Trans Abdominal Soave's Pull-Through for Hirschsprung's Disease: Single Stage versus Multi-Stage

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Abstract

Background/ Purpose: The conventional multi-stage modality for the surgical treatment of Hirschsprung's disease incorporates prior colostomy creation, which is now being avoided because of complications associated with colostomy in children. The purpose of this study is to compare trans-abdominal single stage Soave’s pull-through with the multi stage procedure so as to determine the safety and applicability of single stage in our setting.

Materials & Methods: A prospective study was done on all the children that presented with Hirschsprung’s disease at the University of Benin Teaching Hospital, Benin City, Edo State, Nigeria, between January 2003 and December, 2007.

Results: Fifty-three children aged 8 months and 16 years (mean 2 years ± 0.8) comprising 35 males and 18 females with male female ratio 1.9:1 presented with Hirschsprung’s disease during the period between January 2003 and December, 2007. Thirty-eight (71.7%) children underwent single stage Soave’s pull-through while 15 (28.3%) had prior colostomy for at least 6 months, before Soave’s pull-through, which was closed 3 weeks after. Single stage pull-through was cost effective and more acceptable to the parents. When complications recorded among children who had single stage pull through (ugly abdominal scars, wound infection and post operative anal prolapse) were compared with those that had multi-stage pull through, an extremely significant statistical difference was observed (P<0.0001). However, no significant difference was observed when post operative anaemia, anal stenosis, pelvic collection and post operative bowel dysmotility were compared between the two groups (P=1.0000). Overall, of the 38 children who had single stage pull through, 1 (2.6%) mortality was recorded, while of the 15 that had multi-stage Soave’s pull-through 2 (13.3%) mortality was recorded.

Conclusion: Trans-abdominal single stage Soave’s pull-through is safe, applicable, cost effective, and has a lot to offer in this sub region.

Index Word: Hirschsprung’s disease, Soave’s Pull-through, Single versus multi-stage.

INTRODUCTION

Hirschsprung’s disease, congenital aganglionosis, is a common cause of intestinal obstruction in children. Since its first description by Harold Hirschsprung in 1896, various modalities of treatment have been described by many authors. The initial workers used three stage operations modality which included creation of a prior defunctioning colostomy, followed by pull-through and finally, closure of the colostomy. The three basic methods of pull-through described by Soave,
Swenson and Duhamel have been modified over the years by different authors but each essentially entails resection of the aganglionic segment with the proximal normally ganglionated bowel segment used for the pull-through with differences in the types of coloanal anastomosis.1

In many hospitals in sub-Saharan Africa, particularly the rural hospitals, the facilities and manpower required for extensive neonatal surgery, and placing clinically unstable children under general anaesthesia for long hours are not available, hence colostomy which is fast to create is commonly used. Even when the children with Hirschsprung’s disease present in stable clinical state, an initial colostomy is created because it is believed that the atonic proximal segment needed to regain its tone before pull-through and the distal anastomosis needed protective colostomy.2-5 However, the morbidities and mortalities associated with colostomy creation are enormous, and this resulted in many centers avoiding its use, and preferring the one stage pull-through.5-8 Although many authors9,10 in developed countries and sophisticated centers in this sub region have reported encouraging results with one stage trans-abdominal, and even one stage trans-anal pull-through for Hirschsprung’s disease, their use are still limited to a few centers. The importance of a study on one stage trans-abdominal Soave’s pull-through in this sub region that will limit the use of colostomy and its associated complications cannot be overemphasized.7

The aim of this five-year prospective study was to compare the outcome of single-stage trans-abdominal Soave’s pull-through with the conventional multi-stage Soave’s pull-through that incorporates prior colostomy creation so as to determine its safety and applicability in this sub region.

PATIENTS AND METHODS

This 5-year prospective study was undertaken at the University of Benin Teaching Hospital, Benin City, Edo state, Nigeria, between January, 2003 and December, 2007. Patients were referred to the unit from hospitals in the state and neighboring states. There were three consultant paediatric surgeons in the unit during the period. All patients that presented with Hirschsprung's disease had trans-abdominal Soave’s pull-through after radiological and histological confirmation. The children that presented during the neonatal period, in poor clinical state and unfit for long exposure to general anesthesia were given right transverse loop colostomy which was fast to create in order to relieve intestinal obstruction. They had Soave’s pull-through between the ages of 8 months and one year (mean 9 months ±1.2) with the protective colostomy in situ for 3 weeks before closure. Those that presented at an older age, in good clinical state and could stand longer exposure to general anaesthesia were recruited for single stage trans-abdominal Soave’s pull-through at an age range between 3 months and 16 years (mean 2 years ± 1.8), after thorough bowel decompression. The aganglionic as well as the dilated proximal bowel segments were resected, and the visibly normal bowel segment was used for the pull-through. Each patient was stabilized before pull-through and certified fit by the anesthetists. Histological specimens were obtained from the bowel used for pull-through to ensure that a well gangionated bowel segment was used. The sex, age at pull-through, mean length of hospitalization, mean overall cost of treatment, parental acceptance of the modality of treatment, complications and the outcome of treatment were documented on a structured proforma.

