



A PROSPECTIVE INTERVENTIONAL STUDY ON EXTERIORIZATION OF INTESTINAL ANASTOMOSIS

General Surgery

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ABSTRACT

Colostomy was introduced in surgical practice more than 200 years ago as a simple and safe procedure. Since then, the time honored dictums "exteriorize colon injuries" and a "well prepared bowel is a pre-requisite for any colon repair", formed the basis for sound colon surgery. In 1945, the practice of routine colostomy was challenged by a military surgeon, James Mason, who introduced the technique of primary suture of unprepared colon and exteriorizing the segment of bowel outside the peritoneal cavity. Initially, this technique did not gain much momentum in civilian practice mainly because of difficulties encountered in introducing procedures which would challenge established orthodox surgical practice. Intestinal disruption is a common problem with a wide-ranging aetiology. It requires anastomosis or repair or creation of stoma with or without Total Parenteral Nutrition therapy. Failure of anastomosis leads to significant morbidity and mortality. Creation of Stoma is associated with significant morbidity. Stoma closure also carries significant risk. In this study, we propose an alternative procedure in the form of exteriorisation of intestinal anastomosis (both small and large bowel), followed by delayed internalization after the anastomosis has healed.

Aim: To develop a technique which could bypass or minimize the risks associated with intestinal disruption following anastomosis and also alleviate the morbidity associated with creation of stomas. Alternative proposed: Exteriorisation of anastomosis.

Materials And Methods: The study has been carried out on 15 patients with clinical presentation of peritonitis in an emergency setting as well as an alternative procedure in an elective setting over a period of 4 years who were seen in general surgery outpatient department (OPD) and general surgery wards of a single teaching institution of Eastern India. The procedural steps include Exteriorisation of anastomosis, keeping the bowel moist using irrigation and internalization after the anastomosis has healed.

Results: 12/19 procedures succeeded (63%). One death occurred due to convulsions despite healing of anastomosis. 7/19 procedures failed (37%). There were two deaths due to failure of anastomosis and lung complications respectively.

Conclusion: Existing treatment options for gut repairs, particularly if proximal, are not wholly satisfactory. This study throws some light on the fact that the temporary exteriorisation of repaired gut is safe. Dangers of intraperitoneal anastomotic leak are avoided. Complications of stoma may be avoided. The requirement of costly, and potentially harmful Total Parenteral Nutrition therapy is lessened. Best technique is yet to be determined.

KEYWORDS

Exteriorisation of Anastomosis, Stoma, Internalization of bowel

INTRODUCTION

Colostomy was introduced in surgical practice more than 200 years ago as a simple and safe procedure.¹ Since then, the time honored dictums "exteriorize colon injuries" and a "well prepared bowel is a pre-requisite for any colon repair", formed the basis for sound colon surgery. In 1945, the practice of routine colostomy was challenged by a military surgeon, James Mason, who introduced the technique of primary suture of unprepared colon and exteriorizing the segment of bowel outside the peritoneal cavity.² Initially, this technique did not gain much momentum in civilian practice mainly because of difficulties encountered in introducing procedures which would challenge established orthodox surgical practice. Nevertheless few reports appeared in the literature since the 1970s using Mason's technique in the emergency management of colon injuries. A literature review of 339 patients treated for colonic injuries by primary repair and exteriorization showed that colostomy was avoided in 63.3% of these patients.³ These patients were saved the staged procedure for colostomy closure and repeated hospital admission.

In many cultures colostomy is not socially acceptable and is strongly resented by patients. In the third world and most developing countries, colostomy appliances are unaffordable or not heard of, special toilet facilities are non-existent and expert personnel in colostomy care are not available. In such circumstances, procedures which would spare patients the inconvenience of colostomy would be most valuable. Nearly all previous studies implementing primary repair and exteriorization of the colon were for colon injuries. In this article we present data on the successful outcome of using this procedure in the management of other colonic and small bowel pathologies.

aetiology. It requires anastomosis or repair or creation of stoma with or without Total Parenteral Nutrition therapy. Failure of anastomosis leads to significant morbidity and mortality. Creation of Stoma is associated with significant morbidity. Stoma closure also carries significant risk. In this study, we propose an alternative procedure in the form of exteriorisation of intestinal anastomosis (both small and large bowel), keeping the bowel moist using irrigation followed by delayed internalization after the anastomosis has healed.

AIM:

To develop a technique which could bypass or minimize the risks associated with intestinal disruption following anastomosis and also alleviate the morbidity associated with creation of stomas.

