New method of hand anastomosis to complete the Duhamel operation for Hirschsprung's disease

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ABSTRACT

Objective/Purpose: This paper describes a new method of hand anastomosis to complete the Duhamel operation for Hirschsprung's disease (HD). **Methodology:** All patients had diagnosis of Hirschsrung's disease confirmed by rectal biopsy and had defunctioning colostomy. At the definitive operation, the ganglionic bowel was brought down in a retro-rectal position and anastomosed at the anal canal just above the dentate line. At this anastomosis, the sutures at 11 and 1 o'clock were left long as stay sutures. An incision was then made down the new bowel at the antimesenteric border from the pelvic brim. Another incision was made down the back of the native rectum. A long-curved artery forceps was then passed into the incision in the native rectum out of the anal canal. This forceps was now hooked round the anastomosis at 12 o'clock and further pushed in until the point appears through the colotomy in the ganglionic bowel. The two layers of bowel between the forceps were incised. The forceps was now inserted to grab the long sutures at 11 o'clock and 1 o'clock in turn, and delivered through the pelvis. Anastomosis between the edges of the native rectum and the neorectum was then done with interrupted PDS inside and silk outside. **Results:** Seven patients had the procedure done. Age ranged between 4 months and 4 years (mean 3.4 years). They were all males. One patient died early in the series from reaction to postoperative analgesia. Four older patients have bowel motions 2-3 times per day, do not soil at night, and are fully continent. **Conclusion:** This preliminary study shows that hand anastomosis could be used to complete Duhamel operation for patients with HD with satisfactory early results.

Key words: Duhamel, Hirschsprung, operations, soave, Swenson

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INTRODUCTION

Hirschsprung's disease (HD) is a congenital malformation characterized by absence of ganglion cells in the distal bowel beginning at the internal anal sphincter and extending proximally for various lengths.[1,2] The diagnosis is mainly by radiographic studies and histological examination of rectal wall biopsies.[3] Swenson in 1948 revolutionized the curative treatment by completely resecting the aganglionic segment and anastomosing the ganglionic bowel to the anus.[1] The Duhamel[4] and Soave[5] operations have been devised as alternatives. All three operations are performed by their devotees with similar results on bowel function. Morbidity and mortality results in large series of each procedure are similar.[2,6] No one of these three procedures is the s"best" for all circumstances, therefore all three must be in the armamentarium of the current well-trained paediatric surgeon. The Duhamel operation is best suited for a "failed" Swenson operation and virtually the operation of choice for a long-segment HD.[7] It has also been used for primary neonatal pull-through.[8,9] Because the Gastro intestinal (GI) endostapler is required to complete the Duhamel operation, the Duhamel is not being done in many third world countries. Our new method describes a new method to complete the operation so that surgeons who do not have the endostapler and need to do a Duhamel can complete the operation.

An institutional ethics committee approval was secured and patients recruited had consents obtained from their parents to convert to standard Swenson's procedure if there was any technical problem with the new method.

PATIENTS AND METHODS

Preoperative preparation

All patients had diagnosis of HD confirmed by full thickness rectal biopsy and were on defunctioning colostomy. Patients were admitted 4 days before operation. Hemograms, and electrolytes and urea were checked and corrected as necessary. A unit of blood was

cross-matched. Low residue diet was given for 3 days. Only fluid drinks were given the day before the operation. Appropriate doses of thalazole and neomycin sulfate were given orally. Saline enema was given through the stomata twice daily and in the morning of the operation.

Anesthesia

All patients had general anesthesia with endotracheal intubation. Anesthesia was maintained with halothane/nitrous oxide/oxygen. A cephalosporin and metronidazole were given parenterally at induction of anesthesia. A nasogastric tube was passed.

Position

Patients were placed supine. A sandbag was used to elevate the patient's buttocks off the operating table. The area from the nipple to the knees were prepped and draped with sterile towels. Each leg was draped separately with crepe bandage. The colostomy was well covered with sterile gauze to prevent contamination of the new operation. An in-dwelling Foley's catheter was inserted.

