Tube ileostomy as an alternative to conventional ileostomy for fecal diversion

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Abstract

Background

Temporary ileostomies although controversial, are still used to divert fecal stream to protect the at risk distal anastomosis. However, these are associated with significant morbidity and patient inconvenience. A novel technique - tube ileostomy is studied for its effectiveness and safety in such patients.

Methods

This prospective study over three years included thirty patients who underwent distal colorectal surgery with proximal diversion using tube ileostomy. The patients were followed for effectiveness of diversion and complications.

Results

30 patients in the study were followed for 2-36 months. Low anterior resection was the most common procedure performed (46.7%). Early complications in the form of peritubal leak and tube blockade were noted in 5 patients (16.7%). Two patients were reoperated for clinical anastamotic leak and pelvic sepsis. There were two deaths (6.7%) in our series one from pulmonary embolism and one from pelvic sepsis. Based upon a questionnaire, 86.67% patients in the study were satisfied with their diversion. The average hospital stay was 8.7 ± 6.3 days. The tube was removed between 20th-25th day in 86.67% patients. During follow up five patients reported with features of subacute intestinal obstruction but none required surgery.

Conclusions

Tube ileostomy is technically easy to construct with good patient acceptance and few complications. It effectively protects distal anastomosis and avoids the need for a second surgery and its related complications.

KEYWORDS: ileostomy, colorectal anastomosis, fecal diversion
Introduction

The role of a temporary defunctioning stoma in patients undergoing primary left sided anastomosis remains controversial. Many colorectal surgeons consider the postoperative morbidity and mortality rates for coloanal, colorectal and even ileoanal anastomoses alone to be sufficiently high enough to warrant routine faecal diversion. Proponents of the defunctioning stoma maintain that it is not possible to predict which anastomosis will leak. Opponents of defunctioning stoma consider the risk of leakage to be sufficiently low and advocate that no patients require defunctioning stoma. However, all colorectal surgeons agree that the consequences of leakage may be fatal and furthermore leakage may result in a permanent stoma at re-exploration. A middle path would be to identify patients at high risk for anastamotic leakage. Proximal diversion is considered essential for patients with anastamosis less then 5 cm from anal verge, patients who have received preoperative radiotherapy, patients on steroids, patients with intraoperative haemodynamic instability, and those where the surgeon considers integrity of anastamosis to be questionable. However, stoma related complications can be substantial and care may be difficult. In addition these patients need subsequent surgery for closure of their stoma.

In order to avoid or reduce the problems associated with these conventional diversion procedures a strategical shift needs to be sought in surgical approach. We tried a new technique in our department. Based on the technique of construction of a feeding jejunostomy we used a "tube ileostomy" as an alternative to the defunctioning ileostomy.
Material and Methods

The prospective study was conducted in a tertiary care hospital over a period of three years from July 2005 to June 2008 after approval by the hospital ethical committee. During this period thirty patients were recruited for the study after informed consent. These patients who underwent distal colorectal surgery with left sided anastamosis and needed defunctioning proximal stoma were enrolled for the study. All patients were evaluated for surgery as per set hospital protocols. Laparotomy was performed in all under general anaesthesia with antibiotic cover using a third generation cephalosporin. After dealing with the primary pathology and performing the necessary procedure such as Anterior Resection(AR), Low Anterior Resection(LAR), Left Hemicolecotony(LH), Extended Left Hemicolecotony(ELH), and Total Proctocolectomy(TPC) with Ileal Pouch Anal Anastamosis(IPAA), a tube ileostomy using a 26 French (Rochester) silicon three way self retaining Foley catheter was performed in the same setting. The interior end of the tube was secured 10 to 15 cm proximal to the ileocaecal junction with a double purse string suture, 2-3 mm apart using polygalactin 2/0 with the eye of the catheter directed proximally. The balloon lying in the lumen of the terminal ileum was inflated with normal saline to an extent just to occlude the lumen and prevent any passage of proximal bowel contents to reach the distal primary anastomotic site. After inflation, the ileum was hitched to the parietal wall of abdomen using absorbable polygalactin 2/0 interrupted sutures on all sides. The exterior of the tube was fixed to the skin using 3/0 nonabsorbable silk purse string suture.
postoperative period the tube was regularly checked for free flow of contents and flushed with normal saline to prevent tube blockade and maintain patency. In patients with no evidence of anastomotic leak the tube was deflated between 5th and 7th post operative day, clamped after second week and finally removed after third week of surgery to have a controlled fistula in place. Oral feeds were started in the form of liquids from the second postoperative day and gradually shifted to soft diet over a period of one week. Clinical suspicion of leak prompted the tube ileostomy to be maintained till the leak would seal. The leak was studied and documented by rectal contrast enhanced pelvic Computerized tomography before further management was decided.