The data obtained were analyzed using SPSS and presented as count, frequency and percentage. Categorical data were analyzed using Fisher's exact test, and where necessary p-values less than 0.05 and greater than 0.05 were regarded as significant and non-significant respectively.

RESULTS

A total of 53 children aged 8 months and 16 years (mean 2 years ± 0.8) comprising 35 males and 18 females with male female ratio 1.9:1 presented with Hirschsprung's disease and had Soave’s pull-through during the period. Thirty-eight (71.7%) children had single stage while 15 (28.3%) had prior colostomy for at least 6 months before Soave’s pull-through which was closed 3 weeks after. Those that had prior colostomy pull-through were younger with mean age of 9 months ± 1.2 compared with those who had single stage with mean age of 2 years ± 1.8. Children that had single stage pull through had a shorter hospital stay (mean 1 week ± 0.8) and spent lesser hospital bills (mean150 dollars) compared to a mean hospital stay of 2 weeks ± 1.3 and mean hospital bills...
270 dollars for those who had colostomy prior to pull-through.

An extremely significant statistical difference was observed when the acceptance by the parents of children who had single stage was compared with those who had prior colostomy (P< 0.0001). This was due to the complications e.g. prolapse, persistent bad odour, and skin excoriation and higher hospital bills associated with colostomy creation. There was, however, no observed statistical difference when the post operative anaemia was compared between the two groups (P= 1.0000). Intraoperative blood loss was insignificant and blood transfusion was not required for Soave’s pull-through during the period for both groups. Due to the multiple abdominal operations, children who had colostomy prior to pull-through were left with more scars on their abdomen than the single stage group. Of the 15 children who had prior colostomy, 14 had ugly abdominal scars, whereas only 2 children had ugly scars among the 38 that had single stage which was extremely statistically significant (P<0.0001).

Comparison of post operative anal stenosis (2.6% for single stage and 13.3% for prior colostomy), anal prolapse (5.2% for single stage and 6.7% for prior colostomy), ileus (10.5% for single stage and 6.7% for prior colostomy) and fever (5.2% for single stage and 6.7% for prior colostomy) were not significant between the two groups. Hirschsprung’s disease was an isolated lesion during the period, and although majority of the children had short segment (recto-sigmoid) Hirschsprung’s disease, the subtypes did not affect the pattern of presentation, the choice and outcome of surgery between the groups. However, the pull-through bowel segments were more hypertrophied and atonic among the single stage group (Figure), hence normal bowels movement was achieved earlier among the children that had prior colostomy. No pelvic collection was observed after both types of pull-through and although both types experienced an initial fecal soilage, they improved with time and no fecal incontinence was observed. Operative site wound infection was recorded only among the children that had prior colostomy and this was mainly pseudomonas infections from prior fecal soilage of the skin. This was statistically significant between the two groups (P=0.0194). Overall, 3 (5.7%) mortality was recorded. Of the 38 that had single stage 1 (2.6%) mortality was recorded, while of the 15 that had prior colostomy soave’s pull-through 2 (13.3%) mortality was recorded.

Table 1. Compares single stage Soave’s pull-through and multi stage Soave’s pull-through.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Single stage</th>
<th>percentage</th>
<th>Prior colostomy</th>
<th>percentage</th>
<th>P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children</td>
<td>38</td>
<td>71.7</td>
<td>15</td>
<td>28.3</td>
<td></td>
</tr>
<tr>
<td>Mean age at pullthrough</td>
<td>2 years±1.8</td>
<td></td>
<td>9 months±1.2</td>
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<tr>
<td>Mean length of hospitalization</td>
<td>1 week±0.8</td>
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<td>2 weeks±1.3</td>
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<tr>
<td>Mean overall cost (in dollars)</td>
<td>150</td>
<td></td>
<td>270</td>
<td></td>
<td></td>
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<tr>
<td>Parental acceptance</td>
<td>37</td>
<td>97.4</td>
<td>5</td>
<td>33.3</td>
<td>&lt;0.0001</td>
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<tr>
<td>Post operative anaemia</td>
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<td>5.2</td>
<td>1</td>
<td>6.7</td>
<td>1.0000</td>
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<tr>
<td>Abdominal wall scaring</td>
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<td>5.2</td>
<td>14</td>
<td>93.3</td>
<td>&lt;0.0001</td>
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<tr>
<td>Post operative anal stenosis</td>
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<td>2.6</td>
<td>2</td>
<td>13.3</td>
<td>0.1897</td>
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<tr>
<td>Post operative anal prolapse</td>
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<td>5.2</td>
<td>1</td>
<td>6.7</td>
<td>1.0000</td>
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<tr>
<td>Wound infection</td>
<td>0</td>
<td></td>
<td>3</td>
<td>20.0</td>
<td>0.0194</td>
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<td>Post operative pelvic collection</td>
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<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
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<td>Post operative incontinence</td>
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<td>0</td>
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<tr>
<td>Post operative ileus</td>
<td>4</td>
<td>10.5</td>
<td>1</td>
<td>6.7</td>
<td>1.0000</td>
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<tr>
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<td>5.2</td>
<td>1</td>
<td>6.7</td>
<td>1.0000</td>
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<tr>
<td>Mortality</td>
<td>1</td>
<td>2.6</td>
<td>2</td>
<td>13.3</td>
<td>0.1897</td>
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</table>
DISCUSSION

