# A Study of New Technique of Loop Stoma Bridge in Tertiary Care Hospital

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***Research Article***

***Abstract:*** **Background and Objectives:** Delay in the application of stomal appliance till the removal of the conventional supporting glass or plastic rods resulted in leakage of faecal matter. The objective of the study was to know the efficacy, safety and compliance of the new technique of loop Stoma Bridge. **Methods:** Subcutaneously, a closed suction drain tube of 16 or 18 F was placed with the help of trocar .The points of entry and exit of the tube are just beyond the circumference of the flange. **Results:** Out of the 45 patients studied no major complications were encountered. Emergency and elective procedures were done in 23 and 22 patients respectively. Complications like pain in 14 patients were noticed and in 4 patients serous discharge was seen. None had pain for more than 10 days. **Interpretations and Conclusion:** It is a safe, cheap method and can be performed easily with low morbidity. The colostomy flange can be applied immediately without faecal leakage.

***Keywords:*** Bridge, loop colostomy, loop Ileostomy.

## 1. Introduction and need for study

Intestinal stomas, although not unique to colon and rectal surgery, are among its most important achievements. The first surgical stoma was created just over 200 years ago, and currently there are approximately one million individuals living in the United States with a functioning enterostomy. An entire industry has developed to create products for these individuals and their special needs. Colorectal surgeons have pioneered new surgical techniques and created ostomy management systems that have allowed the intestinal stoma to become a barely noticeable alternative to per anal defecation. In recent years as there is early detection of colorectal tumors, diverticulitis, inflammatory bowel diseases and trauma and with advance in availability of stoma care products, there is rapid growth of enterostomal therapy. Modern stapling equipments have increased the frequency of loop stomas and decrease in the end stomas [1]. Despite the advances proper stoma construction and management remains vital [2]. Conventionally supporting rods made of glass, plastic or similar material have been used for seven to ten days for loop stoma to prevent retraction. However this is associated with difficulty in applying the stomal appliance till the removal of the rod resulting, in leakage of faecal matter. The compliance of the patient plays a prime role in acceptance of the procedure. The new technique of loop stoma bridge enables immediate application of colostomy flange. Hence this study was undertaken to know the efficacy, safety and compliance of the new technique of ***loop stoma bridge***.

## 2. Aims and Objectives

1. To study the efficacy of new technique, of loop stoma bridge.
2. To study the safety of loop Stoma bridge
3. To study the compliance of patients with loop Stoma bridge.

## 3. Materials and Methods

**Study design**: Longitudinal study with retrospective component. Patients undergoing loop colostomy from April 2005 to April 2012 was included for the study. Data required for the study was obtained from medical records retrospectively from April 2005 to July 2010 and subsequently prospectively data till April 2012, using pre-tested semi structured questionnaire.

**Source of data:** Patients undergoing loop Diversion-loop Ileostomy and loop colostomy in M.S. Ramaiah Hospital.

**Inclusion Criteria:** Patients undergoing loop diversion-loop Ileostomy and loop colostomy in M.S. Ramaiah Hospital.

**Exclusion Criteria:**

**1.** Loop colostomy converted to end colostomy.

**2**. Previous surgical scar.

**Sample Size estimation:**

From the previous record analysis at our hospital 33 cases were present during 2000 to 2007.Assuming 20% attrition 26 cases retrospectively and 20 cases prospectively shall be included for the study. 45 cases was the included as study population (n=45).

April 2005 — Longitudinal study: Retrospective — July 2010 — Prospective — April 2012

 

**Statistical Analysis**

Descriptive statistics comprising of means percentages and proportions was used to describe the data. Chi-squareand Fisher Exact tests of proportion were used to compare the statistical significance of differences in complications between the various parameters such as age, gender, complications and indication for surgery. Level of significance was fixed at 95% (error 5%).

**Ethical Issues and Ethical Committee Clearance**

An ethical clearance was obtained from the ethical committee. The ethical committee emphasised on the need to take informed consent which it said is to be explained to the patients in their own language.

