

A PROSPECTIVE STUDY OF INDWELLING TRANS-ANASTOMOTIC RECTAL TUBES IN COLOSTOMY CLOSURE IN CHILDREN

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ABSTRACT: CONTEXT: The present study is planned to evaluate the feasibility and advantage if any, of indwelling trans- anastomotic stent in paediatric patients undergoing colostomy closure. **AIMS:** To compare Group A (Cases), in which trans-anastomotic stent is placed at time of colostomy closure with Group B (control), in which colostomy closure is done without putting trans-anastomotic stent in terms of: 1) Time taken to start early feeds and then to achieve full feeds. 2) Local anastomotic complications and postoperative complications like wound infection, anastomotic leak, and anastomotic stricture. 3) Postoperative length of hospital stay. **SETTINGS AND DESIGN:** A total of 62 paediatric colostomy closure patients (31 in study group and 31 in control) were studied. It's an interventional case control study. **METHODS & MATERIAL:** A total of 62 paediatric colostomy closure patients (31 in study group and 31 in control) were studied. In the study group Indwelling Trans-anastomotic rectal tubes were placed at time of colostomy closure. Ryle's tube with several additional perforations made near its distal tip was used as trans-anastomotic stents. Ryle's tubes of appropriate size varying from no 12 to 18 were used depending on the size of lumen of bowel. In the control group conventional colostomy closure was done without putting trans-anastomotic stent. **STATISTICAL ANALYSIS USED:** Statistical analysis was done using students 't' test for continuous variables. Non parametric data were analysed using Wilcoxon and Mann Whitney test. Significance was measured by p value and a value of less than 0.05 of alpha α was taken as significant. **RESULTS:** Patients in Case Group A had significantly early first sustained feeds, full feeds and there was an earlier removal of nasogastric tubes and withdrawal from intravenous fluids ($p < 0.05$). Mean post-operative hospital stays were 6.2 ± 2.1 days in study Group A versus 8.4 ± 2.0 days in Control Group B ($P < 0.0001$). **CONCLUSIONS:** These results show that, indwelling trans-anastomotic rectal tubes used in paediatric patients undergoing elective colostomy closure is safe, well tolerated, does not increase postoperative complications, and has potential benefits.

KEYWORDS: Colostomy, Indwelling Trans-anastomotic Rectal Tubes.

INTRODUCTION: "Stoma" is a Greek word meaning "mouth" or "opening." An opening into the colon is a "Colon Stoma" or a "Colostomy."⁽¹⁾ A colostomy is a surgical procedure in which a stoma is formed by drawing the healthy end of colon through an incision in the anterior abdominal wall and suturing it into place.⁽²⁾

Indications for creation of a colostomy may be either congenital or acquired. Congenital indications are more common and include high anorectal anomalies and Hirschsprung's disease. Acquired indications include bowel perforation, high fissure-in-ano, severe perineal traumas, post trauma paralysis, and to protect distal anastomoses (Such as coloanal anastomosis of pull-through procedures).⁽³⁾

ORIGINAL ARTICLE

Colostomy closure is indicated when the underlying condition which required the colostomy allows it and there is adequate distal colon and rectum to safely re-establish gastrointestinal continuity.⁽⁴⁾ Colostomy closure is typically performed 6-12 weeks after creation of the stoma after the inflammation that may have been associated with colostomy placement has resolved.⁽⁵⁾

According to the literature, anastomotic dehiscence consecutive to colostomy closure in the paediatric population can occur with a frequency that varies from 0 to 12.5%: and wound infection from 0.4 to 45%.⁽⁶⁾ Other complications such as bleeding, anastomotic stricture and death have been reported in the paediatric population.

Anastomotic leakage following colorectal surgery is a significant cause of morbidity and mortality.⁽⁶⁾ Prevention of leakage requires healthy bowel with good blood supply, absence of tension between the two mobilized limbs, an adequate lumen and a well-constructed anastomosis.