Alternative Proposed: Exteriorisation of anastomosis

Inclusion Criteria:

A patient requiring gut perforation repair/ anastomosis, in presence of:

- Very old age
- Delayed presentation
- Malnutrition
- Severe peritonitis
- Gut wall oedema/congestion
- Per-operative hypotension

Exclusion Criteria:

- Local/systemic factors which might compromise repair.
- Anastomosis that cannot be mobilised enough
- Repairs of fixed portions of gut

Prerequisites:

- Liberal mobilization

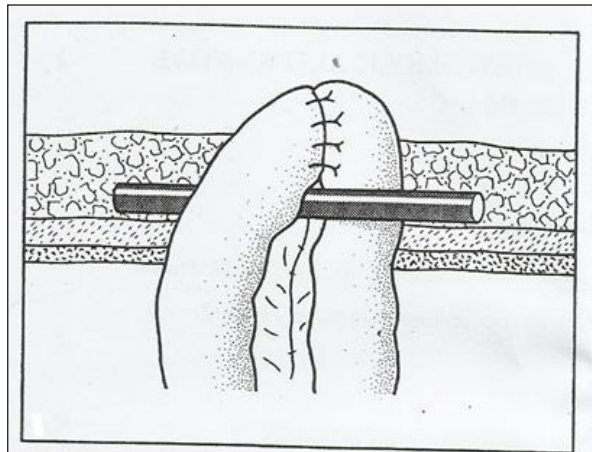
Intestinal disruption is a common problem with a wide-ranging

- Healthy margins
- Moist environment
- Daily inspection
- Early drop-back

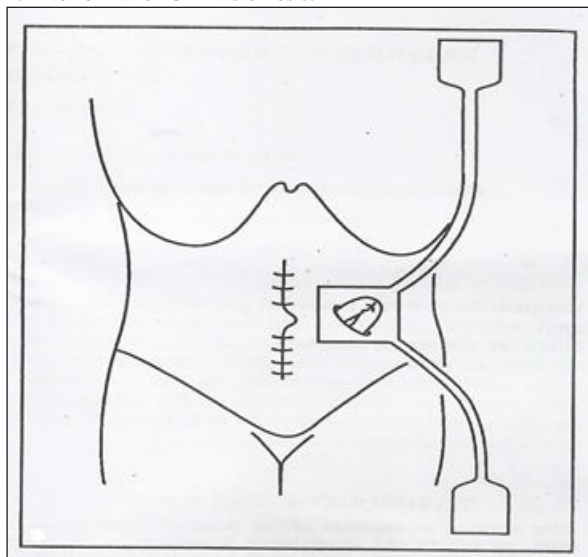
MATERIALS AND METHODS:

The study has been carried out on 15 patients with clinical presentation of peritonitis in an emergency setting as well as an alternative procedure in an elective setting over a period of 4 years who were seen in general surgery outpatient department (OPD) and general surgery wards of a single teaching institution of Eastern India. Written and informed consent was taken from all the patients included in this study. Ethical clearance was taken from the institutional ethics committee.

METHOD:



1. Exteriorization Of Anastomosis:



2. Keeping The Bowel Moist:

3. Internalisation: After The Anastomosis Got Healed, It Was Internalized.

- For the anastomoses which had leaked or perforated, bowel loops were exteriorized and stoma was created. Later, extracorporeal anastomosis was done. This anastomosis was then internalized after it was healed.

Grand Chart:

SL. NO.	CASE/ FINDINGS	INDICATION	PROCEDURE	COURSE	RESULT	COMMENTS
1. 25y M	Typhoid perforation in terminal ileum	Peritonitis Delayed presentation	Ileal perforation repaired and exteriorised beneath skin	Minor leak, which closed spontaneously	Internalised, 4 weeks later; well on 4 years follow-up	WORKED
2. 30y F	Tuberculous perforation in mid ileum	Peritonitis	Perforation repaired and exteriorised beneath skin	Healed, with normal gut function till 1 month	Patient did not return for internalisation	WORKED
3. 30y M	Transverse colon injury leading to circumferential haematoma	Doubtful Bowel viability; loaded colon	Transverse Colon resection anastomosis done and exteriorised beneath skin	Healed, with normal gut function till 3wks	Patient did not return for internalisation	WORKED
4. 34y F	Severe appendicitis with caecal gangrene	Doubtful bowel viability	Limited Right Hemicolectomy, with ileo-ascending anastomosis, exteriorised beneath skin	Healed, with normal gut function	Internalisation at 3 months; dense adhesions found, well at 4 years follow-up	WORKED
5. 35y M	Appendectomy + reoperation with complicated, multiple fistula	Gross malnutrition Sepsis	Limited Right hemicolectomy with ileo-ascending anastomosis, exteriorised open	Healed, with normal gut function; had Subacute Intestinal Obstruction which resolved spontaneously	Internalised at 9days; well at 1 ^{1/2} years follow-up	WORKED
6. 15y M	Meckel's diverticulum perforation	Peritonitis	Ileal resection and anastomosis, exteriorised open	Healed, with normal gut function	Internalised at 2 weeks; well at 2 years follow-up	WORKED
7. 50y F	Caecal growth	Hypoalbuminaemia , Anaemia	Right hemicolectomy with ileo-transverse anastomosis exteriorised open	Leaked on 4th day- converted to stoma	Patient died due to pulmonary complications on 7th day	FAILED
8. 43y M	Proximal ileal gangrene due to adhesions	Doubtful bowel viability Delayed presentation	Ileo-ileal anastomosis exteriorised open	Leaked - converted to stoma on 7th day. Worsened, no TPN-repaired extra-corporeally	Internalised on 9th day; Well at 1m follow-up	FAILED WORKED!
9. 70y M	Mesenteric ischaemia	Doubtful bowel viability	Ileo-ileal anastomosis exteriorised open	Leaked and converted to stoma on 7th day	Discharged with stoma, lost to follow-up	FAILED