## Methods/Technique

The basic principle is that the function of the bridge should not be compromised but at the same time, it should not interfere with fixing of the stomal appliance. A tube used for closed suction drain like Romovac™ (Romsons, India) 16 or 18 F is used **(Fig. 1-a).** This tube has adequate stiffness, is porous at one end, and is connected to the trocar at the other. Note that about 30 cm or more of the tube does not have pores. The flange used for the stoma is available indifferent brands and sizes resulting in variations in diameter. As the incision is generally 4 to 5 cm, a 60-mm Coloplast™ (Coloplast A/S, Denmark) flange is preferred **(Fig. 1-b)** and measures 11 cm in diameter. A suitable site is marked for the ostomy. Under appropriate anesthesia, a transverse incision, of 4 to 5 cm, is made deepening it up to the fascia. The fascia is incised, and the bowel is delivered in a standard fashion [3, 4]. A small rent is created between the marginal artery and the mesenteric border of the colon in an avascular area.

At this stage or immediately after skin incision, the entry and exit points of the bridge are marked. Appropriate points of entry and exit should be at least 1 to 2 cm more than the radius of the flange. In this case, it would be 6.5 to 7.5 cm from the incision line. This margin of 1 to 2 cm is required for the application of adhesive plaster over the flange. Entry and exit points at distances lesser than this would prevent the proper application of the flange, whereas greater distances would mean more chances for stomal sagging and retraction. With the help of the trocar, the skin is punctured about 7 cm from the main wound, tunneled in the subcutaneous space immediately below the dermis, and brought out through the main wound, dragging the suction tube along with it. A medium-sized artery forceps is used to bring the tube through the mesocolic rent. The tube is reconnected to trocarand tunneled in the subcutaneous space above with a skin exit at a similar 7 cm from the wound edge. The rest of the procedure involving closure of fascia and fixing of the colon to the fascia is completed [1, 2, 5]. After ensuring that no porous part of the tubing is used for the bridge, the tube is held taut by pulling both ends and anchoring to the skin **(Fig.2).** The stoma is matured in the standard method and the flange is applied **(Fig.3a and 3b).** The adhesive plaster, bag, and clip are then placed appropriately. The entry and exit points of the tubing may be smeared with a little povidone iodine ointment and left open. The bridge is removed between 7 and 10 days without disturbing the flange **(fig. 4).**

## Other techniques currently in vogue

1) Suture Bridge Formation. Small defect created in the small bowel mesentry through which 3.0 Monocryl Suture is passed and fixed to subcutaneous tissue on either side following multiple passes without tension.
2) Skin Bridge :Joining two inter-digitating skin flaps raised from the margins of the stoma, an adjustable bridge is formed that can accommodate colon loops of any diameter.
3) Biethium bridge is inserted subcutaneously producing a small, flush stoma to which then colostomy bag can easily be applied and.therefore fecal leakage is no longer a problem It is 4.5cms long, 1cm wide and 2mm thick with perforations at either end for fixation. It is completely absorbed within 21 days by polymorphonuclear leucocytes leaving a small plaque of scar tissue.
4) Deep tension sutures using nylon sutrues is enclosed by plastic sheath and supports the bowel directly while the nylon suture anchors it to the skin on either side of the stoma. The suture and its sheath are less bulky than any of the proprietary bridges and lie entirely within the cut-away adhesive contact area of the stoma bag. This it is tailored to the bowel and allows easy changing of the appliances while the patient is learning to handle the stoma
5) Rectus sling: Following mobilization of the colon a mesenteric window is created and the anterior rectus sheath is loosely reconstituted under the colon by suturing the incised corners back together through the mesenteric defect with synthetic polyglactin sutures. The colon is then opened with a transverse incision and the stoma is completed with several mucocutaneous absorbable sutures. The resulting stoma is suitable for use with standard stoma appliances.

## Results

A total of 45 patients included under study. The above characters were noted. Mean age was 45 years with a range from 14 -65 years. Average days of stay in hospital noticed were 20.24 days. Mean day of removal of bridge noted was 11.31 days. Mean follow up was 10.44 months. Out of 45 patients studied, 48.9% were above 55yrs of age (table 1).

