# Transanal Endorectal Pull-Through for Hirschsprung's Disease

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***Purpose:*** A new endorectal pull-through technique using a transanal approach is presented in this report.

***Methods:*** Mucosectomy, colectomy, and pull-through are performed transanally, and neither laparotomy or laparoscopy are required. Five patients affected with Hirschsprung's disease have been operated on with this technique.

***Conclusion:*** During the 6- to 15-month follow-up period, all of them have had postoperative normal bowel movements.
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INDEX WORDS: Hirschsprung's disease, endorectal pull-through, transanal mucosectomy.

ENDORECTAL PULL-THROUGH for Hirschsprung's disease was described in 1964 by Soave.[1] In the same year, the technique was modified by Boley who performed the coloanal anastomosis during the pull-through.[2] Henry So et al[3] reported on 20 newborns in 1980 who were treated with endorectal pull-through and no previous colostomy. In 1995, Georgeson et al[4] operated on 12 children using transanal mucosectomy and primary laparoscopic pull-through for the abdominal stage.

Different modifications to endorectal pull-through techniques for Hirschsprung's disease have been designed, and most of them require laparotomy or laparoscopy. A new endorectal technique and its preliminary results are introduced here where rectal mucosectomy, aganglionic segment colectomy, and normoganglionic colon pull-through are performed through the anus. No laparotomy or laparoscopy are required in this technique.

## MATERIALS AND METHODS

Between October 1996 and July 1997, five boys ages 24 days to 21 months suffering aganglionosis of the rectum or distal sigmoid underwent surgery by transanal endorectal pull-through (TEPT) at Instituto Nacional de Pediatría in Mexico City. Before the procedure, all patients were submitted to manometric, radiological, and histopathologic studies to corroborate the diagnosis. Three patients had enterocolitis several days after birth and before undergoing operation.

### *Preoperative Management*

To confirm diagnosis and establish the transitional zone, each patient was submitted to manometry, full-rectal thickness biopsies, and barium enema. During this time, the colon was decompressed with saline enemas, and the patient was fed orally. Twelve hours before undergoing surgery, the patient fasted, total intestinal irrigation was performed, and intravenous ampicillin, amikacin, and metronidazole were administered. After surgery, antibiotics were continued for the first 72 hours.

### *Rectal Mucosectomy*

For the operation, the patient was placed in a prone position with the pelvis elevated. As a first step to the transanal mucosectomy of the rectum, the anal canal was exposed, and a circumferential incision was made 1 cm above the dentate line in the rectal mucosa as illustrated and described by Boley.[5] Using blunt dissection, a submucosal plane was developed placing multiple 5-0 silk traction sutures in the mucosa to facilitate its separation from the muscular wall. This submucosal plane was extended 6 cm (Fig 1).

### *Muscular Sleeve*

The next step was to prepare the muscular sleeve through which the normoganglionic colon would be pulled. At the same site at which mucosectomy was finished, a complete incision on the rectal muscle was made to reach into the perirectal tissue. To liberate the muscular sleeve, perirectal tissue was dissected and smooth muscle fibers of the rectum were divided circumferentially (Fig 2). Through this procedure, the muscular sleeve could be liberated and returned to its original position. Finally, a posterior myotomy of the sleeve was made above the place where the anastomotic line would be created as it has been depicted by Georgeson et al.[4]

### *Colon Mobilization*

Once the muscular sleeve was prepared and liberated, the rectum was pulled down and perirectal tissues were easily exposed; the mesenteric vessels were dissected, tied, and divided (Fig 3). Thus, the colon was freed and could be pulled through (Fig 4). Then, the macroscopic transitional zone could be seen (Fig 5). During this step, full-thickness biopsy specimens of the colon were examined by frozen section to assure normoganglionic level.

### *Colon Resection and Anastomosis*

When the normoganglionic colon was reached and freed without tension up to the proposed anastomotic line, a colectomy of the dilated and thickened aganglionic segment was performed. To securely fix the normoganglionic pulled through colon, two absorbable sutures were placed in the lateral walls of the muscular sleeve; the anastomosis to the rectal mucosa was sutured with absorbable material.

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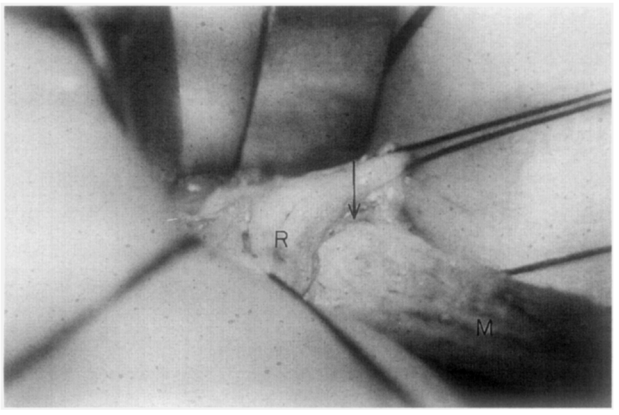


Fig 1. Submucosal plane of dissection (arrow) during mucosectomy. M, mucosa; R, circular smooth muscle fibers of the rectum.