10. 34y M	Severe abdominal trauma causing loss of parietes and ileal injury	Gross loss of abdominal wall precluding closure	Ileo-ileal anastomosis left exposed in wound bed	Leaked-repeated attempts at extra-corporeal repair of the gut failed.	Patient expired after 11 weeks	FAILED
11. 61y M	Abdominoperineal Resection, for low rectal carcinoma-ileal perforation, on 16 th postoperative day	Peritonitis	Mid-ileal perforation found-repaired and exteriorised	Leaked and converted to stoma on 5th day	Survived, but lost to follow-up after 4 weeks	FAILED
12. 70y F	Ileal perforation due to ingested foreign body	Peritonitis Doubtful bowel viability	Ileo-ileal anastomosis exteriorised open	Prolonged ileus, anastomosis healed	Internalised at 3 weeks Well on follow-up at 3 months	WORKED
13. 19y M	Multiple Tuberculous strictures of jejunum with perforation of proximal stricture; on Anti-tubercular drugs	Peritonitis Delayed presentation Failure of 1st repair	Perforation exteriorized-Repaired extra-corporeally at 12 days -failed-Resection - anastomosis done on 29th post-op day extra-corporeally	Healed well	Sudden death on 10th day after convulsions, before drop-back could be achieved	FAILED WORKED
14. 45y M	Duodenal perforation with mid-ileal perforation	Peritonitis Failure of 1st repair	Both repaired. Peritonitis detected on 10th post-op day-reexplored-3rd new perforation in proximal jejunum and leakage from ileal repair- resection and anastomosis of jejunal segment and re-repair of ileal perforation	Both suture lines exteriorised; ileal repair healed well but jejunal repair leaked from 3rd post op day-No TPN available -re-repaired extra-corporeally and skin closed over it on 14th day- minor leak	Internalised at 4 weeks Well on follow-up at 3 years	FAILED WORKED WORKED
15. 28y F	Ileal perforation due to Gossypiboma	Peritonitis	Ileoileal anastomosis exteriorised open	Minor leak on 8th day which healed on conservative management	Patient discharged with healing main wound; Well on follow-up at 1 year	WORKED

RESULTS:

- 12/19 procedures succeeded (63%)
- 1 death due to convulsions despite healing of anastomosis
- 7/19 procedures failed (37%)
 - 4-original disease,
 - 2- technical opening too narrow (Case 8)
 - instrumental injury (Case 9)
 - 1-inability to provide abdominal wall cover(Case 10)
- 2 deaths
 - 1-failure of anastomosis (Case 10)
 - 1-lung complications (Case 7)

SITE:

Colon: 1

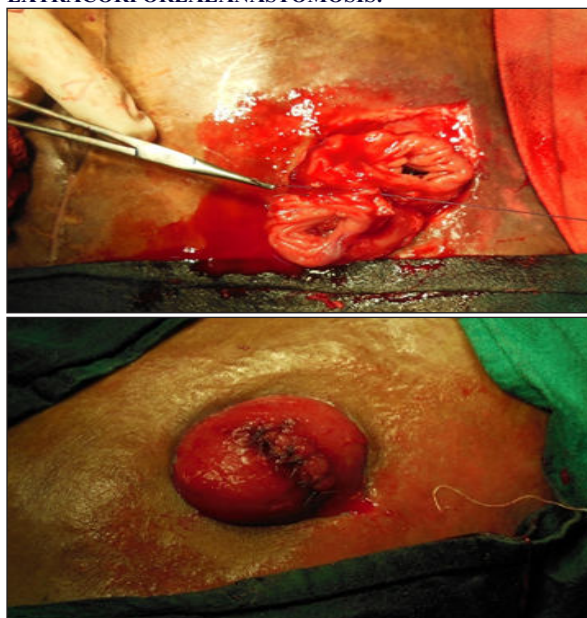
Ileum: 11

Ileo-colic: 3

Jejunum: 4

 Open exteriorization: 13
 Beneath skin: 6
ANALYSIS:

TOTAL 15 CASES	AETIOLOGY:	INDICATIONS:	PROCEDURE DONE:
19 PROCEDURES	Koch's: 2	Peritonitis: 8	Jejunal perforation repair: 1
	Typhoid: 1	Doubtful Viability: 5	Jejunal resection and anastomosis: 3
	Other	Malnutrition: 2	Ileal resection and anastomosis: 7
	Infections: 5	Abdominal wall loss: 1	Ileal perforation repair: 4
	Trauma: 2	Failure of 1 st repair: 3	Ileo-Colic anastomosis: 3
	Growth: 1	Age above 60 yrs: 3	Colonic anastomosis: 1
	Non-specific: 2	Delayed presentation-most!	
	Ischaemic: 2		

EXTRACORPOREAL ANASTOMOSIS:

Steps Of Internalisation:**Late Follow Up:****DISCUSSION:**

Mortality and morbidity of septic peritonitis due to anastomotic leak, remains significant. Total average mortality rate due to secondary bacterial peritonitis was 18.5%.⁴ Anastomotic leaks are frequently diagnosed late in the postoperative period and often after initial hospital discharge, highlighting the importance of prospective data entry and adequate follow-up. CT scan is the preferred diagnostic modality when imaging is required.⁵ Factors predictive of anastomotic leaks include chronic obstructive pulmonary disease, peritonitis, bowel obstruction, malnutrition, use of corticosteroids, and perioperative blood transfusion.⁶ The overall rate of anastomotic leakage was 3.4 percent⁶ and the mortality following dehiscence was estimated to be approximately 24 percent.⁷ Management of an anastomotic leak is aimed at repair or creation of stoma. Creation of Stomas lead to significant nutritional disturbances along with fluid and electrolyte depletion. The more proximal the location of the stoma the more severe is the incidence of complications. Staged procedures are needed for stoma closure. The outcome of stoma surgery was greatly influenced by bowel quality. The overall complication rate for creating a stoma was 36 percent.⁸ Another study done on complications following colostomy closure revealed a complication rate of 33 percent.⁹ The major factor affecting the complication rate was the interval of time from creation of the colostomy to its closure.¹⁰ Two classic approaches have been applied to the surgical management of colon injuries. One has been exteriorization of the injured segment. The other has been primary repair of the injury in selected cases. A compromised approach can be utilized when the risk of leakage is high in a primarily repaired segment of colon: exteriorization of the primarily repaired injury without colostomy. This technique has prevented the need for formal colostomy in 49 per cent of a group of thirty-seven patients who otherwise would have required colostomy. This approach appears to be a useful addition to the various procedures used for the treatment of penetrating injuries of the colon in civilian practice.¹¹

Another study by Kirkpatrick JR with this procedure has demonstrated that it is a safe, reliable adjunct to be used in colon surgery when primary intraperitoneal repair is not desirable, that the added operating time (20 to 30 minutes) will not be deleterious to the patient and that the likelihood of a prolonged septic postoperative course is not high.¹² Exteriorized colon anastomosis is simple, avoids the inconvenience of colostomy and can be an alternative to routine colostomy. It is suitable where colostomy is socially unacceptable or care is not available.¹³

Advantages Of The Proposed Alternative Procedure:

- Avoids intrabdominal contamination, upon leak
- Avoids stoma, if successful
- Permits enteral nutrition
- Avoids need for Total Parenteral Nutrition
- Easily convertible to stoma on failure

- Easier and safer final step- Drop back is easier and safer than stoma closure.

Disadvantages Of The Proposed Alternative Procedure:

- A second operation is almost always required
- There is a significant chance of obstruction
- Post-leak created stoma is inferior to planned stoma
- Late complications are expected to be similar to stoma.

CONCLUSION

Existing treatment options for gut repairs, particularly if proximal, are not wholly satisfactory. This study throws some light on the fact that the temporary exteriorisation of repaired gut is safe. Dangers of intraperitoneal anastomotic leak are avoided. Complications of stoma may be avoided. The requirement of costly, and potentially harmful Total Parenteral Nutrition is lessened. Best technique is yet to be determined. Randomised Control Trials with a large number of patients could help in better understanding of the advantages and disadvantages of the approach.

Conflict Of Interest:

The authors declare that there is no conflict of interest.

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