Use of indwelling Trans-anastomotic rectal tubes in colorectal surgeries have been demonstrated to be safe and without increased postoperative morbidity in adults.^(7,8) But there are limited data to validate the benefit of these trans- anastomotic stents in colorectal surgeries in paediatric surgical patients. The present study is planned to evaluate the feasibility and advantage if any, of indwelling trans anastomotic stent in paediatric patients undergoing colostomy closure.

PATIENTS AND METHODS: The study was conducted in division of paediatric surgery under department of Surgery, M. Y. Hospital Indore from July 2013 to October 2014. Ethical committee clearance was taken for the study. Retrospective data of patients, who underwent colostomy closure in the Division of Paediatric Surgery without any Indwelling trans-anastomotic rectal tubes, were taken as historical controls and constituted Control Group B. They received traditional feeding practise, that is nil per orally, usually till the fifth postoperative day.

Patients were enrolled in the Case Group A after taking informed consent from their parent. All patients underwent standard preparation before surgery (In form of distal bowel stoma washes with povidone iodine and normal saline). No mechanical bowel preparation was used and the patients were administered preoperative antibiotic (Intravenous Ceftriaxone 50mg/kg/dose and metronidazole 10mg/kg/dose, one hour before surgery). All operations were performed under general anaesthesia with additional caudal epidural block in majority of cases. Bowel anastomosis was performed using Silk or Vicryl sutures of appropriate size. Indwelling Trans-anastomotic rectal tubes were placed at time of colostomy closure. Ryle's tube with several additional perforations made near its distal tip was used as trans-anastomotic stents. Ryle's tubes of appropriate size varying from no 12 to 18 were used depending on the size of lumen of bowel. The rectal tube were inserted per rectally and were advanced well above the anastomosis and sutured to perianal skin. The motility of intestinal tract was evaluated by auscultation and discharge of faeces from indwelling rectal tubes. The rectal tubes were routinely removed on the fifth postoperative day.

After surgery, cases in Group A, were given early feeding, starting on first postoperative day at the rate of 1-2ml/kg every 2 hourly and increased by 1ml/kg after every two feeds as tolerated. The subjects were considered as taking full feeds if he/she accepted 80% of maintenance volume for the age. Intolerance to feeds in the form of persistent vomiting, diarrhoea and abdominal distension were noted; in patients having intolerance to feeds, two feeds were omitted before restabilising the feeding protocol.

ORIGINAL ARTICLE

Patient's information including name, age, sex, weight, diagnosis, date and time of operation were recorded in predesigned proforma. Also noted were:

- Time to first sustained feed.
- Time taken to achieve full feeds.
- Postoperative length of hospital stay.
- Symptoms and signs of feed intolerance (Vomiting and abdominal distension, diarrhoea).
- Complications (Wound infection and dehiscence, anastomotic leak, sepsis, peritonitis, anastomotic stricture and reoperation rate).

Parents were notified of planned discharge when tolerating full feeds without any other complications: the time recorded was actual date of leaving the hospital. Follow up of all patient was done up to 1 month after colostomy closure surgery, complications like wound infection and dehiscence, anastomotic leak, sepsis, peritonitis and any emergency room visits were noted.

These prospectively acquired data were compared and statistically analysed with the data gathered retrospectively from control group patients that had undergone colostomy closure in our department in recent past and were taken historical controls.

DEFINITIONS: Sustained feed: feed after which build up and progression of feed was feasible. Abdominal distension: abdominal girth increase of 2 cm or more during 8 hours for age less than one year and increase more than 3 cm for those aged more than one year. Persistent vomiting: more than 3 episodes of vomiting in an hour. Postoperative fever: temperature above 38C (100.4 F) Wound infection: as per CDC Definitions of Surgical Site Infections.