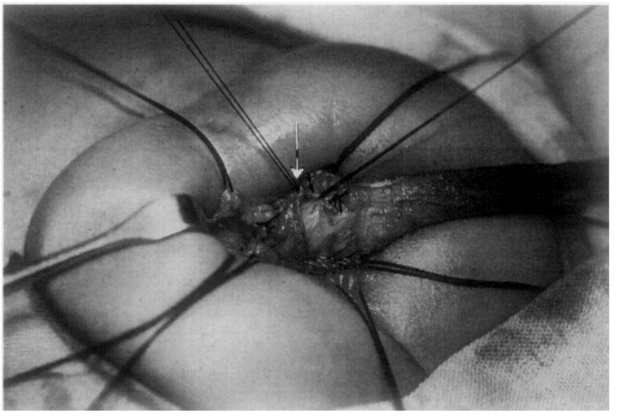

Fig 3. Ligation of mesenteric vessels (arrow) during colon mobilization.

## RESULTS

Ages, length of aganglionic segment and of colon resected, as well as other main features of the patients who underwent surgery with this technique are shown in Table 1. All patients started postoperative bowel function within the first 24 hours, and oral feeding was resumed the next 24 to 36 hours. During the first 2 weeks, two patients had 10 to 15 bowel movements per day, the other three had only three. Subsequently, bowel function was normal in all of them with one to three bowel movements per day. There were no intraoperative or early postoperative complications. Infection or anastomotic leak developed in none of the patients.

Follow-up has been secured for 6 to 15 months. Bowel movements range from one to three per day. No patient has soiled his diapers between bowel movements. No enterocolitis or intestinal obstruction has been observed.

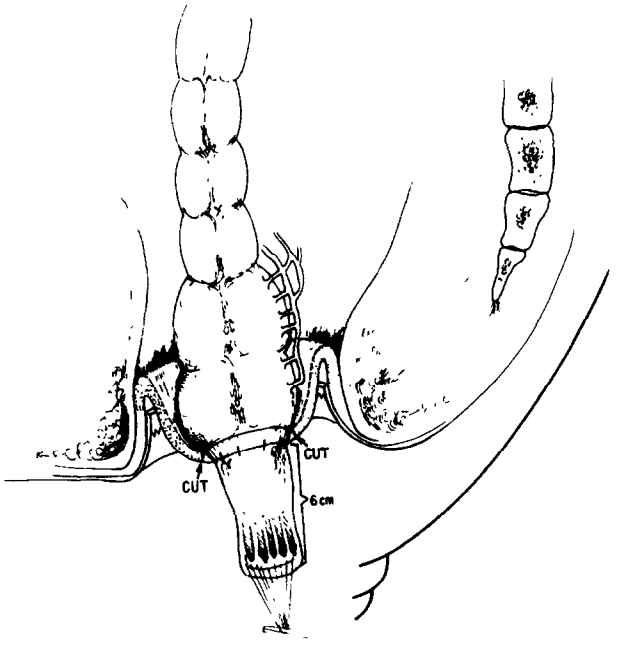


Fig 2. The mucosectomy has been completed. Transection in the muscle of denudated rectum (dotted line) begins to form the muscular sleeve.

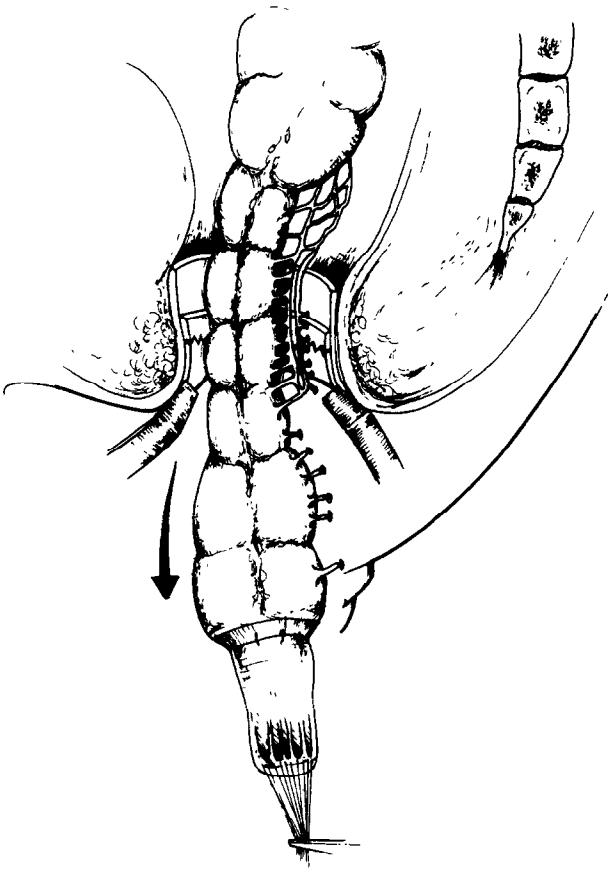

Fig 4. Mesenteric vessels divided. Colon pulled down through the rectal sleeve.

