



MODIFIED MARTIN DUHAMEL VS MARTIN DUHAMEL PROCEDURE – A COMPARISON STUDY

Paediatric Surgery

Dr. Deen Dayal Sharma

Assistant Professor, Department of Pediatric Surgery, R.N.T Medical College Udaipur, Rajasthan, India.

Dr. Nimil Mary Thomas*

P.G Resident, Department of General Surgery, R.N.T Medical College Udaipur, Rajasthan, India. *Corresponding Author

ABSTRACT

Background: In majority of Hirschsprung disease cases following Duhamel Martin procedure due to incomplete excision of the colorectal spur after side-to-side anastomosis, it acts as a diverticulum which can result in forming fecaloma resulting in obstruction. **Aim:** A study regarding comparison between the original and modified Martin-Duhamel procedure done for Hirschsprung's disease in terms of post-operative complications, cost in infants. **Material & Methods:** In a 5-year period (April 2017 to March 2022) among 22 children diagnosed with Hirschsprung's disease, 12 patients were operated in the modified method of Martin -Duhamel procedure and 10 in the conventional method. **Results:** Among the 22 patients 12 underwent the modified Martin Duhamel procedure and 10 the conventional method, both the procedures showed similar outcome. **Conclusion:** Modified Martin Duhamel procedure is cost effective and time saving. This modified method was very satisfactory as the complications were mild and had better outcome. We believe that this method represents a significant advancement in the management of Hirschsprung's disease.

KEYWORDS

Duhamel-martin procedure, Hirschsprung's disease, infant

INTRODUCTION

Hirschsprung's disease is malformation of the hindgut, characterized by congenital aganglionosis in the distal colon usually manifested as megacolon [1, 2]. Usually, it is diagnosed shortly after birth because of absence of meconium passage within 48 hours, abdominal distension, bilious vomiting. Many modifications have been developed in the treatment of the disease including laparoscopy, one-stage Martin-Duhamel procedure. In our hospital it is usually done in a two-stage approach - initially a diverting proximal loop colostomy with incision biopsy of the proximal and distal segment for confirming the diagnosis, followed by at an age of 1 year of aganglionic segment and then pull through of proximal segment thus restoring the normal bowel continuity [3]. The common complications following Duhamel procedure is that due to incomplete excision of the colorectal spur after side-to-side anastomosis, it acts as a diverticulum which can result in forming fecaloma resulting in obstruction. We have developed a modified method of Duhamel procedure which can avoid these complications and is also a cost-effective approach.

MATERIALS AND METHODS

The study was undertaken after approval from the ethical committee and obtaining informed consent from patients. We conducted a 5-year study in 22 patients and this modified method of Duhamel procedure was done in 12 patients and in the rest conventional method. To obtain homogenous results few patients were excluded from the study such as extended aganglionosis, trisomy 21 and other associated anomalies.

Operative Procedure

After proper preoperative preparation including meticulous bowel preparation with distal wash, the procedure is carried out with patient in the lithotomy position. The abdomen is opened through a hockey stick shaped incision extending through the colostomy site. The rectum is divided just above the peritoneal reflection and in our modified method the rectal stump is not closed. (Fig 1). Following resection of aganglionic segment, the proximal end of the stoma is sutured, ends of the sutures are left long so that they may be grasped with the clamp subsequently to be inserted through the rectum. Presacral dissection was carried out up to the pelvic diaphragm. The anus is gently dilated, and the rectum is thoroughly re-irrigated with sterile saline solution. A stab wound is then made in the posterior wall of the rectum 1 cm above the dentate line extending into the space previously created by the presacral dissection of the abdominal approach. A curved hemostat is then inserted, and the lower end of colon is grasped and drawn through the stab wound into the lumen of the rectum. Polyglactin sutures are then placed along the circumference of the stab wound, & end to end anastomosis with rectum & colon done. Sized stapling device, is then introduced from below with the two limbs of the instrument placed on either side of the common double wall (rectum and ganglionated colon). The arrowhead

of the stapler is introduced into the open end of the rectum in order to utilize the whole of its length of stapler sutures (Fig 2). The instrument is locked and the central cutting bar advanced, completely dividing the common wall, both rectum and colon. As the stapler has been applied only from below complete division of the common wall is achieved, on comparison with firing from both above and below as originally described in conventional method. Through the abdomen approach open end of rectum is sutured with colon as end to side.