Single stage trans-abdominal Soave’ pull-through for Hirschsprung’s disease is feasible in this subregion as shown in this study and earlier reports.7,8 Of the 53 children who presented with Hirschsprung’s disease during the period, 38 (71.7%) had single stage Soave’s operation with good results. Comparison of single stage and conventional multi-stage which incorporates prior colostomy creation revealed that the single stage had many advantages over the multi-stage.7 The male preponderance recorded in this study tally with previous reports3-5 in sub-Saharan Africa for unexplained reasons. However, children presented very late with Hirschsprung’s disease (mean age 2 years ± 0.8) in this study. This agrees with earlier reports in this subregion but at variance with reports from developed countries.2,5,11,12 This could be attributable to the ignorance, financial constraints and non availability of health facilities that are prevalent in the developing countries.

Children who had single stage spent lesser amount on treatment, shorter mean hospitalization time and missed fewer days at school. These led to higher acceptance among the parents of the children who had single stage than those that had multi-stage in this study and others.7,8,13 Also, parents of children that had prior colostomy accepted it poorly because of the associated prolapse, skin excoriation, persistent odor and psychological repulsion to colostomy.2,6 The care for children with colostomy was difficult especially among rural parents who recorded more complications during the period. These were associated with non availability of colostomy bags, water shortage and exposure to pathogenic bacteria due to unhygienic environment.

Incidence of wound infection was recorded only among the children that had prior colostomy and there was an observed statistically significant difference when compared with those that had single stage (P=0.0194). The infection which was mainly pseudomonas as a result of fecal soilage of the skin, responded to antibiotics without sequel. Post operative pelvic infections, pelvic collections; anal prolapse/retraction with resultant anal stenosis had been the major indications for protective colostomy in this subregion.2,5 These complications were, however, not recorded among the children that had single stage. There were no significant statistical differences observed when pelvic collection, post-operative anal stenosis, anal prolapse/retraction and fecal incontinence were compared between the groups. Nonetheless, satisfactory bowel functions were achieved earlier among children that had prior colostomy. This could be due to the redundant dilated proximal bowel segment in the single stage group which needed time to regain functions. Resection of this segment along with the aganglionic segment led to improved result with no observed significant statistical difference between the two groups during the later part of this study. Incompletely resected aganglionic segment in a child which presented several years later as megacolon and persistent enterocolitis in adults have been reported.18,19 This supports the importance of obtaining histological tissue from the bowel segment used for the pull-through.
through as done in this study. In centres where there are no facilities for frozen section, obtaining tissue specimen from bowel segment used for colostomy helps to ascertain whether the bowel segment is well ganglionated for the definitive pull-through, and this remain the major advantage of prior colostomy in such centres. Earlier workers recorded similar experiences with post pull-through bowel dysfunctions and device various modalities of management which gave good results.

The classification of Hirschsprung’s disease into subtypes as done in the literatures did not play any significant and contributory role to the pattern of presentation, choice of modality of treatment and post operative outcome between the two groups in this study and another report. Although the influence of associated congenital anomaly such as Down’s syndrome on the outcome of management for Hirschsprung’s disease has been documented, all the cases seen during this study were isolated lesions and no other factors apart from the modality of treatment contributed to the outcome of treatment. Both morbidity and mortality recorded were higher with the conventional multi-stage pull-through than the single stage as also reported by previous worker.

CONCLUSION

Trans-abdominal single stage Soave pull-through for Hirschsprung’s disease gave satisfactory results in this study; with many advantages over the conventional multi-stage pull-through which incorporates creation of prior colostomy. With adequate patients recruitment and pre-operative preparation morbidity and mortality recorded were lower and the modality was more acceptable to parents and caregivers. Trans-abdominal single stage Soave’s pull-through was found to be safe, applicable, and with lower associated complications in our setting. In centers where there are no facilities and manpower required for trans-anal pull-through, a trans-abdominal single stage Soave’s pull-through has a lot to offer.

REFERENCES


