

## **Primary Neonatal Transanal Pull Through for Hirschsprung's Disease: Ten-Year Experience**

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Transanal endorectal pull through (TEPT) is a minimally invasive technique for the surgical management of Hirschsprung's disease. This study reviewed the early and late complications with this technique when utilized to neonates since 1999.

**Methods:** The records of the author's neonatal cases undergoing TEPT from 1999 to 2011 were reviewed for early and late complications. Early complications investigated were: anastomotic dehiscence, perianal excoriations, pelvic infection, wound infection and enterocolitis. Late complications included: anastomotic stricture, enterocolitis, retraction of pullthrough segment, rectal prolapsed, soiling and constipation.

**Results:** Sixty three patients were included in the study of which 54 were evaluable for long term complications. The average weight of the patients was 3 kg (range 0.8 kg - 3.5 kg). Mean post-natal age was 16 days (range 6-28days). There were 39 males and 24 females. The rates of early complications were: Anastomotic dehiscences (1.59%), wound infection (1.59%), enterocolitis (9.52%). The late complications were: Anastomotic stricture (3.70%), enterocolitis (7.41%), retracted pull-through segment (18.52%), rectal prolapse (3.70%) and perianal excoriations (9.26%). In 26 patients, 4 years old and above, the rate of voluntary bowel movement was 80.76%. Three patients, initially, had constipation with soiling.

**Conclusion:** TEPT, as a definitive surgery for neonates with Hirschsprung disease, provided acceptable early and late complication rates in the personal experience of the author comparable with the experience of surgeons from other institutions. The procedure provided the patients less number of operations and admissions, and lesser costs. Only 3 patients required abdominal incision. This will encourage us to continue utilizing the technique in newborns.

**Key words:** transanal endorectal pull through, Hirschsprung's disease

Transanal Endorectal Pull-Through (TEPT) represents one of the latest developments in the concept of the minimally invasive surgery for Hirschsprung's disease (HD). Transanal mucosectomy was practiced for many years in conventional (abdomino-perineal) and during laparoscopic-assisted endorectal pull-through for HD.<sup>1-3</sup> The novel description of an entirely TEPT approach by De la Torre-Mondragon and Ortega-Salgado in 1998<sup>4</sup> was rapidly followed by similar promising early experiences from various centers, including the Philippine General Hospital. The technique was started in the institution in 1999. Since then, the technique was also utilized for neonates.

Since it started managing Hirschsprung's disease, the Section of Pediatric Surgery of the Philippine General Hospital has utilized staged procedures with colostomy created as an initial procedure for almost all of the neonates diagnosed with HD. In 1999, we started utilizing TEPT as a primary procedure (without initial colostomy) for neonates.

During the past decade, the author utilized primary trans-anal pull-through for HD in the newborn if no contraindications to the procedure were noted. Weight of patient was not considered a major contraindication. Severe associated anomalies, especially cardiac abnormalities, were considered as major contraindication to doing primary pull through.

The initial results with primary neonatal pull through were presented in 2002 in the paper forum of the Philippine Society of Pediatric Surgeons. A total of 18

patients were reported. Fourteen patients were personally done by the author. Four other patients were done by the senior fellow of Pediatric Surgery under the supervision of the author. The advantages of neonatal TEPT mentioned at that time were absence of abdominal incision and early feeding of the patients. Early complications [peri-anal excoriations (37.7%), strictures or cuff constriction (5.5%), no enterocolitis and wound infection] were comparable to previous paper on HD of other institutions<sup>1-4</sup> utilizing abdomino-perineal, laparoscopic and trans-anal approaches. The paper emphasized the safety and cost-effectiveness of transanal endorectal pull-through in the treatment of HD especially for a developing country like the Philippines.<sup>5</sup>

This paper aims to review the early and late complications of primary neonatal TEPT after a decade of personal experience with the procedure.

## Methods

All neonatal patients with HD operated on using the TEPT technique and followed up by the author from 1999 to 2011 were included in the study. Data collected included age, sex, weight, length of aganglionosis and associated anomalies. Early and late complications including whether the patient required hospital admission or medication, were also recorded. Stooling pattern was recorded at 1 month and 6 months and yearly thereafter from time of surgery. The stooling record included the frequency of stooling and the presence of incontinence as well as constipation. Krickenbeck international classification of postoperative results was utilized to evaluate the results.<sup>6</sup> Enterocolitis was clinically graded using a previously established system from mild (grade 1) to severe (grade 3).<sup>7</sup>