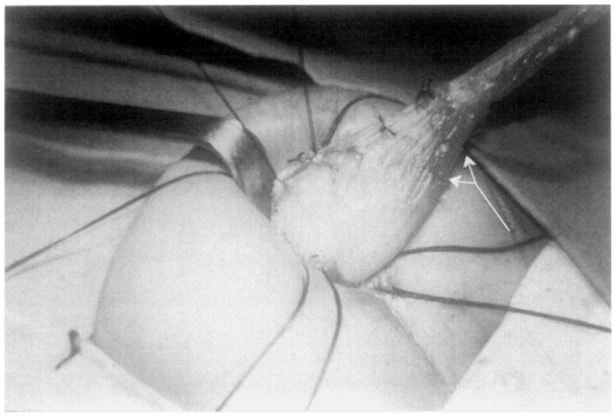

**Fig 5. Colon freed. Macroscopic transitional zone can be observed (arrows).**

Four patients were submitted to rectal dilatations for 3 months; rectal dilatation was not performed on one patient because the parents did not grant permission. However, anal stricture has developed in no one.

## DISCUSSION

Transanal mucosectomy has been used for many years in endorectal techniques for Hirschsprung's disease. It was used by Georgeson et al[4] who described the use of laparoscopy for the abdominal stage. Boley[5] and Saltzman et al[6] also used this approach for rectal mucosectomy; however, the abdominal stage required laparotomy. To our knowledge, there are no previous reports on primary transanal endorectal pull-through without laparotomy or laparoscopy. The TEPT has precise indications in rectal and distal sigmoid Hirschsprung's disease; 78% of the cases at the Instituto Nacional de Pediatría in México are of this type.

This technique has the following advantages. Neither abdominal nor intraperitoneal bowel opening is necessary; therefore, the risk of adhesion formation presumably decreases. Also, it offers the best cosmetic results in the surgical correction of Hirschsprung's disease. Likewise, the endorectal dissection preserves the anorectal sphincters as well as the local blood supply and innervation, and, so, fecal and urinary continence may not be affected. It also helps avoid damaging pelvic structures, such as the ductus deferens, which lies anterior and external to the bowel wall.[2]

**Table 1. Features of Patients Operated With TEPT at Instituto Nacional de Pediatría**

| | Patient No. | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Age at operation | 24 d | 44 d | 148 d | 21 mo | 18 mo |
| Weight (kg) | 3.2 | 3.3 | 4.8 | 10.2 | 10.4 |
| Colon resected (cm) | 20 | 18 | 11 | 13 | 20 |
| Aganglionic segment (cm) | 18 | 15 | 9 | 12 | 17 |
| Intraoperative bleeding (mL) | 50 | 10 | 30 | 160 | 55 |
| Bleeding v patient TBV (%) | 19.5 | 3.7 | 7.8 | 19.6 | 6.6 |
| Operating time (min) | 180 | 90 | 120 | 180 | 300 |
| Follow-up (mo) | 15 | 14 | 13 | 7 | 6 |

Abbreviation: TBV, total blood volume.

During the endorectal mucosectomy there were no difficulties in patients who had enterocolitis in the preoperative period. However, patients 1 and 4 had some esteemed blood loss at the sites at which full-rectal-thickness biopsy sections were taken previously for diagnosis. The bleeding in these two patients was more than 10% of their total blood volume requiring blood transfusion. However, when diagnosis is done with rectal suction biopsy, the mucosectomy field remains bloodless.

Because the transanal approach offers a smaller operative field, a potential hazard with this technique could be uncontrolled bleeding when the colon is being freed and mobilized. When colorectal vessels are being dissected and tied to free the colon, extreme care should be exercised to obtain hemostasis. Likewise, the mobilization of the colon through the anus requires retraction to maintain visibility. Because the sphincters are stretched, the functional results on them are not predictable at this time. In spite of this, the five patients have had normal bowel movements and no one presents soiling between bowel movements. However, these are preliminary data and our patients will be submitted to manometry for a complete evaluation (external and internal sphincters) at the age of 3 years or as soon as their cooperation can be obtained.

The transitional zone level seen in the preoperative barium enema could be located higher during the operation, and, so, this technique would not be enough or it would not be easy to reach the normoganglionic colon for a pull-through and for a complete resection of the dilated and thickened megarectum. There has been good correlation of the observed transitional zone level between the barium enema and the surgical findings. We suggest, that if we have a patient with a more proximal (higher) aganglionosis, a complementary laparoscopy could be performed to release the colon as described by Georgeson et al.[4]

Although the follow-up for the first three patients is over 12 months, the functional results are preliminary, and a continued assessment of fecal continence, sphincter, and bowel function are needed. We believe the procedure to be suitable for classical rectosigmoid aganglionosis because it appears to be effective and promising.

## ACKNOWLEDGMENT

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