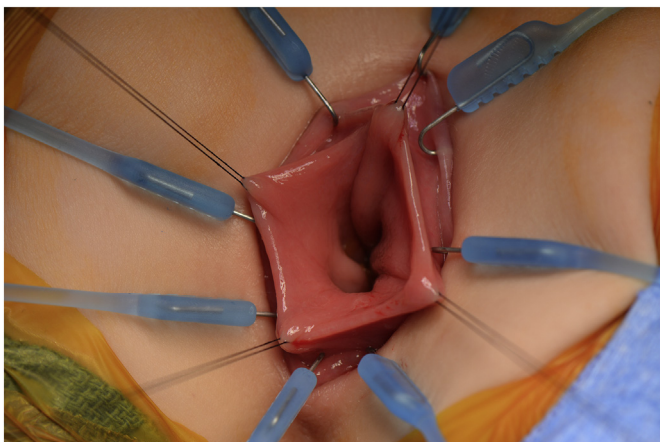


Fig. 2. The hooks are relocated 2 cm proximal to protect the anal canal. Then, four traction sutures are placed equidistant.

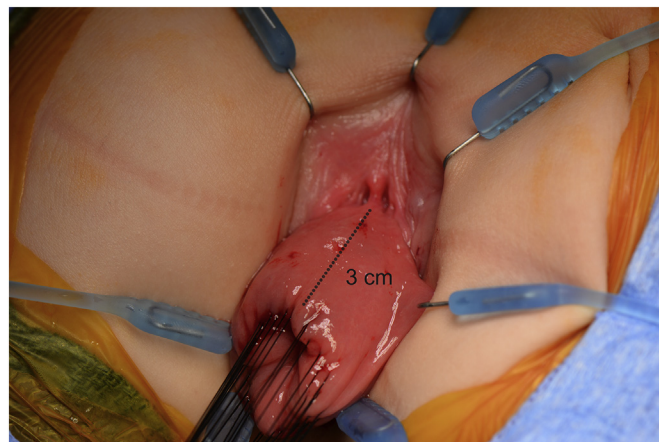


Fig. 4. For demonstration purposes. Three hooks are relocated distally to demonstrate the total distance of 3 cm from the traction sutures to the pectinate zone.

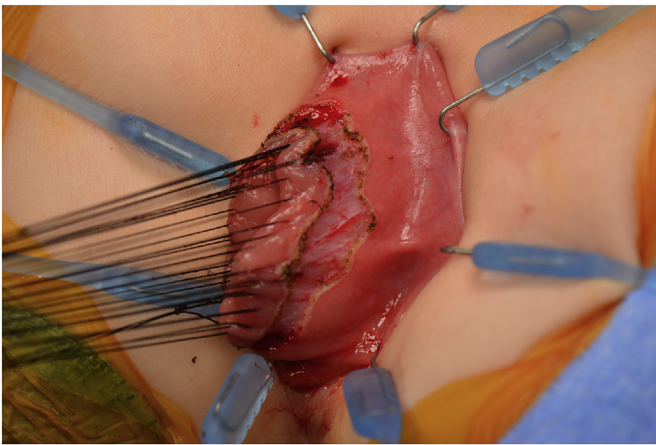


Fig. 5. Incision of the mucosa with electrocautery is made in close proximity to the traction sutures.

for patients, parents, and physicians who desire a timely resolution. If medical treatment fails, surgical intervention must be considered. The surgery for rectal prolapse cannot guarantee any recurrence. Consequently, it is appropriate to select the technique with the lowest frequency of recurrences and complications.

Currently, there are various surgical techniques, classified as abdominal and perineal, to repair rectal prolapses. In the literature, the abdominal methods have been more often reported in adults. Rectopexy is the most common procedure and can be performed by itself or combined with sigmoidectomy. The operation is completed as open surgery or laparoscopically. Recurrence of prolapse in children after this procedure is reported to be 0%–54% [8–15], and the reported complications are enterocutaneous fistula [16], anastomotic dehiscence [17], constipation, and sexual dysfunction in men [18–21]. The last complication has not been reported in children.