## Results

The subjects of the study included patients from Philippine General Hospital (29 patients), St. Luke's Medical Center Quezon City (12 patients) and Bonifacio Global City (4 patients), National Children's Hospital (3 patients), Medical Center Manila (2 patients), San Juan de Dios Hospital (3 patients), University of Perpetual Help Medical Center (Las Pinas) (3 patients), Asian Hospital

and Medical Center (2 patients), Metropolitan Hospital (3 patients) and De la Salle University Medical Center (2 patients). (Table 1) The hospitals were chosen based on availability of pathologists proven capable of reading HD specimens. Fifty nine cases were done and followed up by the author. Four cases were done by a pediatric surgery fellow at Philippine General Hospital (2001-2002) under the supervision of the author. Follow ups of the 4 patients were erratic. A total of 63 patients were included in the study. All patients were evaluated preoperatively and managed postoperatively with pediatricians and many of them with neonatologists. They were all deemed fit for the procedure.

**Table 1.** Name of hospital and corresponding number of patients.

Name of Hospital	Number of Patients
Philippine General Hospital	29
St. Luke's Medical Center Quezon City	12
St. Luke's Medical Center Bonifacio Global City	4
National Children's Medical Center	3
Medical Center Manila	2
San Juan de Dios Hospital	3
University of Perpetual Help Medical Center (Las Piñas)	3
Asian Hospital and Medical Center	2
Metropolitan Hospital	3
De La Salle University Medical Center	2

Two patients were deemed not fit for primary pull through because of cardiac anomalies. One patient came from Philippine General Hospital while the patient was referred from San Juan De Dios Hospital. Both underwent creation of colostomy. Other patients diagnosed to have total colonic aganglionosis were also excluded (2 patients: 1 from San Juan de Dios Hospital and another from Philippine General Hospital).

The weight of the patients ranged from 0.8kg to 3.5kg with age of gestation ranging from 30 weeks to 40 weeks. The mean birth weight was 3kg. Post-natal age was from 6 days to 28 days at the time of operation. Mean post-natal age was 16 days.

Out of the 63 patients, 39 (61.90%) were males while 24 (38.10%) were females.

Only 3 patients required abdominal incisions because of the length of aganglionosis. Sixty patients were done on purely trans-anal approach.

Fifty eight patients were Filipinos. Three were from Guam while two were from other Pacific islands.

No major anesthetic problems were noted even for the 800g infant.

Except for 3 patients, all other 60 patients resumed feeding a day after the surgery. All patients had full feedings on 4th day postoperatively.

Follow-up period ranged from 1 month to 12 years

### *Early Complications*

Early complications (within 3 months from time of surgery) noted are listed on Table 2.

One patient developed anastomotic dehiscence and pelvic infection. He initially required creation of colostomy. He later developed anastomotic stricture which responded to postoperative dilatations. Posterior retraction of the pulled through bowel was also noted in this patient.

All patients with perineal excoriation improved with local control {judicious cleaning after bowel movement and zinc oxide application} and with time. The frequency of bowel decreased from an initial 6-10 times a day during the first week postoperatively to 1-2 times a day after 2 to 3 months from time of surgery. With improving frequency, excoriations also improved (less incidence of excoriations in table 3). The patients with soiling had more difficulty managing the excoriations.

One patient requiring abdominal incision developed subcutaneous infection for which drainage of abscess was done and intravenous antibiotics were given. Four patients required hospitalization for early enterocolitis with the earliest occurring at 14 days postoperatively. All of the four patients required colonic irrigations and intravenous antibiotics. None required re-operations for enterocolitis. (Table 2)

### *Late Complications*

Only about 54 patients were available for evaluation of their late complications. Four patients done by the

pediatric surgery fellow was not seen by the author after a month from time of surgery. Three foreigners did not follow up after a month. Only two patients from Guam maintained follow-ups consistently. Two Filipino patients did not maintain regular follow-ups after 2 months.

One patient had retraction of the pulled through colon requiring more dilatations for his anastomotic stricture lasting for 5 months. Another patient (from Metropolitan Hospital with long segment HD requiring abdominal incision) developed anastomotic stricture requiring dilatations until 6 months postoperatively.

Two patients developed rectal prolapse which did not require further treatment. Two new patients developed grade 2 enterocolitis, in addition to another 2 patients who had previous history of enterocolitis. (Tables 2 & 3)

**Table 2.** Early complications among 63 cases who underwent transanal endorectal pull through of the author from 1999-2011.