A detailed record of tube drainage, peritubal leak, tube blockade, any feature suggestive of anastomotic leak, or any other complication was maintained. The day when tube was deflated, clamped and removed was recorded. Time to closure of the controlled fistula was also noted. The time required for daily care of the tube was recorded. All the patients were regularly followed in the outpatient department for any complications. The patients were also subjected to a detailed questionnaire regarding satisfaction about the procedure. The results were finally compiled and analyzed.

**Results**

In a prospective study carried over a period of 3 years, there were 30 patients (13 females and 17 males) with a mean age of 48 years (range 32-81 years) were included in the study. Bleeding per rectum was the most common symptom (56.5%) followed by pain (47.8%), constipation (47.8%)
and abdominal distension (30.4%). 10 patients (45.4%) were admitted with intestinal obstruction. The diagnosis and the surgical procedure done in the 30 patients is shown in table 1. Of the 30 patients six tube ileostomy related early complications were noted in 5 patients (16.7%) during the time in which the tube ileostomy was in place. Leak around the tube ileostomy was observed in four patients (13.3%). This was noted on the sixth or seventh day and thought to be due to thickening if ileal contents blocking the tube. The tube was flushed with normal saline and the second port of the three way Foleys opened to allow free drainage. In three patients the leak settled within one day and in the other it was deemed safe to deflate the balloon as seven days had already passed. Early tube block in two patients (6.7%) on the second day. In both cases the additional port was opened and saline flushing given till the block was relieved. Two patients (one following LAR and the other following IPAA) were reoperated for clinical anastomotic leak and pelvic sepsis. In both the collection was drained and the tube ileostomy was converted to conventional loop ileostomy. There were two deaths (6.7%) in our series. One died after emergency extended left hemicolectomy for carcinoma of descending colon due to pulmonary embolism and the other died after elective LAR for carcinoma Rectum from anastamotic leak with pelvic sepsis and septicaemia.

Based upon a questionnaire 24 of the 28 patients who survived were satisfied with there diversion while the remaining 4 were unhappy because of leak around the tube ileostomy. In our study the mean tube ileostomy output was 960ml/day (Range 490-2100ml) before deflation of the balloon. After deflation of balloon the drainage reduced in volume and a day prior to discharge the average output was noted to be 420ml/day (Range 110-1260ml). The average hospital stay was 8.7 ± 6.3 days. The tube was removed between 20th-25th day in 26 patients
while in the two it was removed between 30th-34th day. The fistula closed spontaneously in all patients within 3-7 days of after removal of the tube.

The follow up ranged from 2- 36 months. During this period five patients reported with features of subacute intestinal obstruction like bloating, pain and distension in the region of tube ileostomy. These included 2 patients of TPC with IPAA, 2 patient of LAR and another with ELH. Three of these patients were admitted 3-6th months after surgery and responded to drip and suction. One amongst these developed a repeat attack at one year also managed similarly. The other two developed features of obstruction at 13 and 15 months post surgery and were both managed conservatively. Contrast enhanced CT was performed in all patients admitted with features of obstruction to determine cause and rule out recurrence of malignancy. In two it was reported as normal, while in the remaining three a small bowel loop was found adherent to the parietal wall at site of tube ileostomy. No patient required surgery during follow up.

**Discussion**

Through significant advances by pioneering and inventive surgeons the last century has seen dramatic improvements in surgical techniques for creating colostomies and ileostomies. A loop ileostomy or colostomy is frequently constructed to temporarily protect a distal anastomosis. Initially loop colostomies were preferred, but since the first report of loop ileostomy by Turnbull
and Weakley in 1966\textsuperscript{11} it has gained popularity and wider acceptance because of technical simplicity, lack of odour, liquid discharge, decreased rates of prolapse and parastomal hernia\textsuperscript{12-21}. Another major factor making ileostomies more popular is the decreased morbidity and mortality associated with the second operation, the “ileostomy take down” and anastamosis as compared to colostomy\textsuperscript{20,22,23}. Therefore presently the loop ileostomy is preferred by most surgeons\textsuperscript{16,17,24,25,28}. The routine use of loop ileostomy to protect the distal anastamosis is much debated and literature supports all arguments both in favour and against. Therefore presently no conclusive evidence or guidelines supports the use or avoidance of such ileostomies. Proponents of routine use argue that though the ileostomy does not prevent leakage, it does however decrease the detrimental effects of a leak\textsuperscript{12,27} with less major leaks\textsuperscript{28-30} and less reoperation rates\textsuperscript{30}. On the other hand those against the routine use of ileostomy claim that the ileostomy adds to the morbidity and mortality besides longer hospital stay and costs. Furthermore because ileostomy closure is not a high priority in this era of stringent financial budgeting it is often postponed or delayed\textsuperscript{24}. During this period stoma related complications have been reported to range from 9-74\%\textsuperscript{9,18,24,28,31-33} Even minor complications with the ileostomy significantly hamper the quality of life of these patients. Tube ileostomy as an alternative to loop ileostomy is an attempt to protect the distal colonic anastamosis and at the same time decrease the ileostomy complications and totally avoid the morbidity and mortality associated with stoma take down.