Statistical analysis was done using students 't' test for continuous variables (Duration of hospital stay). Non parametric data were analysed using Wilcox and Mann Whitney test (Post-operative vomiting, abdominal distension). Significance was measured by p value and a value of less than 0.05 of alpha α was taken as significant.

RESULTS: There were 31 patients in each group. Majority of patients in both group were male. Majority of patients in both groups, were in 0-20 (46.75%) and 20-40 (30.64%) months respectively.

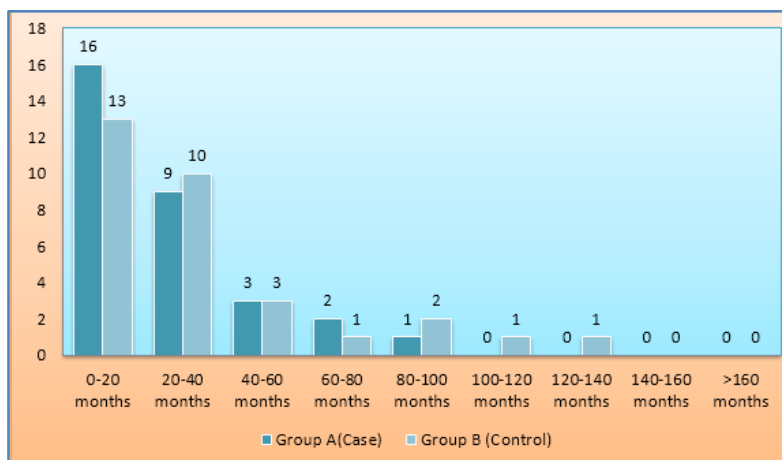


Fig. 1: Age profile of patients in Group A Case and Group B Control

ORIGINAL ARTICLE

Anorectal malformation was the most common diagnosis in both the groups followed by Hirschsprung's diseases and intestinal perforation. 83.2% patients in Group A Case had male anorectal anomalies, as compared to 77.4% in Group B Control.