Access

A laparotomy was done through a hockey stick-shaped incision, starting as a left paramedian, but ending in the midline of the pubis. The site of bowel desired for the pull-through was marked with a stay suture. The relatively avascular retrorectal space was developed. The rectum was mobilized beyond the coccyx with the index finger. The inferior mesenteric artery and vein were ligated at the pelvic brim. Small-folded gauze on Roberts clamp was passed down the retrorectal space to tent the rectum to expose the dentate line [Figure 1]. Using electrocautery, a semicircular incision was made in the posterior rectal wall parallel to and 0.5 cm above the dentate line, extending for approximately half of the circumference of the rectum. Sutures were placed in all quadrants to maintain traction and orientation. The sponged clamp was then removed. The bowel was resected at the transition zone and both ends closed. The forceps was then passed through the posterior rectal incision into the peritoneal cavity to pull the marked proximal (ganglionic) gut gently down into the rectal incision with its orientation maintained. A colo-anal anastomosis was then done with figure-of-8 PDS suture.

New method of anastomosis

At the colo-anal anastomosis, the sutures at 11 and 1 o'clock were left long as stay sutures. Using a cutting diathermy (to prevent excessive bleeding), a colotomy was made in the ganglionic bowel at the antimesenteric border from just below the pelvic brim toward the anus. The native rectum was also incised posteriorly in the midline under direct vision as far distally as directly visible. The Roberts clamp was now inserted into the lumen of the native rectum out of the native anus. The clamp was now guided into the new anus at 12 o'clock. By continuing insertion, the clamp was delivered through the lumen of the ganglionic bowel. The two layers of bowel hooked up by the Robert's clamp were then cut using the diathermy. The clamp was now used to deliver each of the stay sutures into the pelvis in turn [Figure 2]. Starting from the stay sutures at markers 1 and 2, the full thickness of the walls of the new and native rectum were anastomosed with interrupted PDS on the inside. Interrupted silk suture was used as second layer.

Closure

Surgeons gloves were changed and the pelvis lavaged with warm normal saline. The laparotomy was closed with nylon mass closure. No drains were used.

Postoperative management

Intravenous fluids were continued as necessary. Parenteral gentamycin was added to the cephalosporin and metronidazole for 3 days and oral antibiotics were given for a further 5 days. The catheter was used to monitor urine output for 48 h. The nasogastric tube was

