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Transanal Swenson's operation for Recto-sigmoid Hirschsprung's disease

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ABSTRACT

Background: Transanal Swenson's operation is a relatively new single-stage procedure for Hirschsprung's disease. The results of this procedure at our centre are presented. **Patients and Methods:** Seventeen patients of recto-sigmoid Hirschsprung's disease underwent single-stage transanal Swenson's procedure. The diagnosis was based on the evidence of a transition zone on barium enema examination. A full thickness incision was made on the rectal wall posteriorly, 0.5 cm above the dentate line. The mobilised segment was resected about 5 cm above the transition zone. Frozen sections were performed whenever the transition zone was not clearly seen intra-operatively. The operation was completed by full thickness colo-anal anastomosis. **Results:** There were fourteen male and three female patients. The ages of the patients ranged from two months to eight years (median 14 months). The median hospital stay was four days (range four to seven days). Two patients required additional abdominal mobilisation. The anatomical transition zone as seen intra-operatively correlated with the pathological transition zone in all the cases. Two patients had episodes of post-operative enterocolitis and the other two patients developed stricture of the anastomosis. The follow-up period ranged from six to 45 months (Mean 35.4 months). Post-operative soiling was observed in all the patients and lasted from two to six weeks (Mean 3.4 weeks). There were no injuries to the surrounding structures. No patient had voiding disturbances and post-void residual urine was normal in all the patients. Initial increased frequency of bowel movements had settled to one to three per day. **Conclusions:** Transanal Swenson's pull through not only avoids laparotomy, but also the problems associated with the muscular cuff of transanal endorectal pull-through. The anatomical transition zone can be safely utilised to decide the resection limits. By a meticulous technique of dissection, injury to the surrounding structures can also be avoided.

Key words: Hirschsprung's disease, recto-sigmoid, swenson, transanal

INTRODUCTION

The surgical management of the recto-sigmoid Hirschsprung's disease (HD) is rapidly changing from the three-staged procedure to a single-stage, transanal, pull-through procedure. This evolution aims at reducing the cost, hospital stay, and the morbidity associated with the staged procedures.[1] Transanal procedures leave no scars; have less post-operative pain, and a shorter hospital stay. The most commonly used technique for the transanal pull-through is endorectal dissection, which leaves a long muscular cuff, which is usually split posteriorly.[2] It is well known that the long muscular cuff that is left behind causes obstruction. A few studies in the literature have shown that the problem of the remnant rectal cuff can be avoided if the transanal resection of the aganglionic segment is performed in the manner described by Swenson; by dissecting the full thickness of the rectum.[3,4] A preoperative rectal biopsy is often used to confirm the diagnosis, but in this study, the clinical, and radiological features were relied upon and their diagnostic efficacy was validated by the findings of the post-operative specimen histopathology. We present our results following transanal recto-sigmoidectomy and colo-anal anastomosis using the radiological signs and the intra-operative features on clinical inspection and palpation, with or without the use of frozen sections.

PATIENTS AND METHODS

From January 2003 to July 2009, 112 patients of HD were seen in the Unit of Paediatrics Surgery. Out of these, 17 children with recto-sigmoid HD were selected to undergo the transanal single-stage Swenson's procedure. All the patients presented with a history of delayed passage of

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the meconium and constipation, and the recto-sigmoid HD was diagnosed by a contrast enema [Figure 1]. Besides recto-sigmoid disease, a good general condition, ability to decompress the colon on pre-operative wash outs, and the absence of the preoperative enterocolitis were the other selection criteria. The patients who required preoperative rectal biopsy for the diagnosis were excluded from the study and the plan of the treatment. Preoperative preparation was done with rectal wash outs using normal saline and antibiotics, as for conventional colorectal surgery. Under general anaesthesia with caudal block, a per-urethral catheter was placed and the rectum was irrigated with dilute Betadine solution. In the lithotomy position, perianal retraction was achieved with an appropriate-sized ring retractor, held in place with the help of six to eight circumferential silk sutures [Figure 2]. At the beginning, a full thickness incision was made on the rectal wall posteriorly, 0.5 cm above the dentate line. The incision was extended all around the circumference, incising the full thickness of the rectal wall. Rectal mobilisation was done by working on the surface of the rectal wall similar to the mobilisation performed for the anorectal malformations using a bipolar cauterisation probe.[5] The dissection could be performed easily once peritoneal reflection was reached, allowing mobilisation of the rectum and sigmoid colon out of the anus without leaving behind any muscular cuff. The proximal dissection was continued till the transition zone was clearly visible. The aganglionic colonic segment was resected; at least 5 cm above the transition zone and a full thickness colo-anal anastomosis was completed. Intra-operative identification of the anatomical transition zone was possible in 10 cases (59%, 10/17) [Figure 3], which was subsequently confirmed by the specimen histopathology in all the ten cases (100%). The absence of ganglion cells, with the presence of hypertrophic nerve fibres were the histological features used for diagnosis. In the remaining seven patients, including two cases with a transition zone at the descending colon, the presence of ganglion cells was confirmed by the intra-operative frozen section.

