Journal of Paediatric Surgeons of Bangladesh (2017) Vol. 8 (1): 20-23
Official organ of the Association of Paediatric Surgeons of Bangladesh

Journal of Paediatric Surgeons of Bangladesh

*Original Article*

# LAPAROSCOPIC ASSISTED TRANSSANAL ENDORECTAL PULL-THROUGH PROCEDURE FOR HIRSCHSPRUNG'S DISEASE IN CHILDREN. OUR EXPERIENCE

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**Abstract:**

**Background: Trans anal endorectal pullthrough procedure is primarily performed for rectosigmoid aganglionosis, generally with excellent results. There is evidence that overstreching the anus and tension traction in the sigmoid colon during the procedure could impair the continence of the patient. Trans anal pull-through for Hirschsprung's disease with laparoscopic assistance is gaining popularity. We describe our early clinical results after laparoscopic assisted endorectal colon pull-through for Hirschsprung's disease.**

**Materials and methods: From july 2013 to june 2016 ,a total of 28 patients were treated with Hirschsprung's disease randomized for laparocopic assisted trans anal pull-through. Of which male were 18 and female 10 . Age ranged from 19 days to 3.5 years. The technique was 3 small (5mm) abdominal ports. A colon pedicle preserving the marginal artery is fashioned laparoscopically. The rectal mobilization is performed transanally using an endorectal sleeve technique. The anastomosis is performed transanally 1cm above the dentate line.**

**Results: The median operative time was 125 min (range 110-180min). Follow up period 15 days to 12months. Overall functional outcome was good in all cases. Three cases developed mild enterocolitis. One patient developed fecal incontinence and soiling.**

**Conclusion: Laparoscopic assisted colon pull-through for Hirschsprung's disease is simple and easy to perform with minimal dissection which cause less damage to the internal sphincter and pelvic nerves.**

**Key words: Laparoscopic assisted, Hirschsprung's disease,**

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## Introduction:

Hirschsprung's disease (HD) is a developmental disorder of the enteric nervous system characterized by absence of ganglion cell in the myenteric and submucous plexuses along the variable length of the intestine. Treatment of Hirschsprung's disease has always been a challenging task for the pediatric surgeon. Numerous surgical technique have been developed for the management of this disorder, which in itself implies that none of the techniques achieve perfect functional results. Dela Torre et al reported the first totally primary transanal endorectal pull through without laparoscopy assistance and it has gained rapid acceptance in many pediatric surgical centers[1]. Georgeson et al describe a minimally invasive approach using laparoscopy for colonic biopsies and mobilization followed by transanal endorectal dissection of the rectum and coloanal anastomosis[2]. In 1999 a multicentric study done by him and described the technique of primary laparoscopic-assisted endorectal pull-through for HD as a new gold stsndard[3]. The benefits of totally transanal endorectal pull-through procedure include utilization of single incision and avoidance of abdominal wall scaring, with the potential for better cosmesis and reduce post operative pain, a shorter operating time and the suitability of this technique for use in resource poor seetings which may lack laparoscopic equipment[4,5]. Potential disadvantages regarding a totally transanal approach include the possible impact of prolonged dilatation of the sphincter muscle on fecal continence [6]. We describe our early clinical results after laparoscopic assisted endorectal colon pull-through for Hirschsprung's disease.

