

PRIMARY TRANSANAL ENDORECTAL PULL-THROUGH FOR HIRSCHSPRUNG'S DISEASE IN NEONATES- OUR EARLY EXPERIENCE

Pradip Kumar Deuri¹

¹Assistant Professor, Department of Paediatric Surgery, Assam Medical College, Dibrugarh, Assam, India.

ABSTRACT

BACKGROUND

The most common cause of bowel obstruction in the neonates is Hirschsprung's disease. Traditionally Hirschsprung's disease was managed in stage procedure of colostomy, the definitive pull-through followed by closure of colostomy but Primary Transanal Endorectal Pull-Through procedure is a recent development in the concept of the management of Hirschsprung's disease through minimally invasive surgery. In this study we represent our early experience to evaluate the feasibility and safety of Primary Transanal Endorectal Pull-Through for management of Hirschsprung's disease during early neonatal period.

METHODS

Six male and four female neonates with Hirschsprung's disease were included in this study. The age ranged from 3-30 days. All babies presented with Hirschsprung's disease was diagnosed with Barium enema study. The inclusion criteria included radiological transitional zone at rectosigmoid or mid-sigmoid region, weight more than 2.5 kg, abdominal distention response to rectal decompression, no evidence of enterocolitis and no associated major anomaly. This is a retrospective study of early neonates with primary transanal endorectal pull-through procedure done for Hirschsprung's disease in our institute from January 2012 to January 2016.

RESULTS

Six male and four female neonates who were included in the study underwent primary transanal endorectal pull-through. The mean operating time was 60 minutes and mean intra-operative blood loss was 20 ml. The mean length of bowel resected was 16 cms. Patients passed stool between 3rd and 4th day post-operatively. Oral feeding was started on 5th and 6th day post-operatively. The average post-operative hospital stay was seven days. None of the patients had post-operative bleeding, urethral injury, anastomotic leak or retraction of anastomotic sites and enterocolitis. Two patients had perineal excoriation. In this study there was no mortality.

CONCLUSIONS

Primary TEPT is both feasible and safe in the early neonatal period with advancement in paediatric anaesthesia, availability of expert paediatric surgeon, improvement in pre-operative and post-operative management and nursing care. Early results of the postoperative complications and functional outcome are comparable to cases treated with primary or multistage surgery in early neonates or childhood period.

KEYWORDS

Hirschsprung's disease, early neonatal period, primary transanal endorectal pull-through.

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BACKGROUND

Hirschsprung's disease is one of the most common causes of intestinal obstruction in neonates.¹ The diagnosis is often suspected when a newborn presented with fails to pass meconium within the first 24 hours of life, has vomiting and abdominal distension.² Traditionally Hirschsprung's disease was managed by colostomy, followed by one of the definitive pull-through procedure (Swenson, Duhamel, Soave), then

colostomy closure. Since Swenson first described the pathological basis of the disease, then there have been extensive advances in the management and correction of Hirschsprung's disease.³

Primary Endorectal Pull-through in the newborn period was first described by So et al in 1980 and then recent onwards paediatric surgeons are performing primary pull-through procedures without a colostomy in the neonatal period.⁴ Now a day's most of Hirschsprung's disease presents within the neonatal period and early diagnosis makes it possible to undergo definitive primary surgery at a neonatal period before they are debilitated by recurrent attack of enterocolitis.

Primary Transanal Endorectal Pull-through procedure was almost concurrently described by de la Torre-Mondregon, Ortega-Salgado 1998⁵ and by Langer et al 1999⁶ respectively. This procedure is particularly beneficial in neonate as the dissection is easier due to the fact that the

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Corresponding Author:

Dr. Pradip Kumar Deuri,

Department of Pediatric Surgery,

Qtr: APQ-13, Lane N,

AMC Campus, Assam Medical College,

Dibrugarh-786002, Assam, India.

E-mail: drpradip11@gmail.com

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colon above the aganglionic segment is not much dilated and episodes of enterocolitis are less frequent.⁷

Primary Transanal Endorectal Pull-through is safely performed during the neonatal period and early infancy and it has the advantage of shorter hospital stay (and therefore less costs), avoid colostomy with its associated complications with satisfactory postoperative results especially for continence.⁸

The aim of this study was to represent our early experience to evaluate the feasibility and safety of Primary Transanal Endorectal Pull-through with respect to peri-operative, post-operative and early outcome for management of Hirschsprung's disease during the early neonatal period.

METHODS

Six male and four female neonates with Hirschsprung's disease from January 2012 to January 2016 were retrospectively studied. All the neonates presented with intestinal obstruction with age ranged from 3-30 days. Initial the neonates were managed by nasogastric aspiration, intravenous fluids and rectal washouts, followed by primary definitive surgery.