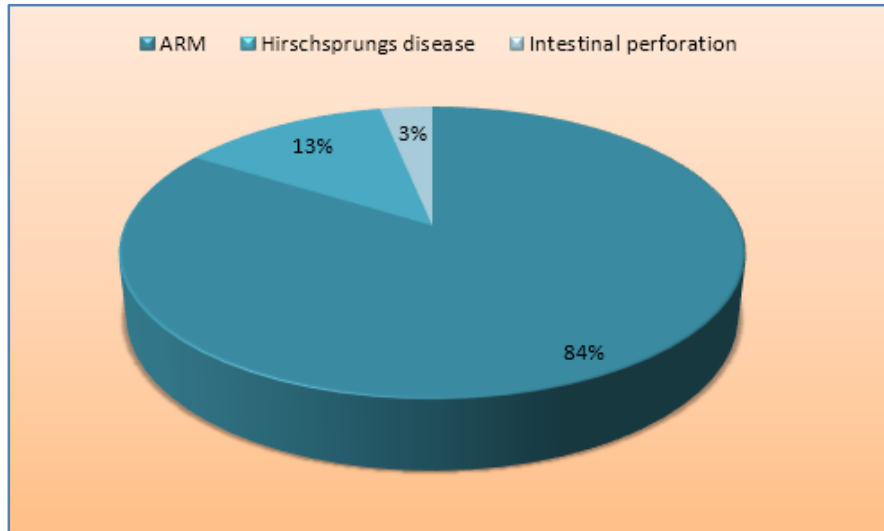


Fig. 2(a): Primary diagnosis in patients in Case Group A

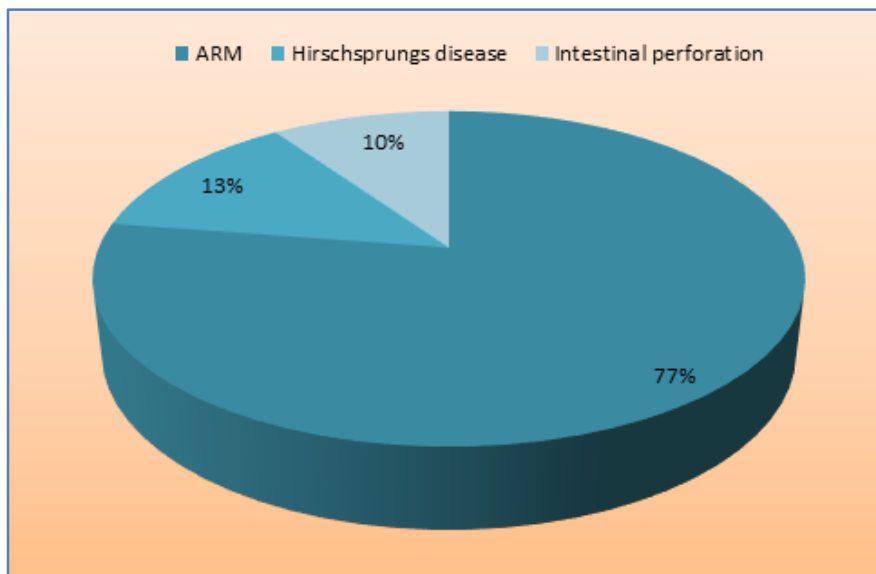


Fig. 2(b): Primary diagnosis of patients in Control Group

The two groups in our study were comparable with respect to age, sex, weight, primary diagnosis, operative procedure performed, operative time and the type of anaesthesia. In both the groups sigmoid colostomy closure (62.9%) was the most commonly performed operative procedure, followed by transverse colostomy closure (37.06 %).

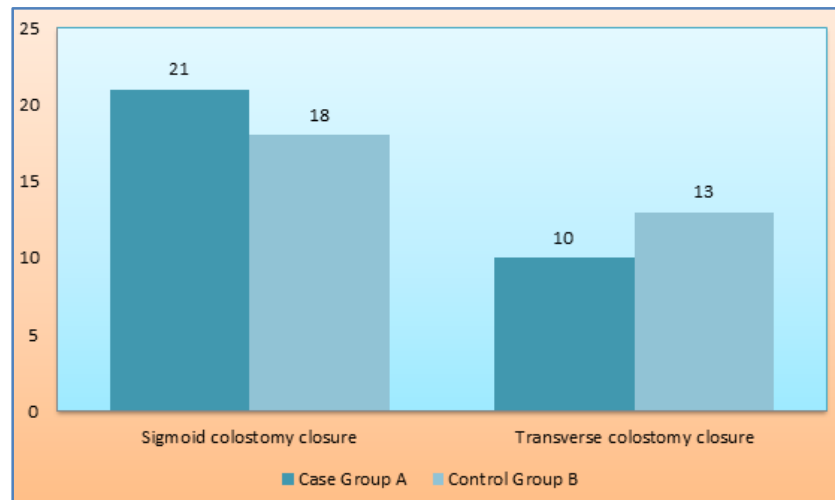


Fig. 3: Surgical procedure performed and site of anastomosis

In our study we were able to achieve early feeding in all our Case Group A patients, with the first sustained feed at a mean of 28.5 hours as compared to 153.8 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

Similarly we were able to achieve full feeds in all our Case Group A patient at mean of 62.3 hours as compared to 196 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

In Case Group A patients in which indwelling trans-anastomotic rectal tubes were placed we were able to remove nasogastric tube earlier at mean of 60.4 hours as compared to 109.77 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

Also in Case Group A patients in which indwelling trans-anastomotic rectal tubes were placed we were able to stop intravenous fluids earlier at mean of 138.5 hours as compared to 196.29 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

Early feeding was well tolerated and did not lead to any statistically significant increase in the incidence of vomiting, diarrhoea, abdominal distension, wound dehiscence and anastomotic leak. Statistical analysis was done using students t test and the p value was greater than 0.05, showing that it was insignificant.