## Materials and methods:

Twenty eight patients with Hirschsprung's disease underwent surgery with laparoscopic assisted trans anal pull-through technique were randomly selected

during a time interval between july 2013 to june 2016. Of which male were 18 and female 10 . Age ranged from 19 days to 3.5 years. The diagnosis was confirmed by suction rectal biopsy, full thickness rectal biopsy and colonic biopsy during laparotomy. Contrast enema was done to know the approximate extent of the disease. Preoperaive preparation of patient include oral and parenteral antibiotics according the usual practice of a surgeon. Rectal irrigation done in all patients both in primary pull through and patients with colostomy 2 days prior to surgery. After endotracheal intubation patients is placed in supine position with head end tilled down and surgeon standing on right side of the patient. Patients were prepped and drepped from nipple to toe, bladder was catheterized. Pneumoperitoneum was created using 5mm supra umbilical port by open technique. Pressure of 8to12 cm of $H_2O$ were tolarated in all age group. Two other 5mm working ports were placed on both flanks. After placement of trocher transition and dilated zone was identified visually in case of primary pull-through and biopsy silk mark in patients of colostomy. A window was made at the level of dilated portion of gut between the colon and the superior rectal vessels. These vessels were divided with bipolar cautary or ligation with silk. The narrow portion of intra abdominal colon was then dissected circumferentially with monopolar hook cautary, keeping close to the rectum. The avascular plane behind the rectum was dissected by monopolar hook cautery, The rectum was dissected anteriorly 1-2 cm below the peritoneal reflection

As we have no facilities of frozen section biopsy, particularly in primary pull-through the mesenteric dissection was extended proximally 7-8 cm proximal to funnel shaped transition zone carefully preserve the marginal artery. But in patients with colostomy where biopsy mark of ganglionated site was indentified for mobilization .In patient with a low rectosigmoid transition zone, very little dissection was needed. In other patients, only the sigmoid colon was mobilized. In a few patients, the lateral fusion fascia was divided upto the splenic flexure and the colo mesentery was mobilized while carefully preserving the marginal artery. These mobilization was carried proximally until the colon pedicle was long enough to reach deep into the pelvis without tension.

Once the laparoscopic dissection of the colon and the rectum had been completed, the perineal dissection was started by placing the 6 -8 traction sutures to evert the anus and expose the rectum. A circular incision was made in the rectal mucosa 5mm above the dentate line.

Fine silk traction sutures were placed in the proximal lip of the exposed mucosal edge, creating a circumferential submucosal plane, which was further developed using blunt and sharp dissection. As soon as the perineal and laparoscopic dissection plane had been joined circumferentially, the rectum and colon were pulled down through the anus, until the dilated and ganglionated portion of gut presented in the anus. The short muscular cuff was usually divided posteriorly to allow more room for the developing neorectal reservoir. Pneumoperitoneum was reintroduced and the colon pedicle was inspected for the internal herniation or twisting. The colon was transected and send for histopathology and a circumferential one layer anastomosis between the neorectum and anus was fashioned using absorbable sutures. Then the port site wound was closed.

**Result:**

Laparoscopic assisted trans anal pull-through operation were performed in 28 patients between July 2013 to June 2016. Of which male were 18 and female 10 . Age ranged from 19 days to 3.5 years. Twenty children with multiple biopsy proven Hirschsprung's disease who had been operated on diverting stoma underwent laparoscopics assisted colon pull-through. Primary laparoscopic assisted colon pull-through done in 8patients. Sixteen patients had a transition zone that was distal to the descending colon and remaining 12 patients had transition zone at classical recto-sigmoid junction. The operating time was varied according to the length of aganglionic segment ,median operative time was 125 min (range 110-180min). Intra operative blood loss was minimum and no need of conversion. Oral feeding started day after surgery in patients of colostomy (20 patients) and deferred after 72 hours in patients of primary pull-through(8 patients). The mean hospital stay was 5 days (range 4-7 days). Patients underwent digital rectal examination on 10-12$^{th}$ post operative day and dilation started on 12$^{th}$ post operative day. The colostomy was closed 6 wks after pull-through. Patients were followed up on a monthly basis for the first 3months and than every 3 months thereafter.

We had followed up with the patients for a period of upto 1 year after colostomy closure.

Post operative enterocolitis developed in 3 patients that respond to conservative measure. Perianal skin excoriation developed in 4 patients that respond to zinc oxide ointment application. There was no instance of anastomosis leak. Anastomotic stricture developed in 4 patients amoung them 2 patients respond to regular dilatation and another 2 patients needs stricturotomy during colostomy closure.

