

Posterior Sagittal Anorectoplasty for Failed Imperforate Anus Surgery: Lessons Learned From Secondary Repairs

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Purpose: The aim of this study was to evaluate secondary operations using a posterior sagittal approach in patients with fecal incontinence and impaction after primary repair of anorectal malformations.

Methods: Twenty patients (14 boys, 6 girls) who had previous failed surgery for imperforate anus underwent secondary operations. The indications for surgery included fecal incontinence (n = 16) and fecal impaction (n = 4). Patients ranged in age from 2 to 30 years (mean, 11 years), with 4 over the age of 20 years. The primary procedures included abdominosacroperineal (n = 7), sacroperineal (n = 10), and perineal (n = 3) pull-throughs. At surgery, none of the patients underwent a diverting colostomy. The rectum was mobilized from the surrounding structures through a posterior sagittal approach. The surgical findings included anteriorly displaced anus (n = 17), laterally displaced anus (n = 3), mesenteric fat surrounding the rectum (n = 4), megarectosigmoid (n = 2), and others (n = 3). The rectum underwent reconstruction, which involved relocation of the rectum and anus to surround them with the muscle complex.

Results: Patients underwent follow-up for periods ranging from 8 months to 6 years after surgery (mean, 3 years). To evaluate the functional results, fecal continence scores (Templeton and Ditesheim) were calculated for incontinent patients. Of the 16 incontinent patients, 12 achieved continence and 4 some improvement. Of the 4 patients with fecal impaction, 2 achieved daily voluntary bowel movement, whereas the other 2 have mild constipation and need occasional enemas.

Conclusions: Our study suggests that (1) a secondary operation through a posterior sagittal approach can restore fecal continence and is efficacious even in adolescents and adults and (2) a posterior sagittal procedure can be safely performed without a diverting colostomy.

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INDEX WORDS: Posterior sagittal anorectoplasty, secondary operation, fecal incontinence.

FECAL INCONTINENCE after repair of anorectal malformations is a tragedy. Patients soil their underpants, have an odor, and become socially unacceptable. Fecal continence may improve with age and by toilet training in some patients.¹⁻³ However, a significant number of patients continue to be incontinent to varying degrees throughout childhood, adolescence, and adulthood.¹⁻³ To establish fecal continence, numerous secondary operative procedures and medical treatments have been designed, including gracilis sling sphincteroplasty,⁴ free autogeneous muscle transplantation,^{5,6} lavatorplasties,^{7,8} and biofeedback therapy.⁹ All have achieved varying degrees of success. However, if the anorectum was pulled-through via an incorrect route, rerouting would be the best therapeutic management.¹⁰⁻¹² We attempted to reroute the rectum in patients with fecal

incontinence and impaction using a posterior sagittal approach.

MATERIALS AND METHODS

Patients

Between 1993 and 1999, 20 patients (14 boys, 6 girls) who had previously failed surgery for imperforate anus underwent secondary operations at our institution. The patients ranged in age from 2 to 30 years (mean, 11 years), with 4 patients over the age of 20 years. Sixteen patients had fecal incontinence, and 4 had fecal impaction. In 1 patient there was a persistent rectourethral fistula, and the 2 cloacal patients had vaginal stenosis. One patient had megarectosigmoid. Among the boys, the original defect was rectovesical fistula in 2, rectourethral fistula in 11, and anocutaneous fistula in 1. Among the girls, 2 had a cloacal anomaly and 4 had a rectovestibular fistula. As for the primary procedures, 17 patients with a high or intermediate type defect underwent the abdominosacroperineal or sacroperineal pull-throughs, which were developed by Stephens and Smith.¹³ Three patients with an intermediate or low-type defect underwent perineal pull-throughs. There was no neurogenic bladder or urinary incontinence except in 1 patient.

The diagnosis of fecal incontinence was based on history, local findings of the anus and the rectum, defecograms, computed tomography (CT), and magnetic resonance imaging (MRI). These radiologic examinations were performed in half of the patients. In these patients, common anatomic findings in the buttocks were an anteriorly placed anus, a laterally displaced anus, and rectal mucosal prolapse. The anus usually appeared open. On digital examination, no muscles were felt in front of the rectum and behind the urethra, whereas thick muscles were identified behind the rectum (Fig 1). In impacted patients, the defecogram showed massive dilation of the sigmoid colon and the rectum.

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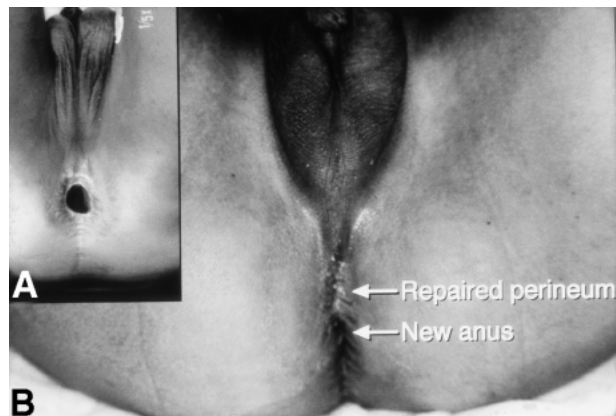


Fig 1. Local findings of the anus. (A) Preoperative appearance. The anus appeared open and displaced anteriorly. (B) Postoperative appearance of the perineum on the same patient.

