

## A Comparative Study of Prophylactic Retention Suturing Versus Primary Closure in Laparotomies for Perforation Peritonitis

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### Abstract

**Introduction :** Abdominal wound dehiscence either partial or complete, a common complication of laparotomy and causes a significant mortality and morbidity, with prolonged hospital stay and repeated surgical interventions. So if any system exists to predict possibility of wound dehiscence, prophylactic retention suturing can be done to prevent adverse events. This study is done to compare such Retention suturing with conventional primary closure in Emergency Laparotomies done for perforation peritonitis.

**Aims and objectives:** The aim of the study was to assess the reduced rate of dehiscence in midline laparotomy using prophylactic retention sutures in high- risk patients.

**Materials and methods:** The study included 60 patients who underwent Emergency laparotomy for perforation peritonitis under regional or general anaesthesia were randomized into two groups of 30 each. The study group was monitored for wound healing, pain, hospital stay, wound gaping, wound infection, evisceration in post operative period.

**Results :** In our study, we have derived that , 14 out of 30 patients (46.7%) who underwent convention primary closure developed wound dehiscence when compared to 3 out of 30(10.0%) in prophylactic retention suturing group . 17 out of 60 patients underwent re-surgery.

**Key words:** Prophylactic, Retention suturing, perforation peritonitis, wound gaping

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### I. Introduction

Acute wound failure (wound dehiscence or a burst abdomen) refers to postoperative separation of the abdominal musculo-aponeurotic layers. It is among the most dreaded complications faced by surgeons and is of great concern because of the risk of evisceration. Acute wound failure occurs in approximately 1% to 3% of patients who undergo an abdominal operation. Dehiscence most often develops 7 to 10 days postoperatively but may occur anytime after surgery, from 1 to more than 20 days. A multitude of factors may contribute to wound dehiscence. Acute wound failure is often related to technical errors in placing sutures too close to the edge, too far apart, or under too much tension<sup>1</sup>. Local wound complications such as hematoma and infection can also predispose to localized dehiscence. Increased intra-abdominal pressure (IAP) is often blamed for wound dehiscence.

Different surgical techniques for closing the laparotomy wounds are being advocated such as interrupted or continuous suturing, mass closure/ layered closure , delayed absorbable/non-absorbable . Abdominal wound dehiscence is surgically managed by retention sutures, mesh, biological implant placement, and interrupted X sutures.

Main objective of the study is to compare the wound healing in prophylactic retention suturing verses conventional primary closure in emergency laparotomies for perforation peritonitis. Secondarily to compare, incidence of wound dehiscence, wound infection, post operative pain, re-surgery and hospital stay.

### AIM

The aim of the study is to compare the efficacy of prophylactic retention suturing technique versus conventional primary closure in patient undergoing midline laparotomy for perforation peritonitis.

### PRIMARY OBJECTIVE

To compare the efficacy of prophylactic retention suturing technique versus conventional primary closure in patient undergoing midline laparotomy for perforation peritonitis.

## **SECONDARY OBJECTIVE**

To compare the prophylactic retention suturing versus conventional primary closure in emergency laparotomies in terms of wound dehiscence, post operative pain, hospital stay and re-surgery.

## **II. Materials And Methods**

This comparative study of wound healing in perforation peritonitis is based on the patients admitted with signs and symptoms of peritonitis due to gastrointestinal perforation for a period of 12 months from December 2016 to December 2017, in general surgery department of Coimbatore medical college hospital, Coimbatore.

A total of 60 patients presenting with perforation peritonitis at emergency department were subjected to emergency midline laparotomy. They are divided into two groups by simple random sampling.

### **INCLUSION CRITERIA:**

- 1) Patients with features of perforation peritonitis undergoing emergency laparotomy.
- 2) Patients age group 20 years and above.
- 3) Patients with Anaemia.
- 4) Patients with Hyperbilirubinemia.
- 5) Patients with Hypoproteinemia.

### **EXCLUSION CRITERIA:**

- 1) Age less than 20 years.
- 2) Immuno-compromised patient.

After proper clinical assessment the patients were actively resuscitated with analgesics, intravenous fluids, nasogastric aspiration and antibiotics. The bladder was catheterized to monitor the urine output.

After stabilizing the general condition, the patients were taken up for surgery. Postoperatively nasogastric aspiration was continued, nutrition and electrolyte balance were maintained with intravenous fluids.

Patients were monitored in the post operative period for pain, wound infection, seroma formation, wound dehiscence, and evisceration. All data were recorded and statistically analysed.

## **III. Results**

This prospective comparative study was conducted among 60 high risk patients who underwent emergency midline laparotomy for hollow viscus perforation in the emergency general surgery department CMCH, Coimbatore. The study was carried out to compare the efficacy of retention suturing against conventional primary wound closure in midline laparotomies for perforation peritonitis in terms of wound infection, post operative pain, wound dehiscence, hospital stay, re-surgeries.