The neonates with clear evidence of radiological transition zone at the recto-sigmoid or mid-sigmoid region, weight more than 2.5 kg, no evidence of enterocolitis or sepsis and no associated major anomaly were included in this study.

The neonates with bowel obstruction not responding to bowel decompression, preoperatively known long segment involvement or with major associated anomalies and severe enterocolitis were excluded from the study. The diagnosis was made with radiologically by water soluble contrast study confirmed recto-sigmoid or mid-sigmoid Hirschsprung's disease.

All the neonates were undergone Primary Transanal Endorectal Pull-through. Pre-operative bowel preparation was done using warm saline until effective decompression of the bowel was achieved.

Surgical Technique

After induction of general anaesthesia, the patients were given injection ceftriaxone intravenously. Foleys urethral catheter and nasogastric tube were inserted. The patient was placed in lithotomy position and everting sutures were taken around anus to expose the anal mucosa. (Figure 1) The anal mucosa was incised circumferentially using needle tip cautery approximately 0.5 to 1 cm from the dentate line. Dissection was started in the submucosal plane for about 1-2 cm and then converted to full thickness of rectal wall beginning posteriorly and then continued circumferentially. The rectum was mobilized by working on the surface of the rectal wall using cautery. The dissection could be performed easily once the peritoneal reflection was reached and the rectum and sigmoid colon were mobilized out of anus leaving a muscular cuff of 1-2 cm. The dissection was continued till the transition zone and the proximal dilated colon was clearly identified. The aganglionic colonic segment was resected 3-

5 cm proximal to the transition zone (Figure 2) and resected length of about 15 cm (Figure 3) followed by a full thickness colo-anal anastomosis was performed with Vicryl 5-0. Nearly 12-16 stitches were taken to complete the colo-anal anastomosis. (Figure 4) Antibiotic soaked paraffin gauze was kept as anal pack and everting sutures were removed. The resected segment was sent for histopathological confirmation of aganglionosis.



Figure 1. Anal Exposure Using Traction Stitches



Figure 2. Anorectal Mucosectomy 0.5 to 1 cm Above the Dentate Line



Figure 3. Full Thickness Mobilization of Colon After Circumferential Division of Cuff



Figure 4. Coloanal Anastomosis

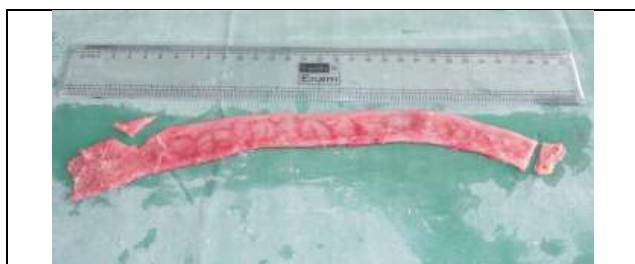


Figure 5. Bowel Resection Length with Provided Specimen for Histopathology

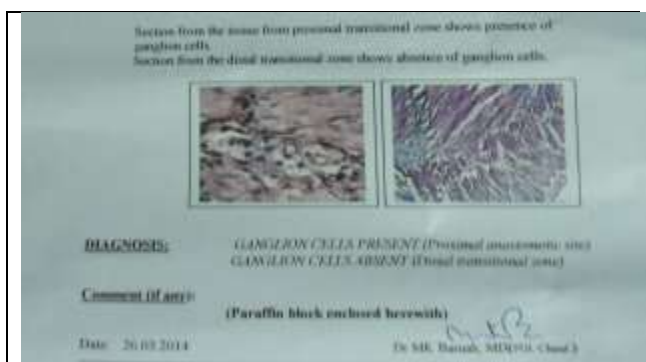


Figure 6. Histopathological Report Shows Presence of Ganglion Cell

The patients were kept nil by mouth for 4-5 days depending on bowel recovery and the feeding was slowly advanced to normal. The first rectal examination was performed three weeks after the operation with Hager’s dilator no. 6 and the anastomotic site was assessed for any stricture, stenosis, or pus discharge. All the patients were put on anal dilatation programme twice daily for 3 months followed by daily for 6 months to 1 year. There after patients were followed up every 14 days for 3 months and assessed for the pattern of stooling, enterocolitis and weight gain. After 3 months, the follow up was continued at monthly intervals. The total follow-up period ranged from 6 months to 2 years.

RESULTS

In this study Primary Transanal Endorectal Pull-through were underwent in six male and four female neonates. The mean weight was 2.5 kg (range 2.4 – 3.5 kg).The age at

operation was range from 3 to 30 days and most common clinical features were delayed passage of meconium, vomiting and abdominal distension.

All the patients were diagnosed Hirschsprung’s disease radiologically transitional zone at recto-sigmoid or mid-sigmoid junction. All the patients’ aganglionosis level was recto-sigmoid.