List of Complications	Number of Patients
Anastomotic dehiscence	1/63 (1.59%)
Perineal excoriation	23/63 (36.51%)
Pelvic infection	1/63 (1.59%)
Wound infection	1/63 (1.59%)
Enterocolitis	6/63 (9.52%)
Grade 1	2 (3.17%)
Grade 2	3 (4.76%)
Grade 3	1 (1.59%)

**Table 3.** Late complications noted among 54 patients.

Late Complications	Number of Patients
Anastomotic stricture	2/54 (3.70%)
Enterocolitis	4/54(7.41%)
Grade 1	1/54 (18.52%)
Grade 2	3/54
Grade 3	None
Retraction of pulled through colon	1/54 (18.52%)
Rectal prolapse	2/54 (3.70%)
Perianal excoriation	5/54 (9.26%)

*Voluntary Bowel Movement, Soiling, Constipation*

Most authors utilized patients aged four years and above to evaluate stooling pattern.<sup>6</sup>

In this study, 38 patients were more than four years of age. However, only 26 of them had regular check-ups and known bowel movement pattern. Table 4 summarizes the bowel movement pattern of the 26 patients.

**Table 4.** Bowel movement patterns of 26 patients 4 years and above, following TEPT for Hirschsprung's disease. (Personal series of the author, 1999-2001).

Criteria	Number of Patients
Voluntary bowel movement	
Yes	21/26 (80.76%)
No	5/26 (19.23%)
Soiling	5/26 (19.23%)
Grade 1	0
Grade 2	5/26 (19.23%)
Grade 3	0
Constipation	3/26 (11.53%)
Grade 1	0
Grade 2	3/26 (11.53%)
Grade 3	0

Twenty one patients  $\geq$  four years of age developed voluntary bowel movement. Three of the patients had constipation which eventually caused soiling. All three patients improved with the management of the constipation using laxatives and dietary manipulation. (Table 4)

Two patients were incontinent without constipation.

These two patients did not have social problems even if incontinence manifested as soiling (Table 4). Both were on suppositories and laxatives.

**Discussion**

Historically, once a diagnosis of HD is made in a neonate in our institution a colostomy is done. The patient may require a two-stage or a three-stage procedure before he may be able to defecate normally. This can result in several hospitalizations, necessitating one or several incisions on the abdominal wall. Financial burden on the family will also be heavy. Due to their smaller pelvic cavities and limited allowable blood loss, neonates were often offered colostomies.

Our initial report on our experience on neonatal transanal endorectal pull through shows the following advantages over the classical abdomino-perineal pull through done in older children: absence of obvious incisions, less intra-operative blood loss, early feeding and resultant lower financial burden (less number of admissions and shorter hospital stay) to the family of the patient. The procedure was also found to be safe.<sup>5</sup>

Compared to other studies, our early complication rate was acceptable, if not better.<sup>8-10</sup> The most important measures of outcomes for HD procedure are continence and constipation.<sup>11-14</sup>

After more than a decade of experience with the procedure in neonates, the author aimed to evaluate its late complications. The late complications included incidence of enterocolitis. The prevalence of enterocolitis was comparable with others (Table 5).

Teitelbaum, in his study on neonatal pull through, quoted its total rate of enterocolitis as 42.3%.<sup>9</sup> In his other study involving neonates and older children, the

**Table 5.** Comparison of late complications of various reports on results of TEPT.

Complication	Catangui	Teitelbaum <sup>9</sup>	Cato-Smith <sup>8</sup>	Dahal <sup>10</sup>
Enterocolitis	4/54 (7.4%)	9/12(75%)		4/131(3.05%)
Soiling	Grade 2 soiling 5/26(19.23%)	All with normal to fair	14/34 heavy soiling (17%)	6/131(4.58%)
Constipation	3/26(11.53%)			2/131(1.52%)

rate of enterocolitis was 75%.<sup>8</sup> Our total rate of enterocolitis of 7.4% was way below their rates.

The rates of constipation of other authors ranged from 3% to 28%.<sup>9,15-18</sup> Our rate of constipation was 11.53%, comparable with other authors utilizing similar technique but their subjects were not only neonates.

The rate of incontinence from 0% to 16% in various series<sup>9,19-20</sup> was lower than our rate of soiling of 19.23%. Our rate, however, included the patients with constipation who later developed soiling. Our rate of soiling without constipation was 7.69%.

## Conclusion

The procedure provided my patients less number of operations and admissions, lesser treatment costs, comparable early and late complications and relatively acceptable rates of soiling and constipation. Only three patients required abdominal incision. This will prompt us to continue utilizing the technique in newborns.

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