

# Single Interrupted Extramucosal Suturing of the Bowel is a Safe Surgical Technique

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## Abstract

**Background:** Leakage from an anastomosis in the gastrointestinal tract is a major complication that is often associated with increased mortality, morbidity and prolonged stay. Different techniques of intestinal anastomosis are present:

- Sutured
  - Single-layer (interrupted or continuous)
  - Two-layered
- Stapled

Controversy regarding single versus double layer anastomosis goes as back as 1887 when Halsted proposed interrupted extra mucosal suturing.

**Aim of the study:** To evaluate the safety of the technique single interrupted extramucosal suturing of the bowel.

**Patients and Method:** This is a prospective study of 60 patients undergoing intestinal surgery over a period of one year and 9 months (January 2009-september 2010) in baquba teaching hospital; Both of emergency and elective surgeries are included in the study.

The way of bowel suturing (perforation or anastomosis) used was single interrupted extramucosal using two zero vycril (polyglactine).

**Results:** No single patient developed anastomosis dehiscence or fecal fistula and they all tolerated early oral feeding.

**Conclusion:** Single-layer sero-submucosal (extramucosal) technique is safe, easy to perform, simply to taught and with no anastomosis-related morbidity and mortality. It can also be accomplished in shorter time.

**Keyword:** Intestinal anastomosis, bowel suturing technique.

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## Introduction

Leakage from an anastomosis in the gastrointestinal tract is a major complication that is often associated with increased mortality, morbidity and prolonged stay [1].

Different techniques of intestinal anastomosis are present: [2]

- Sutured
  - Single-layer (interrupted or continuous)
  - Two-layered
- Stapled

Controversy regarding single versus double layer anastomosis goes as back as 1883 when Halsted proposed interrupted extra mucosal suturing. Then Senn in 1887 advised double layer anastomosis. By 1931, more than 52 techniques for G.I anastomosis had been described [3]. Currently single layer extra mucosal anastomosis is popular as advocated by Norman Matheson of Aberdeen as it probably causes the least tissue necrosis and luminal narrowing. [4]

Double layer anastomosis produces mucosal inversion and serosal apposition. The first inner layer is anastomosed but taking suture through all coats of gut wall and in second outer layer, serosa is approximated. The inner layer is believed to be haemostatic but there are chances of strangulation of mucosa due to damage to submucosal vascular plexus [5]. In single layer technique, only seromuscular layer of gut wall is approximated. This technique incorporates the strongest layer (submucosa) of gut and causes minimal damage to the submucosal vascular plexus. The objections against traditional double layer are that it ignores the basic principle to accurately opposing the clean cut edges and large amount of ischemic tissue within the suture line which may increase the incidence of leak and excessive inversion may lead to narrowing of lumen.[6] In contrast, single layer technique, employing extra mucosal sutures allows for accurate opposition, incorporate the strongest layer (submucosa) of gut, causes minimal damage to submucosal vascular plexus and least disturbance to lumen.[7,8]

Interrupted single layer is now widely considered to be the gold standard for intestinal anastomosis [9].

Anastomotic failure had always been a cause for concern in patients undergoing surgery with gastrointestinal anastomosis, as it adversely affects the surgical outcome. Healing process is dependent on general factors as age, state of nutrition and associated diseases like renal failure, jaundice, malignancy, as well as local factors like vascularity, sepsis and suture technique.(10) *The optimal method of intestinal anastomosis would:*

- Promote primary healing by achieving accurate alignment of the divided bowel
- Cause minimal disruption of local vasculature

- Incorporate the minimum amount of foreign material
- Not to implant malignant cells at the anastomosis
- Not to enhance the risk of metachronous cancers.[11]

Experimentally one layer technique has been proven superior to two layer method with respect to luminal reduction, tissue strangulation and strength of anastomosis on the fifth postoperative day. Mucosal continuity and muscle realignment on histological examination occurs more rapidly with single layer method. In addition to safety associated with the use of one layer technique there are other advantages, of which most appealing is its simplicity. This is especially apparent in very low rectal anastomosis where a single layer is much easily placed compared to two layer technique in the deep confined space. [12, 13, 14, 15, 16]

Though the general factor plays an important role in the ultimate outcome they may not be correctable all the time. Surgeon may have to operate in a comprised or nearly optimized general condition. This is where safety of technically controllable factor becomes a major determinant of ultimate outcome.

The extra mucosal anastomosis, reappraised by Matheson and Irving, with acceptable morbidity and mortality, may be considered as having many of the attributes of an ideal and safe anastomosis. [17, 18, 19, 20, 21, 22]

### **Aim of the Study**

To evaluate the safety of the technique single interrupted extramucosal suturing of the bowel.

### **Patients and Methods**

This is a prospective study of 60 patients undergoing intestinal surgery over a period of one year and 9 months (January 2009-september 2010) in baquba teaching hospital;

reviewed for the safety of the technique single interrupted extramucosal suturing of the bowel.

Both of emergency and elective surgeries are included in the study.

**Table (1):** Types of elective surgeries included in the study.

Type of surgery	Number
Closure colostomy	6
Closure ileostomy	3
<b>Total number</b>	<b>9</b>

The emergency surgeries are due to stab wounds, shell injuries, bullet injuries or blunt trauma.

**Table (2):** Types of emergency surgeries included in the study.

Type of surgeries	Single	Multiple	Total
Single or multiple perforation in the small bowel	15	23	38
Single or multiple perforations in the large bowel	4	1	5
Single or multiple anastomoses in the small bowel	5	3	8
<b>Total number</b>	<b>24</b>	<b>27</b>	<b>51</b>

The method of bowel suturing (perforation or anastomosis) used was single interrupted extramucosal using two zero vycril (polyglactine).

The strategy of the study was not to place a nasogastric tube and to start oral sips of water (30 ml) every 1 hour starting 24 hours following surgery (and continue for 24 hours) regardless the presence or absence of bowel sound (assuming that the small bowel function return to normal within 4-6 hours) and providing the patient has no vomiting. In the next 24 hours the patient asked to increase fluid intake to half a glass (125 ml) every a half hour with an added simple solid food as biscuit or cake or small pieces of bread.

In the next 24 hours (fourth 24 hours postoperatively), the patient allowed free oral fluid and to have solid food as well. The patients tested for the development of gastric upset, repeated vomiting or the development of fecal fistula (disruption of intestinal suturing).

The patient asked to stop intake whenever he (she) developed repeated vomiting. The patient is considered not tolerating early oral

intake when 3 days (72hours) passed and still not able to tolerate the oral intake(fluid or solid).

### Results

No single patient developed anastomosing dehiscence or fecal fistula and they all tolerated early oral feeding.

### Discussion

Sixty patients undergone intestinal surgery both elective and emergency in baquba teaching hospital over a period of one year and nine months. They were reviewed for the safety of the technique of single interrupted extramucosal suturing of the bowel.

No single patient developed anastomosing dehiscence or fecal fistula. This is in concordance with those of Irwin ST, Krukowski ZH, Matheson NA [19], Matheson NA [20] and those of Matheson NA, McIntosh CA [21] .;they all concluded the safety of single layer suturing of the bowel and it is even superior to double layer suturing in avoiding fecal fistula. It is also simple and can be accomplished in shorter time.

## Conclusion

Single-layer serosubmucosal (extramucosal) technique is safe, easy to perform, simply to taught and with no anastomosis-related morbidity and mortality. It can also be accomplished in shorter time.

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