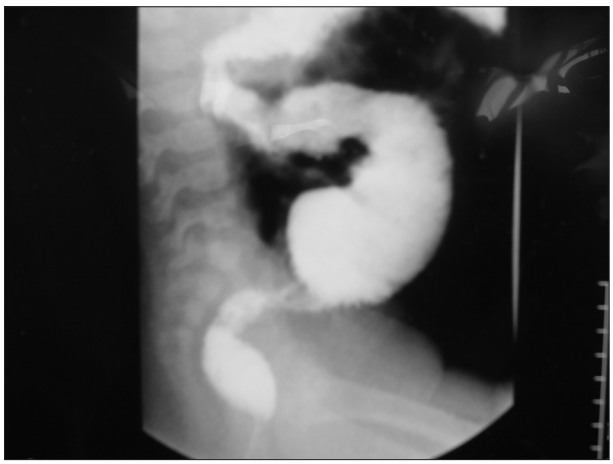


Figure 1: Barium enema examination showing recto-sigmoid Hirschsprung's disease

RESULTS

A total of seventeen children, fourteen males and three females, with age ranging from two months to eight years (Median 14 months) underwent transanal Swenson's procedure. The operating time, including the time taken for the frozen sections, ranged from 120 to 200 minutes (Mean 141.7 minutes). The length of the bowel resections ranged from 15 to 29 cm (mean 18.2 cm). Two patients required abdominal mobilisation of the colon, as the narrow segment extended to the descending colon as well. The estimated blood loss was 40 to 180 ml (average 58.5 ml). Post operatively, seven patients passed stool within 24 hours and the other 10 had bowel movements within three days of the operation. All the 17 children tolerated full oral feeds by the

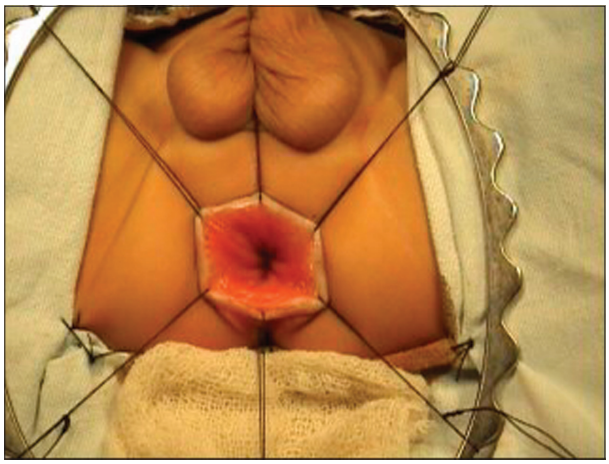


Figure 2: Retractor in place just before start of dissection



Figure 3: Intra-operative delineation of anatomical transition zone

third post-operative day. The hospital stay ranged from four to seven days (median four days). There were no intra-operative or post-operative complications related to the pull-through procedure. None of the children had anastomotic dehiscence, wound infections, or bowel obstruction. Two patients had post-operative enterocolitis, which resolved with antibiotics and rectal wash outs. Two children developed anastomotic strictures. The strictures were evident by the sixth post-operative week and required three and four anal dilatations, respectively, in each patient at intervals of 15 days. The follow-up period ranged from six months to 45 months (Mean 35.4 months). Post-operative soiling of the diapers in between the acts of defecation was observed in all the patients, which lasted from two to six weeks (Mean 3.52 weeks). Most of the patients (14 / 17, 85%) had achieved normal bowel movements within three weeks. No voiding disturbances in the form of incontinence, poor stream, or retention were encountered in the follow-up period, and the ultrasound examination of the urinary bladder did not reveal any post-void residual urine. The initial increased frequency of the bowel movements had settled to one to three per day by the second week and none of the patients complained of recurrent constipation. None of the remaining 15 patients had required post-operative anal dilatations or dietary modifications. The requirement for post-operative pain relief was negligible and all the patients could be started on oral feeds the next day.

DISCUSSION

The first reconstructive operation for Hirschsprung's disease was described by Swenson and Bill in 1948.[2] Since then, various other trans-abdominal pull-through procedures like Soave, Duhamel, and Rehbein have been described. The first report on the transanal procedures for the classic recto-sigmoid HD was published in 1998.[6] The primary transanal pull-through techniques with various modifications have become the standard of care around the world, each having their own proponents.[7] The advantages of one-stage transanal procedures are numerous, ranging from the avoidance of multiple laparotomies and the preliminary colostomy with their associated complications, reduced operating time, less blood loss, no pelvic structure damage, single hospital admission, short hospital stay, decreased need for analgesics, significantly lower hospital costs, and no external scars, and with improved cosmetic appearance,[8-11] without compromising on the functional outcomes[12] Above all, there is a high degree of parental acceptance of the procedure, as it avoids the need to care for a baby with a colostomy. However, the aganglionic rectal muscular sleeve in the transanal Soave's procedure limits the volume of the replaced sigmoid and the rectum.[13] This remnant rectal cuff also causes cuff strictures, diarrhoea, and incontinence.[14-16] Many authors have recommended that this cuff be divided down to the sphincter to avoid constriction of the pulled through bowel, but this has remained controversial.[17] Falchetti *et al* reported that the cuff can roll down during the transanal pull-through and form a constricting ring just above the anastomosis.[18] To avoid this problem, a few authors have used a much shorter mucosectomy with a shorter muscle cuff measuring only 1-2 cm -above the dentate line.[7,18] Gao *et al.* described primary transanal recto-sigmoidectomy with the potential advantages of a partial rectal mucosectomy, shorter muscular cuff, internal anal sphincterotomy, and oblique anastomosis.[19] A few authors have entirely eliminated the sub-mucous dissection and described a transanal Swenson procedure without any residual muscular cuff.[3,4]

