

Combined Abdominal and Posterior Sagittal Approach for Redo Pull-Through Operation in Hirschsprung's Disease

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Background/Purpose: In Hirschsprung's disease (HD) redo pull-through (PT) is indicated for anastomotic complications and retained aganglionosis after a previous operation. Duhamel or Swenson method is used commonly for redo operations. The pelvic dissection may be difficult, especially in Swenson's type of operation, because of fibrosis resulting from previous surgery or its complications. To overcome this, the authors used a combined abdominal and posterior sagittal approach to perform redo pull-through of Swenson's type in 4 children.

Methods: Four boys (2.5 to 12 years) underwent redo pull-through for failed endorectal pull through (n = 2), persistent symptoms after 2 myectomies (n = 1) and late anastomotic disruption after Swenson's PT (n = 1). Abdominal dissection was done first to mobilize colon and resect aganglionic segment as far as the mid pelvis. The mobilized ganglionic colon was tacked to the pelvic rectal stump, hemostasis checked, and the abdomen closed. The lower pelvic dissection was done through the posterior sagittal route, under

direct vision. The remainder of diseased rectum was excised, and the pull-through colon was retrieved and anastomosed to the anal stump. No covering colostomy was done.

Results: A rectocutaneous fistula developed in one patient, which healed spontaneously. All patients had increased stool frequency in the early postoperative period but improved with time. All patients have attained normal voluntary bowel actions, but one child has infrequent minor soiling. There was no anastomotic narrowing in any case.

Conclusions: Posterior sagittal approach is a useful alternative in difficult redo pull-through surgery. It offers excellent exposure, precise dissection, and direct anastomosis. There are minimal chances of complications, and continence is retained.

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INDEX WORDS: Hirschsprung's disease, redo pull-through, stricture, posterior sagittal approach, aganglionosis.

IN HIRSCHSPRUNG'S DISEASE (HD) redo pull-through (PT) is indicated for anastomotic strictures, leaks, and retained or acquired aganglionosis after a standard pull-through operation.¹⁻³ Duhamel or Swenson method is used commonly for redo operations.²⁻⁵ The pelvic dissection may be difficult, especially in Swenson's type of operation, because of previous surgery or its complications. To overcome this, we used a combined abdominal and posterior sagittal approach to perform redo PT of Swenson's type in 4 children with failed surgery for HD.

MATERIALS AND METHODS

Four boys aged 2.5 to 12 years (all referred from elsewhere) underwent redo PT for HD. Two had a failed endorectal pull-through, one had persistent symptoms after two myectomies, and one had late complications after a Swenson's operation. Their data are shown in

Table 1. The initial diagnosis had been classical HD (rectosigmoid) in case 1, 2, and 4 and short segment disease in case 3.

Patient 1 had a history suggestive of a cuff abscess in the early postoperative period, which led to a tight and long anastomotic stricture. He had a right transverse colostomy, which had been performed at birth but not closed in view of the stricture.

Patient 2 had constipation and fecal impaction caused by an anastomotic stricture after a 2-staged endorectal PT. Several attempts at dilation had failed. We opened a colostomy at the descending colon/splenic flexure proximal to the thickened and dilated distal colon. Redo pull-through was performed 3 months later.

Patient 3 had long segment HD that had been misdiagnosed and treated by 2 transanal myectomies. The myectomy specimen had shown aganglionosis in the first and skeletal muscle in the second specimen. He had persistent constipation and underwent reoperation by PT. No colostomy was performed before the PT.

Patient 4 had undergone a 3-staged Swenson's PT at 3 years of age and was subsequently well. At the age of 8 years he was treated for pulmonary tuberculosis. At 12 years he had multiple perianal fistulae and passage of bone fragments per rectum. He had had low-grade pyrexia for 1 month before these symptoms. Two other members of the family were on treatment for pulmonary tuberculosis. Rectal examination showed anastomotic disruption posteriorly through which the sequestrum could be extruded. A diverting colostomy was performed in the right transverse colon (same site had been used for colostomy before the first PT). Under the same anesthetic, perineal toilet and distal colonic washout was given, a few loose bone fragments were removed per rectum, and a biopsy specimen was taken from one of the fistulae. Although the histopathologic examination showed nonspecific inflammation and no acid fast bacteria (AFB) could be demonstrated, a diagnosis of tubercular osteomyelitis with secondary anastomotic dis-

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Table 1. Patient's Clinical Data