Patients are kept nil per oral for 5 days and then discharged over the next 2–3 days when oral intake is adequate. They are followed up routinely a week later and every month for 3 months. They are seen once in 6 months and then yearly at least till the age of five.



Fig. 1: Aganglionic segment is excised, and the rectal stump is not closed instead clamped with Non crushing intestinal clamp

Fig. 2: The anastomotic stapler is introduced from below (see the arrowhead in the rectal stump)



Fig. 3: 80mm - 3.8mm Auto Suture Loading Unit

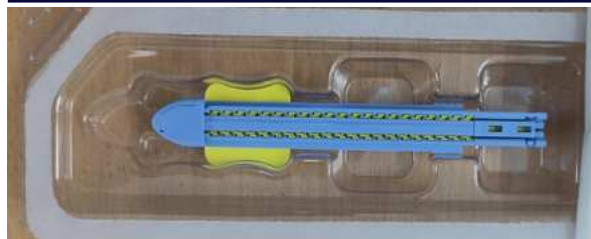


Fig. 4: 80mm - 3.8mm Auto Suture Loading Unit



Fig. 5: Linear Cutting Stapler



Fig. 6: Linear Cutting Stapler

RESULTS

Among the 22 patients 12 underwent the modified Martin Duhamel procedure and 10 the conventional method, both the procedures showed similar outcome. No intraoperative complications noted in both groups. Wound infection occurred in 1 patient in the immediate postoperative period in the modified method. Although statistically insignificant, 3 patients operated with conventional and 2 with modified methods were readmitted with enterocolitis. Anastomotic leak occurred in 1 patient operated with conventional and 1 with modified methods were managed by laparotomy and primary repair. By 2-5 years all children are toilet trained, continent and growing well.

COMPLICATIONS	MODIFIED METHOD	DUHAMEL MARTIN METHOD
1. Wound Infection	1	2
2. Enterocolitis	2	3
3. Anastomotic leak	1	1

DISCUSSION

Hirschsprung's disease is a congenital disorder with an incidence of 1:5000, with a male to female predominance of 4:1 [4, 5]. It is characterized by an absence of enteric ganglion cells from the distal intestine, causing chronic functional bowel obstruction [6]. Although this can affect any length of bowel from the anus proximally, 80–85% of cases are limited to the recto sigmoid [7]. Although contrast enema is useful in establishing the diagnosis, full thickness rectal biopsy remains the criterion standard. Operative management involves resection of the abnormally innervated bowel. Despite surgical treatment, postoperative defects in bowel function are common, and highly specialist long-term aftercare that includes transition to adult care providers is required. Prerequisites for surgery is that it is usually performed in children >12 months of age with minimum weight of 10 kg [8, 9, 10].

Usually in conventional method the rectum is closed with sutures /staples, so while placing the stapler device the tip of arrowhead would touch the closed stump thus resulting in incomplete excision of the common wall. In or modified method the arrowhead tip of the stapler is introduced beyond the rectum margin (as it is not sutured) thus excising the common wall which includes the wall of rectum and colon resulting in new rectal ampulla with anteriorly the old rectal wall and posteriorly the ganglionic segment of colon is in half of its circumference. Followed by which rectal stump is closed and the side to end anastomosis done through the abdominal approach. By this procedure the complication of colorectal spur due to which fecaloma

leading to obstruction can be minimized, reflex control of defecation is also assured since the original rectum remains and forms the anterior half of the new rectum. The posterior half is made up of colon containing normal ganglion cells which provides adequate peristalsis and propulsion of feces, this the complication of constipation is also less. On cost basis the whole procedure can be done with single cartridge around 8000-10000 rupees and is also time saving not to use 2nd cartridge

CONCLUSION

Protocol based approach to patients with Hirschsprung's disease is required for the optimization of results. Modifications of the conventional Martin Duhamel procedure are cost effective and time saving. This modified method was very satisfactory as the complications were mild and had better outcome.

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