The mean operative time was 60 minutes (range 60 to 110), the average bowel resection length was 15 cm (range 10 to 20 cm). (Figure 5) The blood loss during intra-operative period was 20 ml (range 10 to 20 ml). (Table 1) In the 10 patients, the final histopathology report corresponded to the clinico-radiological findings. (Figure 6)

| | Present Study (n-10) | Bhatia et al (n-5) | Ali (n-28) | Hassan (n-42) |
|----------------------------|-----------------------------|---------------------------|-------------------|----------------------|
| Operation time | 60 min (60-110) | 68 min (60-120 min) | 90 min | 80 min (75-100 min) |
| Intra-operative blood loss | 20 ml (10-30 ml) | 20 ml (10-30 ml) | | 20 ml (15-30 ml) |
| Bowel resection length | 15 cm (10-20 cm) | 14.8 cm (12-20 cm) | 14-35 cm | 20.8 cm (15-30 cm) |

Table 1. Comparison of Operative Finding with Other Studies

First oral feeding was started 4th to 5th post-operative day onwards. All the patients pass stool 3rd to 4th day post-operatively. The average length of hospital stay was 5 to 7 days.

There was no mortality in this study. None of the patient had intra-operative urethral injury, post-operative bleeding, anastomotic leak or retraction of anastomotic site. Perineal excoriation was observed in two patients and was managed conservatively with frequent application of zinc oxide cream. (Table 2)

No enterocolitis was observed in this study.

| | Present Study (n-10) | Bhatia et al (n-5) | Ali (n-28) | Hassan (n-42) |
|-----------------------|-----------------------------|---------------------------|-------------------|----------------------|
| Enterocolitis | Nil | 1(20%) | 4(14.3%) | 5(11.9%) |
| Perineal excoriation | 2 (20%) | 3 (60%) | 15 (64.3%) | 11 (26%) |
| Anastomotic leak | Nil | Nil | 1(3.6%) | Nil |
| Anastomotic stricture | Nil | Nil | 2 (7.1%) | 2 (4.8%) |

Table 2. Comparison of Post-Operative Complications with Other Studies

DISCUSSION

In children the most common surgical disease is known as Hirschsprung’s disease. Rectum and Recto-sigmoid junction is common segment involve in majority of Hirschsprung’s disease. The increasing number of paediatric surgeons it has been recognized that the routine use of colostomy is unnecessary over multistage procedure and it is better to perform single stage procedure at an early age. Minimal

invasive surgery is the recent development to perform as primary Transanal Endorectal Pull-through procedure for Hirschsprung's disease and in neonate it is feasible and safe.⁹ Over traditional multistage procedure single stage procedure can avoid colostomy and its complications with reduce hospital and affordable cost over multistage procedures. Primary Transanal Endorectal Pull-through procedure is particularly beneficial in neonate as the dissection is easier due to the fact that the colon above the aganglionic segment is not much dilated and episodes of enterocolitis are less frequent.⁷ and the colon is loosely fixed to the retroperitoneum allowing longer segments of the colon can be resected through the anus in contrast to more laborious dissection in older child.^{1,10} In our study the average length of bowel resected was 15 cm (Figure 2, 4) which is comparable to other studies.^{1,7,9} (Table 1)

In this study the intraoperative blood loss and operating time are also lower in neonates as compared to older children because of less dilated colon above the aganglionic segment of colon, lesser fat laden mesentery, presence of less adherent mucosa with easily controllable blood vessel and less episodes of enterocolitis.⁷ (Table 1)

In our study we followed used of a shorter mucosectomy with a shorter muscular cuff measuring 1-2 cm above the dentate line⁸ to avoid initial description of transanal endorectal pull-through with a long seromuscular cuff leading to symptom of obstruction, constipation and enterocolitis.

In our study no issue found regarding significant stretching of the anal sphincters during surgery with its potential impact on continence in later life. Majority of case we found it is transient and bowel movements become normal within 3 weeks to 3 months.¹¹

In our study no enterocolitis was found may be due to use of a shorter mucosectomy with a shorter muscular cuff measuring 1-2 cm above the dentate line. However Hackman et al reported that presence of stricture, adhesion lead to intestinal obstruction may increase the risk of and subsequent enterocolitis.¹²

CONCLUSIONS

Primary Transanal Endorectal Pull-Through is both feasible and safe in the early neonatal period due to advancement in paediatric anaesthesia, availability of expert paediatric surgeons, improvement in pre-operative and post-operative management and nursing care. During early neonatal period, Primary Transanal Endorectal Pull-Through is easy and bloodless, does not cause visible scar, and has short intra-operative time and postoperative hospital stay. Results in early functional outcome comparable to cases treated with

primary or multistage surgery done in early-neonate/childhood period.

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