A reduction in the incidence of postoperative fever and wound infection was seen in Case Group A patients in which indwelling trans-anastomotic rectal tubes were placed as compared to Control Group B patients. P value came out to be significant ($p = 0.01$ and 0.02 respectively).

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ORIGINAL ARTICLE

The mean hospital stay was 6.22 days in Case Group A as compared to 8.45 days in Control Group B Patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

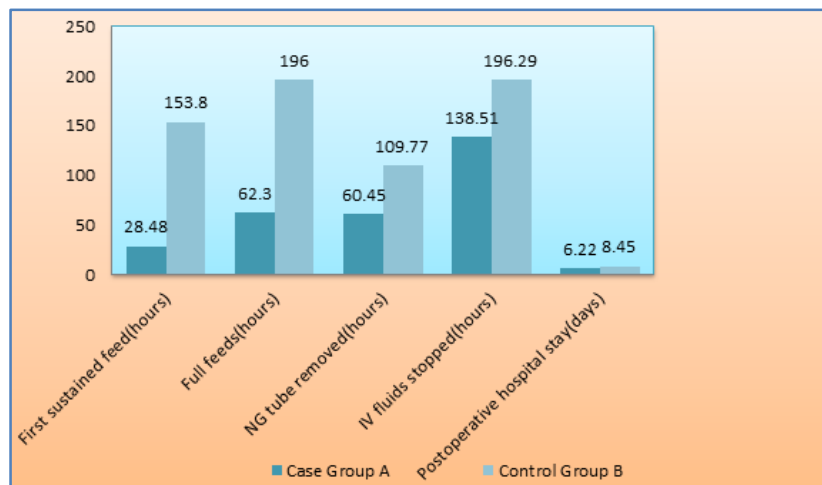


Fig. 4: Feeding outcome data with significant statistical difference

DISCUSSION: As one is aware, Colonic surgery is usually associated with a complication rate of 15-20% and a postoperative hospital stay of 6-10 days. According to the literature, anastomotic dehiscence consecutive to colostomy closure in the paediatric population can occur with a frequency that varies from 0 to 12.5%; and wound infection from 0.4 to 45%.⁽¹⁾ Other complications such as bleeding, anastomotic stricture, and death have also been reported in the paediatric population.⁽⁴⁾

Bowel anastomosis during colostomy closure surgery carries with it certain risks and complications such as bleeding, infection, prolonged functional ileus especially in children and anastomotic leak, leading to increased morbidity & mortality.

In addition, traditional postoperative management of patients, after bowel anastomosis, entailed keeping them nil per orally on continuous Ryle's tube suction. It is continued till there is resumption of bowel activity (passage of flatus and stools) and decrease in Ryle's tube aspirates. Feeds are then started slowly followed by a slow progression from liquids to solids.

Historically, the rationale for delaying the initiation of feeding has been to overcome postoperative ileus and prevent anastomotic dehiscence. The duration of postoperative fasting varies from few days to weeks in different practices without much scientific basis.

Management of these complications is time consuming, thus prolonging the overall hospital stay of the patient & thus indirectly increasing the cost. Therefore by controlling these, the associated morbidity as well as indirectly costs can be decreased.

Use of indwelling Trans-anastomotic rectal tubes in colorectal surgeries have been demonstrated to be safe and without increased postoperative morbidity in adults.^(7,8) But there are limited data to validate the benefit of these trans- anastomotic stents in colorectal surgeries in paediatric surgical patients. The present study was planned to evaluate the feasibility and advantage if any, of indwelling trans-anastomotic stent in paediatric patients undergoing colostomy closure.

Present study supports the view that in paediatric patients putting indwelling trans-anastomotic rectal tubes during colostomy closure is well tolerated, safe and beneficial. These trans-

ORIGINAL ARTICLE

anastomotic rectal tubes are beneficial in terms of starting early feeding on first postoperative day itself and also useful in preventing local anastomotic complications and postoperative complications like wound infection, anastomotic leak, bowel obstruction, and anastomotic stricture.⁽⁹⁾ Thus helpful in decreasing postoperative length of hospital stay.