**Table 1:** Study characteristics

| Characteristics | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|
| **Age in years** | 14 | 65 | 45.18 | 14.790 |
| **Number of days of hospital stay** | 14 | 32 | 20.24 | 4.844 |
| **Day of removal of Bridge** | 9 | 15 | 11.31 | 1.411 |
| **Follow up (months)** | 4 | 20 | 10.44 | 3.609 |

Out of 45 patients, 37 patients underwent colostomy maximum were elective cases. In the Ileostomy group maximum were emergency cases. (Table 2)

**Table 2:** Indication for surgery in Loop Diversion

| Type of Loop | Emergency | Elective | Total |
|---|---|---|---|
| **Colostomy** | 16 (43.2%) | 21 (56.8%) | 37 |
| **Ileostomy** | 7 (87.5%) | 1 (12.5%) | 8 |
| **Total** | 23 | 22 | 45 |

Fisher's Exact Test .P= 0.047.Significant

Out of 45 patients studied, the bridge was removed after 10days in 26 patients and within 10days in 19 patients (table 3).

**Table 3:** Day of Bridge removal

| Age in years | Day of Bridge removal | | Total |
|---|---|---|---|
| | <10 days | >10days | |
| **<45** | 12(57.1%) | 9(42.9%) | 21 |
| **>45** | 7(29.2%) | 17(70.8%) | 24 |
| **Total** | 19 | 26 | 45 |

$\lambda 2$ =3.53. P =0.058 not significant

Of the 45 patients studied, 23 were emergency cases in which 76.2% were less than 45 years of age. 22 patients underwent elective surgery, of which 12 were carcinoma rectum cases. In the 23 patients who underwent emergency surgery maximum patients had perineal injury followed by cases with viscus perforation. Excepting 1 patient, all patients were discharged before 30days. (Table 4)

**Table 4:** Indication for surgery

| Age in years | Indication for surgery | | Total |
|---|---|---|---|
| | Emergency | Elective | |
| <45 | 16(76.2%) | 5(23.8%) | 21 |
| >45 | 7(29.2%) | 17(70.8%) | 24 |
| Total | 23 | 22 | 45 |

$\lambda 2$ =9.91. P =0.002. Highly significant.

Out of 37 patients of colostomy only 29.7% had complications but 62.5% of Ileostomy patients had complications. (Table 5)

**Table 5:** Occurrence of complications based on type of diversion stoma

| Type of Loop Diversion | Complications | | Total |
|---|---|---|---|
| | Present | Absent | |
| **Colostomy** | 11(29.7%) | 26(70.3%) | 37 |
| **Ileostomy** | 3(37.5%) | 5(62.5%) | 8 |
| **Total** | 14 | 31 | 45 |

Fisher's Exact Test .P= 0.689. Not significant

Out of 45 patients, delayed removal of flange was associated with complications. Out of 45 patients, maximum patients stayed in the hospital between 16-20 days. Discharge was found only in 10.8% of colostomy patients, none among ileostomy patients. (Table 6)

**Table 6:** Day of removal of bridge in relation to complications

| Complications | Day of removal of Bridge | | Total |
|---|---|---|---|
| | 9-12 | 13-16 | |
| **Present** | 9 (23.6%) | 5(71.4%) | 14 |
| **Absent** | 29(76.4%) | 2(28.6%) | 31 |
| Total | 38 | 7 | 45 |

Fisher's Exact Test .P= 0.023. Significant

 

## 4. Discussion

A well-constructed loop ileostomy or loop colostomy provides near complete fecal diversion. [4]. Diversion colostomies are performed for decompression or for temporary diversion for the protection of a complicated distal anastomosis. Despite various new techniques like loop-end colostomy [6], the conventional loop ostomies still need to be performed for various reasons. A bridge is used for all the loop ostomies. A view is that loop ileostomies do not require a bridge [7], whereas loop colostomies do. However, some loop ileostomies might still require a bridge. The bridge prevents retraction or sinking of the loop into the wound and elevated bridge provides the desired diversion of fecal matter. A glass or plastic rod placed underneath the loop between the marginal artery and the mesenteric border of the colon resting on the skin raising the posterior wall of colon to above the skin level is the standard technique described; [3, 4] but, with this technique of the rod placement, stoma care device application would be difficult during the initial week or till such time the bridge is removed. This resulted in the exploration of alternative techniques. Many types of bridges described. Skin level bridge, which includes the standard glass or plastic rod or deep tension suture suggested as a cheap and reliable alternative to a proprietary bridge. .Alternatively, a loop of nasogastric or rubber tube is passed under the loop of colon, and the shortened ends are joined together above the bowel with a single nylon suture [8]. This technique can cause sinking of the loop [9].Other techniques used are sutures themselves as bridge but they can have bowstring effect [9-11].