Perineal operations are performed more often in children. The recurrence and complication frequencies differ depending on the surgical intervention. Operations with no recurrence or complications are the Delorme's procedure [5–7], mucosal plication [22], and closed rectosacropexy [23]. A procedure with no recurrence but with complications is Ekehorn's rectosacropexy, with an 80% infection rate [24,25]. On the other hand, methods without complications but with significant recurrence frequency are sclerotherapy with a 5%–71% rate [21,26–31], anal cerclage with 80% [26], and posterior sagittal rectopexy with 6%–70% [19–21]. There is one reported mortality case after sclerotherapy with phenol [27]. Three authors have reported complications and

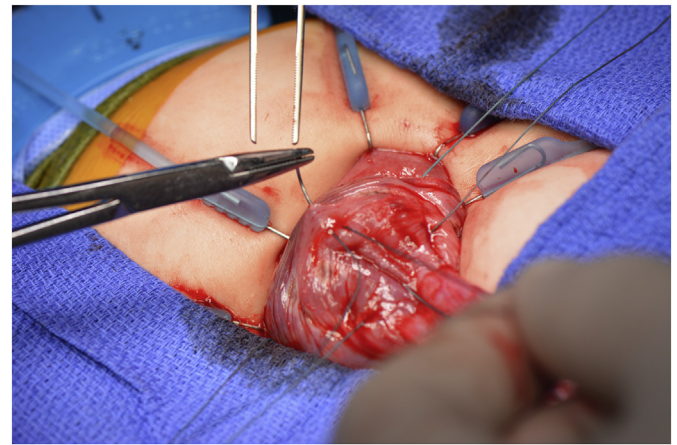


Fig. 7. Longitudinal plication stitches are placed all along the muscular cuff.

recurrences with linear cauterization [32], Thiersch's technique [26], and Lockhart–Mummery technique [11,33].

Delorme's procedure is a transanal mucosectomy with a colorectal anastomosis producing plication of the muscular wall of the rectum [3]. It was described in 1900 as a mucosectomy beginning in the anus without suturing the muscular cuff [3,6]. Later, in 1947, David included reconstruction of the sphincter mechanism [6]. Currently, this reconstruction is not performed, and the mucosectomy is started above the dentate line [5]. We used the prone position of the patient instead of the lithotomy and the Lone-Star® (CooperSurgical) retractor. In addition, we started the mucosectomy without prolapsing the rectum, as was described originally. We also found that longitudinal stitches were useful for the plication to provide better hemostasis of the perforating vessels and to facilitate the colorectal anastomosis. Of note, the surgeon must tie the sutures gently to avoid ischemia or necrosis of the muscular cuff. In the Delorme's procedure, the rectum is not denervated and the rectal reservoir is preserved [12], which is why there is no postoperative constipation as with other methods [10,11,22]. In the literature, the reported recurrence and complication rates of the Delorme's procedure are 0% in patients with idiopathic rectal prolapse [5–7].

Factors that predispose to recurrence include obsessive–compulsive disorders and myelomeningocele. Hill described a secondary rectal prolapse on defecation and straining in a patient with an obsessive–compulsive disorder [34]. This patient required two Delorme's operations. The procedure was successful only after controlling the patient's psychiatric disorder and subsequently performing the second operation.

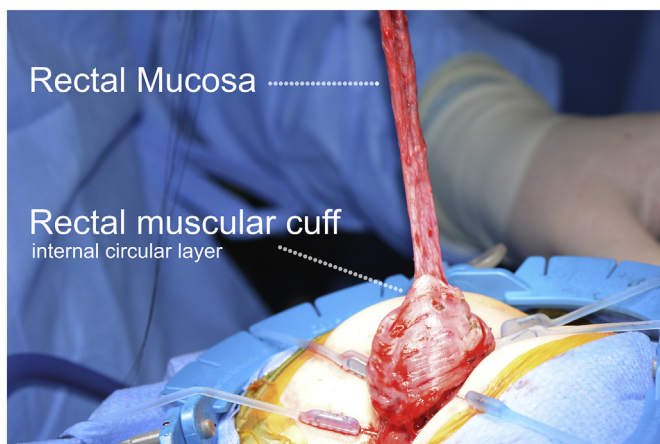


Fig. 6. The dissection of the mucosa is finished. The internal circular layer of the denuded rectal cuff is observed.

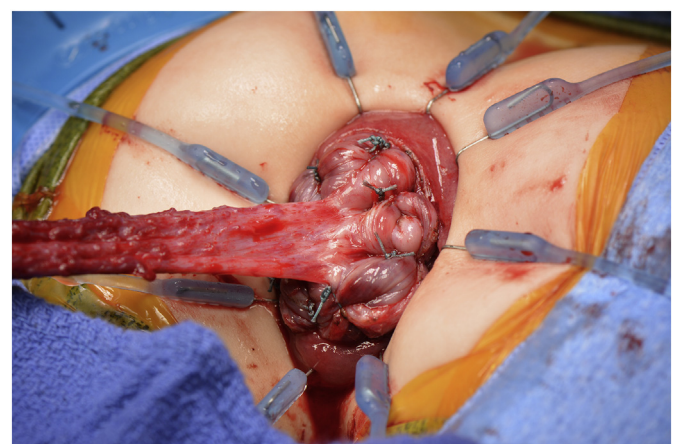


Fig. 8. The sutures on the muscular sleeve are tied with gentle tension so as not to compromise the perfusion of the muscle.