Children with bowel stoma are often malnourished, particularly in developing countries due to frequent episodes of diarrhoea and blood loss from mucosal surface. Postoperative starvation could be further detrimental to the existing compromised nutritional status in these patients, further emphasizing the need to ensure caloric input by early feeding.

The concept of bowel rest for anastomotic healing has no scientific basis; fear of dehiscence with early feeding is an important factor for restriction of oral nutrition in postoperative period, although increased wound healing and anastomotic strength after early feeding have been demonstrated.

Many parameters have been used to indicate the resolution of postoperative ileus; however they are not exact, nor are the management of postoperative ileus very definite. The scientific basis supporting early feeding is that it stimulates gastrointestinal hormones, elicits propulsive activity and thus coordinated gastrointestinal motility. Beneficial effects of intra-luminal contents on intestinal motility have been reported in many studies.

In our study we were able to achieve early feeding in all our Case Group A patients, with the first sustained feed at a mean of 28.5 hours as compared to 153.8 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

Similarly we were able to achieve full feeds in all our Case Group A patient at mean of 62.3 hours as compared to 196 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

In Case Group A patients in which indwelling trans-anastomotic rectal tubes were placed we were able to remove nasogastric tube earlier at mean of 60.4 hours as compared to 109.77 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

Also in Case Group A patients in which indwelling trans-anastomotic rectal tubes were placed we were able to stop intravenous fluids earlier at mean of 138.5 hours as compared to 196.29 hours in Control Group B patients. Statistical analysis was done using students t test and the p value was less than 0.05($p < .0001$), showing that it was significant.

Early feeding was well tolerated and did not lead to any statistically significant increase in the incidence of vomiting, diarrhoea, abdominal distension, wound dehiscence and anastomotic leak. Statistical analysis was done using students t test and the p value was greater than 0.05, showing that it was insignificant.

A reduction in the incidence of postoperative fever and wound infection was seen in Case Group A patients in which indwelling trans-anastomotic rectal tubes were placed as compared to Control Group B patients. P value came out to be significant ($p = 0.01$ and 0.02 respectively).

The indwelling trans-anastomotic rectal tubes were also beneficial in preventing local anastomotic complications and postoperative complications like wound infection, postoperative fever. The presence of rectal tubes through anastomosis and in contact with the colonic mucosa for five days postoperatively did not produce ill effects.

ORIGINAL ARTICLE

Postoperative hospital stay was reduced in Case Group A patients, which has significant implications on the reduction of cost and burden on hospital resources. Similar benefits of early feeding on reduced length of hospital stay have been shown in other studies, but again, these were mostly adult studies. Reduction in length of hospital stay has significant implications and it helps in efficient utilization of healthcare resources. The mean hospital stay was 6.22 days in Case Group A as compared to 8.45 days in Control Group B Patients. Statistical analysis was done using students t test and the p value was less than 0.05 ($p < .0001$), showing that it was significant.

Indwelling rectal tubes simplifies the postoperative management. Nasogastric intubation may be discontinued at once or within a short period after the operation. Also early feeding can be started which are well tolerated. And intravenous fluids can be stopped earlier. Objective evidence of normal peristalsis is revealed when faecal matter is discharged from the tube. There is no doubt that rectal tubes prevent the distension of the bowel, eliminated injuries effects such as increased intraluminal pressure upon the circulation of intestine, and interference with healing of the anastomotic suture line. Minimum nursing care was required to keep the tube in place.

CONCLUSION: These results show that, indwelling trans-anastomotic rectal tubes used in paediatric patients undergoing elective colostomy closure is safe, well tolerated, does not increase postoperative complications, and has potential benefits.

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ORIGINAL ARTICLE

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