The second category of bridge are subcutaneously placed which may be absorbable [12-15] and nonabsorbable bridges. A rectus fascial sling was used as bridge[16]. Subcutaneous bridge does not raise the mesenteric wall of the colon to skin level or beyond. This could potentially result in the lack of total diversion of intestinal contents resulting in the failure of one of the main purposes of the ostomy. Intestinal contents and flatus would move preferentially toward the low pressure side of any gradient that is into the appliance which is at atmospheric pressure than, into the distal loop [3]. In the New technique described, the bridge tube is placed in the subcutaneous tissue right underneath the dermis. Hence, it would not matter whether the individual is obese or thin. On the other hand, when a rectus sheath sling is used [16], it would matter if the individual is obese. The tube is inserted and stitched on either side before maturation of the stoma. In addition, the colostomy flange and the colostomy bag are applied immediately; the chances of infection or contamination of the tube tract are minimal. The bridge is nontoxic, soft, and gentle on the bowel, whereas at the same time stiff enough to prevent retraction and sinking of the loop. It is cheap and easily available and supplied in sterile packs. The technique does not require great skill, can be performed by junior surgical resident unlike the rectus sling bridge.

In this study 45 patients underwent surgery using the new technique of loop stoma bridge were aged between 14-65 yrs mean age of 45yrs. Colostomy flange was applied immediately; thus preventing the faecal leakage which is distressing to the new stoma patient [17]. Out of 45 patients 23 underwent emergency procedure and were <45 yrs of age, in the 22 patients who underwent elective surgery most were >45yrs. Complications like pain, discharge, dermatitis, eczema were noticed. Pain was noticed in 15 patients among whom it was less than 3 on VAS score and in 3 of them pain was noticed up to maximum of 10 days VAS score <2.Serous discharge was noticed in 4 patients which decreased after keeping the area dry. Day of flange removal was between 9-15th day average being 11thday.Days of hospital stay ranged between 14-32 days mean of 21 days. Eczema, dermatitis was noticed near the stoma site and not near entry or exit point of the bridge.

## Summary

The new technique of loop stoma bridge was performed in 45 patients in our study. It included age group ranging from 14yrs to 65 yrs, mean age of 45yrs.27 patients were males and 18 were females. Complications like pain, discharge, dermatitis, eczema were noticed. Pain was noticed in 15 patients among whom it was less than 3 on VAS score and in 3 of them pain was noticed up to maximum of 10 days VAS score <2.Serous discharge was noticed in 4 patients which decreased after keeping the area dry. Day of flange removal was between 9-15th day, average being 11thday.Days of hospital stay ranged between 14-32 days mean of 21 days. Eczema, dermatitis was noticed near the stoma site and not near entry or exit point of the bridge. Hence this method can be considered as safe, cheap and can be easily performed with low morbidity.

## Conclusion

1. The new technique of loop Stoma Bridge has low morbidity without any mortality.
2. Morbidity is seen in the form of pain and serous discharge only.
3. It is a cheap method wherein a suction tube is used.
4. It helps in the immediate placement of the colostomy appliance resulting in no faecal leakage.
5. The acceptance of the colostomy is better by the patients because there is no faecal leak.

6. Overall it is a very safe procedure, easy to perform by the surgeon and very well accepted by the patient.

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Competing Interest – The authors declare that they have no competing interests.

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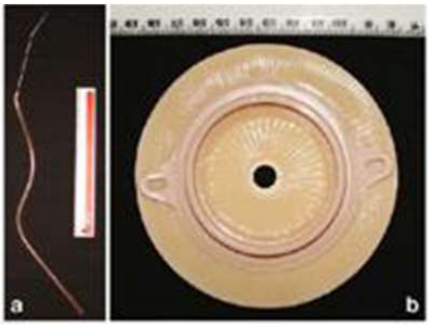


***Figure 1:*** a.closed suction tube b. colostomy flange

***Figure 2:*** New technique of loop stoma bridge

***Figure 3a:*** New technique of loop stoma bridge

***Figure 3b:*** Colostomy flange with bridge

***Figure 4:*** After removal of the bridge

 