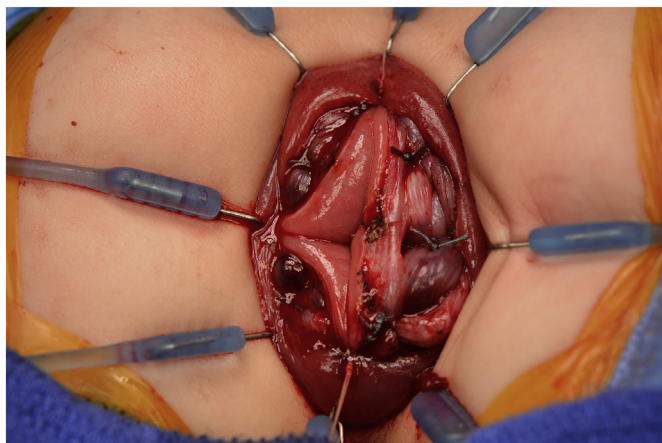


Fig. 9. The mucosa of the rectum was excised. Notice how the plication of the muscular cuff facilitates the anastomosis.

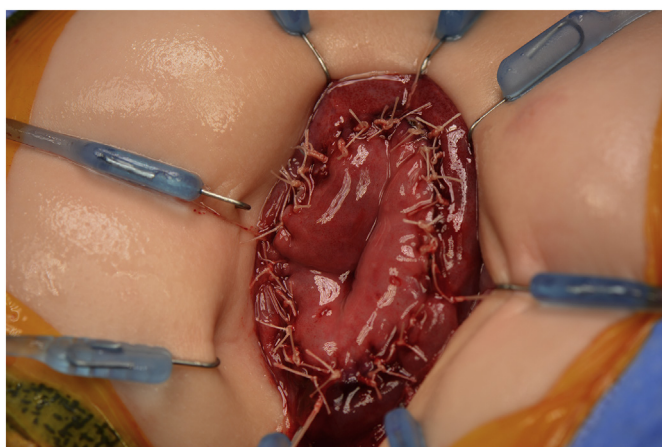


Fig. 10. The hooks are repositioned to the skin, and the anastomosis is performed.

5. Conclusions

The modified Delorme's procedure performed in 14 patients with idiopathic rectal prolapse resulted in no recurrence or complications. The same outcome has been reported by three other authors [5–7]. Pediatric

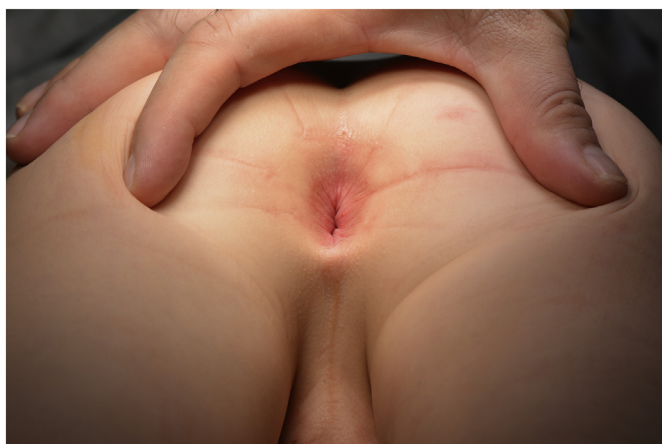


Fig. 11. Observe the clinical appearance of the reduction of the anastomosis and the muscular cuff.

Table 1

Features of 14 children with rectal prolapse treated with a modified Delorme technique.

Number	Gender	Age [years]	Length of Prolapse [cm]	Time with prolapse [months]	Follow up since surgery [months]
1	M	2	8	7	15
2	M	4	5	3	15
3	F	5	3	6	19
4	M	6	5	16	21
5	F	9	3	4	18
6	M	10	7	36	54
7	M	11	11	60	68
8	M	11	8	48	42
9	M	11	15	24	51
10	M	12	5	36	15
11	M	17	10	36	51
12	M	7	6	6	24
13	M	6	5	54	28
14	F	16	8	12	18

surgeons may consider this technique as a good choice for resolving idiopathic rectal prolapse.

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