Operative Technique and Findings

None of the patients underwent a diverting colostomy. The bowel was prepared by polyethylene glycol and cleansing enemas the day before surgery. The patient was placed in a jackknife position. A skin incision was made in the natal cleft, starting in the coccyx and continuing down to the posterior margin of the anus, then running around the anus. Multiple 5-0 silk sutures were placed at the mucocutaneous junction of the anus as described by Peña.^{10,11,14} The incision was deepened through the levator muscle and muscle complex until the posterior wall of the rectum was identified. Then, the dissection was carried out around the anus, staying as close as possible to the bowel wall without injuring it. All muscle structures were dissected away from the bowel wall and preserved using needle cautery. The dissection from these 2 directions allowed the surgeon to raise the rectum out from the wound and to look directly at the anatomic relationship between the previously pulled-through rectum and the pelvic muscles. The anatomy was explored with an electronic muscle stimulator.

In 17 patients, the rectum was pulled-through anteriorly from the anterior limit of the muscle complex; namely, the rectum was pulled-through close to the posterior wall of the urethra. In 3 patients, the rectum was displaced laterally with a variable degree of destruction of 1 side of striated muscle. In 4 patients who had previously undergone the abdominosacroperineal approach, mesenteric fat around the rectal wall was found.

The rectum underwent reconstruction, which involved relocation of the rectum and anus so as to surround them with the muscle complex. The mesenteric fat was resected. In cases of a laterally displaced anus, relocation of the new anus at the center of the muscle complex as described by Peña was not performed. Tapering of the rectum was not performed in any of the cases.

A persistent rectourethral fistula was closed in 1 patient. The posterior urethral diverticulum was resected in another patient, which consisted of the portion of distal rectum left attached to the urethra at the primary operation. Vaginal stenosis was repaired simultaneously in the 2 cloacal patients. The dilated rectosigmoid was resected 1 year after the secondary surgery in 1 of the patients with impaction.

RESULTS

All patients had uneventful postoperative courses except for 2 who had partial wound dehiscence. One needed resuturing of the rectal wall to the skin and wound dehiscence spontaneously healed in the other.

Glycerin enema was recommended once a day for toilet training in the early postoperative period. Patients underwent follow-up for between 8 months to 6 years (mean, 3 years). Eighteen patients were examined at outpatient clinics, and 2 underwent follow-up by telephone questionnaires.

Of the 16 incontinence patients, 12 have voluntary bowel movements and are free from soiling and staining, whereas 4 patients have occasional soiling and accidents, especially when they have diarrhea. To evaluate the functional results, fecal continence scores (FCS) developed by Templeton and Ditesheim¹ were calculated for the 16 incontinence patients (Table 1). With this 6-point scale, a score of 5 represents continence, whereas a score of 0 represents incontinence to a socially unacceptable degree. The FCS was compared for the pre- and postoperative period (Fig 2). The preoperative mean FCS was 0.3 (range, 0 to 3). The mean FCS at the time of this report was 4.1 (range, 2 to 5). Overall, 12 of the 16 incontinent patients achieved continence.

Of the 4 patients with fecal impaction, 2 achieved daily voluntary bowel movement, whereas 2 required occasional glycerin enemas for constipation.

DISCUSSION

Posterior sagittal anorectoplasty (PSARP) for failed surgery for imperforate anus was first advocated by Peña.¹⁰ He stated that surgeons tended to pass the rectum as close as possible to the urethra because they believed that the puborectal portion of the levator muscle has the most important role in continence. Moreover, the most distal portion of the muscle complex, ie, the external sphincter muscle, may be underestimated. As a consequence, the rectum was pulled-through via a space between the urethra and the anterior wall of the muscle complex, resulting in incontinence and an anteriorly displaced anus.^{10,15} The posterior sagittal approach provides a clear anatomic relation between the misplaced anorectum and pelvic muscles and allows surgeons to perform proper repositioning of the neoanorectum within the muscle complex.