We have performed a primary transanal Swenson's procedure in selected cases where the preoperative contrast enema showed a distinct transition zone, with dilatation of the proximal normal bowel. Intra-operatively, we started our full thickness rectal dissection 0.5 cm above the dentate line, so as to remove the whole aganglionic bowel segment, because the aganglionic segment may lengthen over a period of time with the growth of the child, and get predisposed to post-operative constipation problems.[3] We commenced our dissection posteriorly, as no important pelvic structures were encountered in that location. In cases, where the macroscopic transition zone was visible, we removed an extra 5 cm segment of the dilated colon to ensure pulling through of the ganglionated segment of the colon. In doubtful cases, where there was no visible differentiation of the transition zone, a frozen section confirmation was sought. With the limited availability of the resources, this seemed to be the logical course of action, and a preoperative biopsy might not be required in all the cases of HD. The combination of the clinical history and the contrast enema findings was 100% accurate for the diagnosis. Preoperative rectal biopsy also makes the subsequent transanal dissection difficult due to scarring and fibrosis, which may affect the functional outcome.[1] Our data shows that a distinct transition zone, if seen on contrast enema, is sufficient for the diagnosis of HD and further investigations may not be necessary. Thus, a contrast enema may not be a sensitive investigation, but is very specific for diagnosing HD. The location of the transition zone, as seen on contrast

Table 1: Comparison of various series of Transanal Swenson's procedure

Series	No. of patients	Preoperative diagnosis	Frozen section	Leak	EC	Stricture	Dilatations	Diet	OT Time (minutes)	Blood loss (ml)	Urologic problems
Gao *et al*., 2001	33	Barium enema, Manometry, rectal biopsy	Yes	None	6.06%	3.03%	Yes	Modified	160 (85 – 260)	45 (15 – 100)	NA
Weidner *et al*., 2003	15	Rectal biopsy	Yes	None	13%	NA	Yes	Modified	158 (110 – 190)	NA	NA
Peterlini *et al*., 2003	22	Rectal biopsy	Yes	9%	Nil	NA	No	NA	NA	NA	NA
Zhi – lin *et al*. 2008	134	Barium enema or Rectal biopsy	Yes	None	2.9%	NA	NA	Normal	70 (50 – 115)	NA	NA
Sookpotarom *et al*., 2009	27	Barium enema or Rectal biopsy	No	None	11.1%	22.2%	Yes	NA	153 (60 – 400)	NA	1 patient urethral injury
Present series 2010	17	Clinical features and Barium enema	Yes (seven patients)	None	11.7%	11.7%	Yes (two patients)	Normal	141 (120 – 200)	58.5 (40 – 180)	None

NA-Not available

enema, has correlated accurately with the anatomical changes in the bowel in 59% of our patients. The loss of the anatomical transition zone in some of the patients can be due to the use preoperative rectal wash outs. Procter *et al.* had shown that the radiographic transition zone correlates accurately with the level of aganglionosis in 90% cases of recto-sigmoid HD.[20] In 10 out of 17 (59%) patients in whom there was a classical anatomical transition zone, we could successfully avoid the frozen section biopsy, thus reducing the operating time. This becomes very important at the centres where the facility for frozen section is either unavailable or not well standardised. Sookpotarom *et al.* performed the transanal Swenson's procedure in 27 patients, based only on the radiological findings and intra-operative assessment of the anatomical changes, without the use of the frozen section technique. Their assessment showed an accurate correlation with the final histopathological level of the aganglionosis in 85% of the patients.[21] In the present study we showed that when present, the anatomic changes correlate with the pathological level of aganglionosis in 100% of the cases. There was no need to taper the dilated bowel. We did not do an oblique anastomosis,[22] but still did not encounter any obstructive problems. With strict dissection on the rectal wall, injury to the urogenital tract and the pelvic nerves could also be avoided. A comparison of the various studies, in literature, for transanal Swenson's procedure is shown in Table 1.

In conclusion, our initial results are quite promising. Transanal Swenson procedure is a feasible and safe undertaking in the properly selected cases of HD. It not only avoids multiple abdominal operations, but also the problems associated with the long muscular cuff of the transanal Soave's procedure. By adhering to the principle of dissecting on the rectal wall, injury to the surrounding structures and voiding disturbances of the bladder can also be avoided. This approach can be used safely in the patients of recto-sigmoid aganglionosis, which comprises of about 70 – 80% of the cases of Hirschsprung's disease.

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