Case No.	Age and Sex	Previous Operation and Age at Surgery	Reason(s) for Redo Operation	Status at Presentation	Management
1	2.5 yr, boy	Endorectal PT (staged) at 1.5 yr	<ul style="list-style-type: none"> • Anastomotic stricture • Ischaemic aganglionosis 	Transverse colostomy	Redo pull-through with take down of colostomy
2	4 yr, boy	Endorectal PT (staged) at 3 yr	<ul style="list-style-type: none"> • Anastomotic stricture 	Constipation Fecal impaction Dilated proximal colon	<ul style="list-style-type: none"> • Colostomy • Redo pull-through with take down of colostomy
3	6 yr, boy	<ul style="list-style-type: none"> • Myectomy • Extended myectomy at 5 yr 	<ul style="list-style-type: none"> • Persistent symptoms • Myectomy aganglionic 	Constipation	Primary pull-through
4	12 yr, boy	Swenson's pull-through (staged) at 3 yr	<ul style="list-style-type: none"> • Multiple perianal fistulae secondary to sacral osteomyelitis • Anastomotic disruption leading to late stricture 	<ul style="list-style-type: none"> • Bony sequestrum on rectal examination • Multiple perianal fistulae 	<ul style="list-style-type: none"> • Colostomy • Antitubercular chemotherapy • Redo pull-through with take down of colostomy

ruption was made because of a strong family history and previous history of tuberculosis. Appropriate antitubercular chemotherapy was started. One year later, there were 2 residual fistulae and severe stricture at the site of anastomosis. A distal cologram was performed at 1 year. Unfortunately, this was complicated by a perforation in the descending colon, probably related to high-pressure injection of the contrast against a distal obstruction. The perforation was repaired through a laparotomy. A redo pull-through was performed 3 months later.

Operative Procedure

Total gut preparation with oral Polyethylene Glycol (Peglec) was carried out 24 hours before surgery. Rectal/colostomy washouts were given with normal saline and Metronidazole solution. Broad-spectrum antibiotics were started on induction of anaesthesia. The bladder was catheterized.

Abdominal operation. In the supine position, a laparotomy was performed through the previous incision or a Pfannenstiel incision skewed to the left. The level of pull-through was decided by frozen section biopsies. In patient 1 the entire colon distal to the colostomy was atrophied and aganglionic, probably related to vascular insult during the first operation. Normal ganglia were found just proximal to the colostomy. In patient 2, although the distal colon showed normal ganglion cells, it was hypertrophied and dilated. Therefore, the level of pull-through was chosen at just proximal to the colostomy. Patient 3 had a transition zone at the splenic flexure. Frozen section showed normal ganglia at left transverse colon. In patient 4, there were dense adhesions around the distal colon, and a segment around the site of previous perforation appeared dusky. Although the splenic flexure showed normal ganglion cells, the level of pull-through was chosen at just proximal to the colostomy in view of very small length of normal colon available distal to the colostomy.

The colostomy was taken down in cases 1, 2, and 4, and the entire distal colon was resected. In case 3 the colon distal to mid transverse colon was resected. Pelvic dissection to mobilize and resect the colon was performed remaining close to the bowel wall. In the lower pelvis, the dissection became very difficult because of severe fibrosis and adherence of bowel to the presacral fascia, and was considered unsafe. At this stage, the pelvic dissection was abandoned. The mobilized colon was transected, and the pelvic stump was closed. The colostomy and distal colon were resected, and the normal colon mobilized further. The cecum was transposed medially and inferiorly so that the ganglionic bowel could reach the pelvis without tension. Appendicectomy was carried out to prevent future appendicitis causing a diagnostic

confusion because of a changed anatomic position. The PT colon was tacked to the rectal stump in the pelvis. Hemostasis was checked, a corrugated drain placed in the pelvis, and the abdomen closed.

Posterior sagittal operation. The patient was put in prone jack-knife position with buttocks elevated. A midline incision was made from midsacrum to about 1 cm behind the anal margin. The levator ani and upper portion of striated muscle complex was divided in the midline. The lower portion of the muscle complex was retracted down to expose the anorectum. Keeping close to the bowel wall, the rectum was mobilized to reach the upper margin where the previously mobilized colon was retrieved. The dissection was carried downward to excise the rectum leaving an oblique stump of anal canal, the posterior level being 0.5 cm lower than the anterior level. The PT colon was anastomosed to the anal stump using a single layer of interrupted PDS sutures. Hemostasis was checked and the incision closed in layers without drainage, ensuring midline closure of levator ani and the muscle complex. A 16F tube with multiple side holes was passed through the anus into the pulled-through colon and fixed to perineal skin. No covering colostomy was fashioned in any case.

Postoperatively, the nasogastric and the rectal tubes were maintained on continuous drainage for 72 to 96 hours. The urethral catheter was removed after 72 hours. Feedings were started on the fourth day. The pelvic drain and the rectal tube were removed on fifth day. Antibiotics were given for 7 days.