We had used the Stephens-Smith type sacroperineal or abdominosacroperineal approach for patients with high imperforate anus.¹³ Most of the patients achieved fecal continence with time, but several patients continued to have fecal soiling and accidents until adolescence or adulthood. In 1993 we adopted the PSARP as the operation of choice for high imperforate anus as primary surgery. The technique is appealing because it is anatomically exact, and the posterior sagittal incision minimizes injury to the anorectum and the pelvic musculature. The reconstruction of the pelvic muscles around the new rectum is logical.¹⁶ Then, we started to perform the PSARP in incontinent patients in whom the rectum was

Table 1. Fecal Continence Score

1. Toilet training for stool	
(A) Successful	1.0
(B) Occasionally successful (awareness of impending stool)	0.5
(C) No awareness of impending stool	0
2. Accidents	
(A) None, or rare	1.0
(B) 3 per week or less	0.5
(C) More than 3 per week	0
3. Extra underpants (or liners) needed	
(A) Never	1.0
(B) Only when having diarrhea	0.5
(C) Always	0.0
4. Social problems	
(A) None	1.0
(B) Infrequent order; does not miss school, but no overnights, dates, camping	0.5
(C) Frequent order affects school and play	0
5. Activity restrictions	
(A) None	0.5
(B) Avoids swimming, sports	0
6. Rashes	
(A) No current problems	0.5
(B) Some current problems	0
Total Score (range)	0-5

NOTE. Scoring system is as follows: good, 4 to 5 points; fair, 2 to 3.5 points; poor, 0 to 1.5 points.

considered to have been pulled down via an incorrect route in the primary operation.

At the secondary operation, we found various kinds of displacement of the rectum. The most frequent situation seen in our series was that the proximal rectum was covered with the levator muscle and part of the muscle complex, but the distal portion of the rectum was out of the ring of the muscle complex and close to the posterior urethra. We repositioned the rectum within the limits of the external sphincter muscle and approximated the anterior and posterior borders of the muscle complex. In several patients, the levator muscle and muscle complex were destroyed partially; muscle fibers were damaged partially or became scarred. We approximated damaged muscle fibers with 6-0 polydioxanone absorbable monofilament (PDS) sutures. The distal portion of the muscle

complex near the skin level (external sphincter muscle) often was scarred; therefore, we sewed the edge of the intact muscle complex to the skin to surround the rectum to prevent rectal prolapse. Patients who have undergone a previous abdominoperineal operation often have mesenteric fat surrounding the rectum. As previously reported, mesenteric fat may interfere with muscle function;¹⁰⁻¹¹ thus, we resected the mesenteric fat to improve the contact between the rectal wall and the voluntary muscles.

What differentiates our experience from that in a previous report concerns the issues of a diverting colostomy and tapering of the rectum. Peña¹⁰ emphasized the importance of a protective colostomy in his early report, although he performed secondary operations without a colostomy in a recent report.¹¹ We did not create a diverting colostomy in any of the patients, because the patients and parents did not desire it. Bowel irrigation with polyethylene glycol allowed us to perform the surgery in a clean operative field. Colostomy seems to be unnecessary when good bowel preparation has been achieved. With regard to tapering of the rectum, we did not taper the rectum in any of our cases. Tapering of the rectum is emphasized in the previous report,¹⁰ because the size of the rectum must be such that it can fit into the levator muscle and muscle complex. It is our experience that when the rectum is pulled and stretched, it can fit into the muscular structure. We were able to repair the lower portion of the levator muscle and muscle complex behind the rectum without tapering.

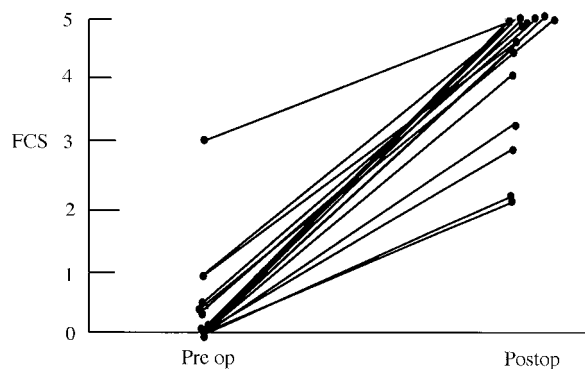


Fig 2. Quantitative assessment of fecal continence. Fecal continence score was compared for the pre- and postoperative period.

To assess whether the indications for secondary operation were correct, we analyzed retrospectively the correlation between local findings of the anorectum, defecograms, CT or MRI, and operative findings. Those preoperative radiologic evaluations did not always show the anatomy as seen in the operation. However, the appearance of the anus and determination of the existence of muscles through digital palpation were most significantly correlated to the operative findings. In most of the incontinent patients, we were not able to feel the muscles between the posterior urethra and the anterior wall of the rectum.

Among the 20 patients, 7 are adolescents or adults. They suffered severe fecal incontinence, which made them socially unacceptable. They were in diapers for a long time and did not have a friend of the opposite sex. After the secondary operation, they used enemas once a day, then gradually learned to control their bowel movements. A

28-year-old man who had incontinence and a persistent rectourethral fistula got married after the operation. All seven adolescent and adult patients have a normal school and social life. We would like to emphasize that this is a report on primary PSARP as a secondary operation even in older patients, namely these secondary operations are likely to be successful if the primary operation was done by one of the old imperforate anus procedures.

We have learned several lessons from the secondary operation for fecal incontinence. A secondary operation through a posterior sagittal approach restores fecal continence, if we properly select the patient, and can be safely performed without a diverting colostomy, which may trouble patients and parents. A secondary repair may produce excellent results even after many years of incontinence and impaction. Therefore, a secondary operation should be attempted before trying other more complicated procedures.

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