In our study we noted complications with tube ileostomy in 16.7\% of patients while the tube was in place. This is significantly less than the reported complication rates after loop ileostomy\textsuperscript{9,18,24,28,31-33}. The peristomal complications like skin breakdown, dermatitis, and erythema are more frequent with ileostomies, ranging from 3-36\%\textsuperscript{8,34}. These problems can be
transient but recurrent till ileostomy is closed\textsuperscript{[8]} and usually hamper the proper application of ileostomy appliance making management of ileostomy effluent difficult. In our study local skin problems were noted in only four patients due to peritubal leakage, however this problem is transient and easily treatable or preventable by maintaining tube patency by regular flushings.

Dehydration requiring frequent hospital admissions is a well known problem after ileostomy due to high ileostomy output. Reported incidence of dehydration range from 2.2-20\%\textsuperscript{[8,35]}. These patients have to be on astringent diet and antidiarrheal medication often\textsuperscript{[36]}. Some recommend such measures only if urinary sodium concentration is low (0-10meq/L) and delay discharge till effluent is less than 1L/day. However this problem was not seen in our patients and none developed features of dehydration.

The other major complications associated with conventional loop ileostomy include prolapsed and retraction. Of these retraction is more worrisome as it results in skin excoriation and incomplete defunctionalisation of the distal anastamosis. This problem is reported to occur in up to 15.9\% of patients\textsuperscript{[7]}. Incomplete defunctionalisation using tube ileostomy occurs if the tube gets blocked and does not drain freely. This was noted in two patients in our series. One of the patients with blocked tube subsequently passed faeces per anus and developed leak from the ileal pouch anal anastamosis. While the other blocked catheter was salvaged by saline flushings. This risk of tube blockade can be prevented by regular irrigation of the tube in the postoperative period till the balloon is deflated. Stomal prolapse has been reported to occur after loop ileostomy\textsuperscript{[36,37]}. However most of these patients do not need reoperation and the problem is
solved at the time of ileostomy reversal. Early bowel obstruction before loop ileostomy reversal has been reported to be due to adhesions, retraction of loop ileostomy and herniation of proximal bowel lateral to the ileostomy[7]. Stoma related obstruction occurred in 6.4% with loop ileostomy in the study reported by Metcalf et al[7]. No patient in our series suffered early bowel obstruction while the tube was in place. On follow up 5 patients (16.6%) reported back after tube removal with features of small bowel obstruction. However, none needed laparotomy and all settled on conservative management. Though the occurrence of small bowel obstruction in our study is slightly greater than that reported in literature of 1.2-14% [8,35], most of the studies in literature have reported only those patients with this complication that subsequently required surgery after closure of the covering ileostomy. There have been reports that the risk of obstruction is less if the ileostomy site is resected and anastamosis performed by stapler[8,38]. However others have not found any significant difference between various techniques of closure[36,38]. Small bowel obstruction in our patients could be due to adhesions or bowel kinking /narrowing at the tube ileostomy site.

Leakage from distal anastamotic site with pelvic sepsis despite proximal loop ileostomy is well known. Garcia-Botello et al[36] reported 10.24% anastamotic leak in series of 127 patients despite proximal loop ileostomy. Four patients (3.15%) had to be reoperated due to generalized peritonitis, worsening clinical signs or evidence of sepsis despite conservative management. Freinberg[8] reported a 13.6% leak rate in their series of 117 patients. However, in the present study only two patients (6.7%) developed leak from the distal anastomosis.
Other complications have been frequently reported with delay in the ileostomy closure or the take down itself. Gallstones occur with gallstone pancreatitis especially if the ileostomy closure is delayed\textsuperscript{[8]}. Anastamotic leaks from ileostomy reversal site in up to 8.3\% are mentioned in literature\textsuperscript{[8,34-36]}. The incidence of wound infection has been reported from 1.3\%-18.3\%\textsuperscript{[35,8]} while incisional hernia occurs in up to 11.9\%\textsuperscript{[8,36]} of patients after ileostomy closure. All these morbidities are avoided with the use of tube ileostomy.

Conclusion

Tube ileostomy was found to be a well acceptable diversion procedure with few complications and easy to construct and manage as compared to conventional ileostomy. It effectively diverts the bowel contents and avoids the need for a second surgery and its related complications. However further studies need to be undertaken to recommend tube ileostomy for routine use as an alternative to the conventional ileostomy.

Table 1: Type of procedure performed in patients.

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Procedure</th>
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<tr>
<td></td>
<td>AR</td>
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IPAA
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<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
<th>Column 5</th>
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<td>14</td>
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<tr>
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<td>Total Number(%)</td>
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<td>2(6.7)</td>
<td>14(46.7)</td>
<td>4(13.4)</td>
<td>7(23.3)</td>
<td>3(10)</td>
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References