RESULTS

The mean age of first surgery was 3.1 years. The mean age at redo PT was 6.1 years. The level of PT was proximal to the colostomy in case 1, 2, and 4. Patient 3 never had a colostomy, but underwent a single-stage reoperation. There was one early complication, a wound infection and rectocutaneous fistula (case 4) that healed spontaneously over the next few weeks. This patient had severe perirectal fibrosis and residual fistulae at the time of surgery. Two fistulous tracts were excised during redo PT. Apart from this case there were no anastomotic complications.

The frequency of defecation was high (5 to 20 motions per day) in the early postoperative period. However, the stooling pattern showed marked improvement over the next few months. The frequency reduced to 3 to 5

motions a day, and stool consistency improved to semi-solid. Occasional soiling accidents with liquid stool were observed in one case. After a follow-up period ranging from 10 months to 3 years, all patients have normal voluntary bowel actions. The bladder function is clinically normal in all.

There has been no recurrence of constipation and no episode of enterocolitis.

DISCUSSION

Redo surgery after a failed pull-through is a formidable challenge. The common indications for a redo PT include complications such as an undilatable anastomotic stricture, ischemic colitis leading to acquired aganglionosis, retained aganglionic segment, and anastomotic leaks.²⁻⁶ Reoperation other than a PT have been advocated and performed for complications such as recurrent enterocolitis and persistent constipation.^{2,7} Most reports on redo PT consist of Duhamel, Swenson, or endorectal type of procedures with success rates varying between 33% and 94%.²⁻⁵ Redo PT is always technically difficult because of pelvic fibrosis and adhesions resulting from previous surgery and its complications. While performing a Swenson type of procedure, the pelvic dissection from the abdominal route may be hazardous and cause injury to the pelvic nerves and adjacent organs. Use of the posterior sagittal approach for dissection and anastomosis in the lower pelvis makes the operation relatively simpler and safer because of the excellent exposure and precise dissection under direct vision. There is minimal risk of injury to the pelvic nerves and adjacent organs. The anastomosis can be performed in the natural position of the anal canal without compromising its blood supply.

Trans-sphincteric rectal surgery is an established technique in adult surgery.⁸ Since the introduction of the posterior sagittal approach for anorectal malformations by Peña and de Vries,⁹ the technique is widely used by pediatric surgeons not only for anorectal malformations but also for some other conditions.^{10,11} We have used it for managing difficult rectal strictures, urethral strictures and vesico-vaginal fistula, and, more recently, for initial and repeat PT in HD. Stringer and Crabbe (1998)¹² reported their initial experience of posterior sagittal proctectomy for Crohn's disease in children and commented on the excellent exposure and other benefits of the approach. However, there has been limited experience with this approach for Hirschsprung's disease. Kimura et

al (1993)⁷ performed posterior sagittal myectomy for persistent rectal achalasia after a Soave operation. Peña^{10,13} used the approach to perform redo as well as primary pull-through in selected cases of HD. Hedlund (1997)¹⁴ reported his initial experience with 10 cases of posterior sagittal PT for short segment HD without a laparotomy. Niedzielski (1999)¹⁵ used a combined abdominal and posterior sagittal approach for staged PT.

Continence and bowel control is an important postoperative consideration. None of our patients have suffered severe incontinence. The increased frequency and irregular stooling pattern observed in the early postoperative period has shown improvement with passage of time. There is clinical^{11,15} and experimental^{16,17} evidence to suggest that the posterior sagittal approach does not interfere with the continence mechanism. Poor bowel control in some patients with repaired anorectal malformations is mainly linked to the severity of the malformation itself rather than the operative approach. In Hirschsprung's disease we are dealing with a normal muscle complex, which is cleanly incised in the midline and closed at the end of the procedure. As far as pelvic neural injury is concerned, the posterior approach gives the best opportunity to save the neurovascular connections to the anal stump. In a classical Swenson operation, the anal canal is completely mobilized as far as the mucocutaneous junction and is everted so that the actual anastomosis is done outside the body before being pushed back in. This results in relative devascularization of the anal canal. With a posterior sagittal approach there is no need for complete mobilization of the anorectal junction since the anastomosis is done under direct vision in the natural position of the anal canal. Consequently, the chances of complications are minimal. Safety is another advantage in that even if the anastomosis leaks, it results in rapid drainage through the wound as a rectocutaneous fistula rather than causing serious pelvic peritonitis. One patient in this series (case 4) had this complication and did not need any active management. Previously reported series of redo PT procedures have shown a 33% to 94% satisfactory outcome.²⁻⁵ Complications like stenosis, kinks, bleeding, and anastomotic breakdown can be minimized with the posterior sagittal approach.

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