In our study there were total of 60 patients, 30 (50%) underwent primary closure and 30 (50%) underwent prophylactic retention suturing for midline wound closure. In this 46 (77%) were males and 14 (23%) were females. The mean age (in years) who underwent primary closure is 38.53 and 54.6 in case of retention closure which is significant (  $p = 0.001$ ).

Post operative pain in the study group was low which was statistically significant (  $p = 0.001$ ). Incidence of wound dehiscence was also low in the study group which was statistically significant (  $p = 0.002$ ). Length of hospital stay (in days) in study group was also low (  $p = 0.001$ ).

One patient in the study group and seven patients in the control group developed evisceration of abdominal contents (  $p = 0.023$ ) which is significant and 3 patients (10.0%) in study group and 14 patients (46.7%) in control group underwent re-surgery (28.3%) (  $p = 0.002$ ).

No statistically significant difference was observed between study and control group in terms of seroma formation and wound infection. Post-operative morbidity and mortality was found to be significantly low in the study group compared to the control.

## **IV. Discussion**

Wound dehiscence is disruption of any or all of the layers in a wound<sup>6</sup>. Dehiscence may occur in up to 3 per cent of abdominal wounds.<sup>2</sup> Wound dehiscence most commonly occurs from the 5<sup>th</sup> to the 8<sup>th</sup> postoperative day when the strength of the wound is at its weakest. It may herald an underlying abscess and usually presents with a serosanguinous discharge. The patient may have felt a popping sensation during straining or coughing. It is a mechanical wound failure due to various factors causing separation of the closed abdominal wound often with evisceration of the contents.

## **RISK FACTORS IN WOUND DEHISCENCE**

### **General<sup>3</sup>**

- Malnourishment
- Diabetes
- Obesity
- Renal failure
- Jaundice
- Sepsis
- Cancer
- Treatment with steroids

### **Local**

- Inadequate or poor closure of wound
- Poor local wound healing, e.g. because of infection, haematoma or seroma
- Increased intra-abdominal pressure, e.g. in postoperative patients suffering from chronic obstructive airway disease, during excessive coughing

The relative merit of vertical versus transverse incisions remains a topic of active debate.<sup>4</sup> Proponents of transverse incisions argue that they anticipate a more secure closure than do vertical incisions, a hypothesis supported by anatomic and surgical principle. The fascial fibers of the anterior abdominal wall are oriented transversely or obliquely. Therefore, transverse incisions parallel the direction of the fascial fibers and allow for ready re-approximation with sutures placed perpendicular to these fibers. In contrast, vertical incisions disrupt fascial fibers and must be re-approximated with sutures placed between fibers<sup>5</sup>. In the latter case, the absence of an anatomic barrier may predispose such sutures to pull through tissue resulting in dehiscence or hernia formation. Despite these concerns, little evidence supports a substantial benefit of transverse incisions.

The abdomen can be closed in multiple layers or en mass.<sup>7</sup> The former technique reconstructs the anterior and posterior aponeurotic sheaths separately with the posterior layer generally incorporating the peritoneum. Mass closure involves a single-layer closure of all layers and may or may not include the peritoneum.

Given the shorter time required to close the fascial layers en mass, this method is generally preferred. Nonabsorbable monofilament suture material is used for the closure even though evidence says that there is no difference between synthetic absorbable like polyglactic acid and nonabsorbable monofilament suture. Nonabsorbable suture causes prolonged wound pain but is preferred in risk category patients. Suture bite interval should be 1 cm but not more; suture length and wound length ratio should be 4 : 1 or more but not less.

Pinkish serosanguineous discharge (salmon-coloured large quantity of fluid) from the wound should raise the suspicion of wound dehiscence. Often omentum or coils of intestine are forced out of the wound. Probing of the wound using gloved finger appreciates dehiscence of musculoaponeurotic layer.

Indications for prophylactic placement of retention sutures<sup>8</sup> at initial operation remain controversial. The purpose of retention sutures in this setting is to relieve tension along the suture line in order to prevent significant wound disruption and evisceration in the patient at high risk.

The potential disadvantages of retention sutures, however, are well known and include entrapment of underlying viscera, increased postoperative pain, poor cosmesis, and leakage of intraperitoneal fluid through the wound.

When employed, retention sutures are placed across the wound prior to formal fascial closure. Interrupted permanent mono filament sutures are passed through skin and fascia approximately 2 cm from the wound margin at intervals of several centimeters. Placement is facilitated by the use of a long cutting needle. It may be advantageous to omit the peritoneum from the retention closure in order to protect underlying viscera from injury or entrapment. After conventional closure of the fascia, the sutures are threaded through rubber tubing bolsters or commercially available plastic bolster devices and tied at the skin level.

## **V. Conclusion**

Study concludes that Prophylactic Retention suturing in patients with perforation peritonitis undergoing emergency midline laparotomy decreases the incidence of wound dehiscence, reduces pain and lessens hospital stay in high risk patients, when compared with conventional primary wound closure.

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