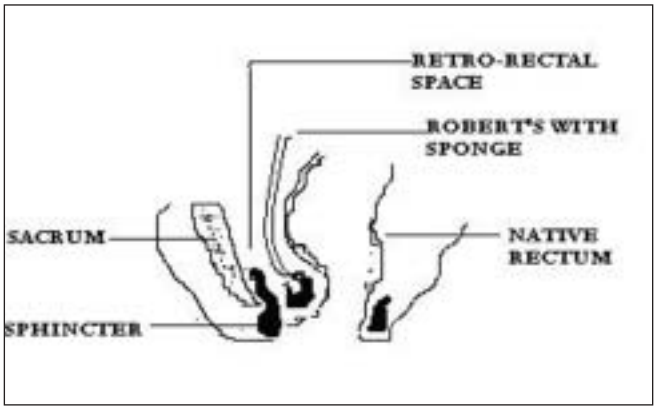


Figure 1: Lateral cross section of the pelvis

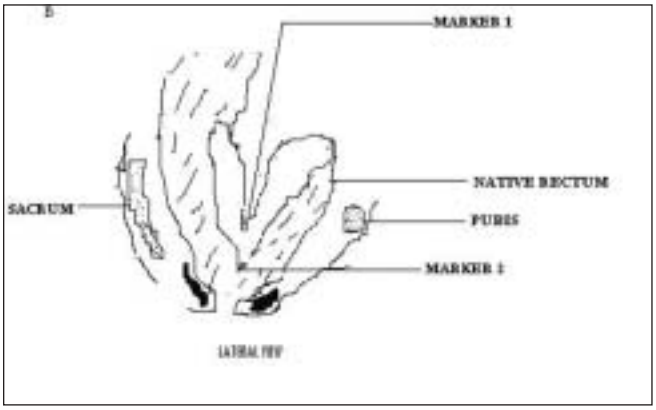


Figure 2: Rectal pouch and pull-through neocolon

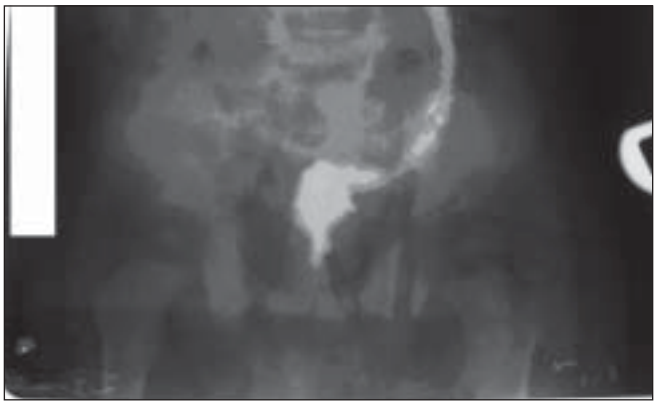


Figure 3: Postoperative limited barium enema showing a ro¬omy rectum

usually removed on the second postoperative day and oral feeding commenced.

RESULTS

Between January 2004 and December 2005, seven patients had this new procedure done. They were all males. Age ranges 4 months-4 years (mean 3.4 years). One patient early in the series died from reaction to postoperative analgesia. Two of the patients are below 3 years and not toilet trained yet. Four older patients have bowel motions 2-3 times per day, do not soil at night, and are fully continent.

DISCUSSION

The goal of all procedures for HD is to place a normally functioning ganglionic bowel within 1 cm of the anal verge. The Swenson, Duhamel, and Soave operations (with different modifications) remain viable options for patients with the rectosigmoid type of disease. The recently developed transanal operation is a modification of the Soave operation[10] with its advantage of avoiding complications of laparotomy; however, a frozen section which is not readily available in many local center must be used. The dissection in the Duhamel operation is less, but the GI stapler may not be readily available in many third world countries because of cost and lack of appropriate paediatric sizes/sets. Many of our patients present late with hugely dilated sigmoid and a faecaloma. Resection of such dilated and hypertrophic rectum may be difficult. Preserving the native rectum is desirable in them. Although repeat Soave and Swenson pull-through can be done, the Duhamel retrorectal operation is probably the safest and the most straightforward approach.[11,12] When applied to neonatal primary pull-through, the Duhamel has less anastomotic complications (leak and strictures), and less morbidity and mortality than either the Swenson or Soave procedures.[6] Personal discussion with paediatric surgeons at various teaching hospitals in Nigeria still shows that many still apply the Kocher's clamp to crush the rectal septum if a Duhamel pull-through is done. Between 1999 and 2005, 15 patients with HD had definitive operations in our unit. Nine patients had Swenson's operation, seven had Duhamel by our new method [Figure 3]. From our preliminary studies bowel function and minor complications (like wound infection) have been the same. The only patient with severe enterocolitis was following Swenson's operation. In conclusion, the Swenson, Duhamel, and Soave operations have stood the test of time in the definitive management of HD. Any of these is not ideal for all circumstances, and a paediatric surgeon must be familiar with all methods. The Duhamel is the operation of choice for a re-do Swenson's, long-segment disease, in neonatal pull-through and desirable in patients who present late in third world countries to preserve their native rectum. Unavailability of the GI stapler may be a hindrance to attempting a Duhamel when indicated. We hope our modification will help surgeons working without the GI stapler (especially in third world countries) and who need to do a Duhamel, to complete their task.

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