There were no complications in relation to the use of laparoscopy in these patients. Some patients developed hypercarbia intraoperatively that responded to modest hyperventilation. No inadvertent injury to the intra abdominal structure. No port site wound infection or hernia.

Most of the patients had frequent stools immediately after their pull-through procedure and those after colostomy closure , apparently because of the small size of the neorectal reservoir. All 28 patients were visited to our follow up clinic and reported to have satisfactory continence.

**Fig.-1:** *Port placement*

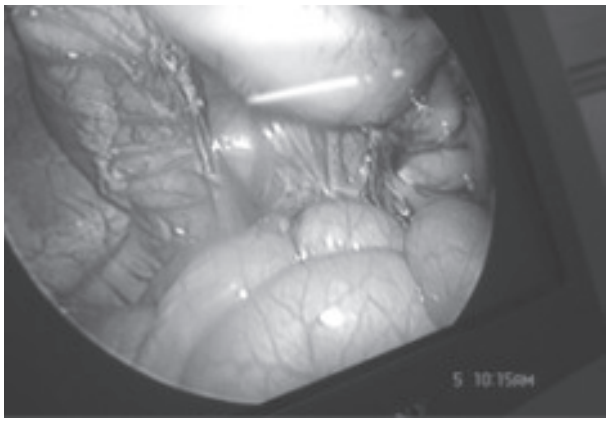

**Fig.-2:** *Laparoscopic dissection of aganglionic portion of colon.*

**Fig.-3:** *Transanal portion begins.*

**Fig.-4:** *Segment to be resected.*

**Discussion:**

The endorectal pull-through procedure avoids injury to pelvic nerves by remaining with in the muscular culf, with lower incidence of constipation and micturation disturbance[7]. Because many of the benefits of the procedure can be attained by Transanal dissection alone, the possibility of performing the pull-through procedure without laparoscopic assistance seems attractive. In few of the cases, we, as well as others, have performed the colon pull-through tranasanally without laparoscopic assistance.

Laparoscopic assistance in the management of Hirschsprung's disease was initited by Georgeson et al in 1995[2]. It has gained the popularity when Georgeson et al published the multi centric study on 80 patients in 1999[3]. Laparoscopic devascularization and mobilization of the intraabdominal aganglionic segment of rectosigmoid colon increases the mobility of the rectum and makes the end point of the endorectal dissection more definitive. Because the endorectal dissection is facilitated by laparoscopic mobilization of the rectosigmoid colon, there is less

potential for overdilating the internal anal sphincter and thereby weakening the patient's fecal continence mechanism during the transanal dissection[3]. It was described by some pediatric surgeons that the role of laparoscopy in the interventional surgery for Hirschsprung's disease is limited to those with long aganglionic segment based on contrast enema study[8,9]. In our series 16 patients had a transition zone that was distal to the descending colon where laparoscopic approach also provides greater versatility in fashioning the ganglionated pedicle proximal to the aganglionic colon and allows for completion of the pull-through. Laparoscopic-assisted colon pull-through appears to reduce the postoperative recovery time and perioperative complications . Post operative enterocolitis developed in 3 patients in our seies that respond to conservative measure. Anastomotic stricture developed in 4 patients amoung them 2 patients respond to regular dilatation and another 2 patients needs stricturotomy during colostomy closure. Most of the patients had frequent stools immediately after their pull-through procedure and those after colostomy closure.

**Conclusion:**

Laparoscopic-assisted transanal endorectal pullthrough can be performed in patients of colostomy as well as in single stage for most patients with Hirschsprung's disease. Laparoscopic-assisted endorectal pull-through sets a new standard for minimizing perioperative complications . Long-term assessment of fecal continence will be necessary to determine the overall utility of this procedure.

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