

An Experience with Primary versus Delayed Primary Wound Closure in Dirty Abdominal Surgery

Primary vs Delayed Primary Wound Closure

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ABSTRACT

Objectives: To evaluate as primary closure versus delayed primary closure in dirty abdominal surgeons.

Study Design: Observational / descriptive study.

Place and Duration of Study: This study was conducted at two units surgery at tertiary care academic hospitals of Liaquat University of Medical and Health Science (LUMHS) Jamshoro and Peoples University if Medical and Health Science (PUMHS) Nawabshah from March 2014 to May 2016

Materials and Methods: 100 patients of both genders from 18 - 62 years in age. Who underwent in exploratory laparotomy for gut perforation or intra-abdominal abscess by two units were involved in this prospective interventional randomized control (RCT). Study population was divided into A and B Groups, based on having primary closure and delayed primary closure respectively. The randomization of patients samples was simple by alternating technique. While samples were of equal size 70 in each group to maintain balance. Study population was divided into A and B Groups, based on having primary closure and delayed primary closure respectively. The randomization of patients samples was simple by alternating technique. Primary and secondary outcomes were SSI and length of history and incisional hernia respectively.

Results: All patients in both groups (28(30%) operated for either penetrating or blunt abdominal trauma were in between (21-32 years). In this plot of 94 patients, 25 (26.5%) from both groups developed wound infection. While in group A, the incidence of SSI was 36% versus 17% of Group B. The total length of hospital stay was bit greater in group B versus A. while rate of post-operative complications and re-admission was higher in group A versus group B. Cause of death was not wound infection in both groups.

Conclusion: Delayed primary closure is safe and effective with reduce rates of SSI as in our part of the world, where infectious disease are on the top and hospital resources are limited.

Key Words: Wound closure, dirty abdominal surgery and surgical site infection..

Citation of article: Shah SKA, Pathan AH, Memon GA, Sahito RA, Rehman H, Leghari S, Baloch S. An Experience with Primary versus Delayed Primary Wound Closure in Dirty Abdominal Surgery. Med Forum 2017;28(4):42-45

INTRODUCTION

Exploratory laparotomy is a very common surgical procedure mostly offered in emergency for dismal and treacherous intra peritoneal insults, while to close primarily or left it open remains controversial debate.¹ The unclosed abdomen after surgery is a nightmare for surgeons and causes a heavy burden to public health resource.² While, incisional hernia results more common in contaminated surgery.³

It has been noticed that primary fascial closure may be associated with high mortality rates due to induced

visceral compression per se.⁴ While delayed abdominal closure in dirty abdominal surgical procedures would effectively prevent the life threatening complication of SSI¹¹. Although the delayed closure often leads to a planned ventral hernia but it earns growing popularity in infectious conditions compared with primary fascial closure.⁵

Surgical site infection (SSI) following abdominal surgery is common. Surgical site infection confers significant morbidity, with an additional risk of mortality.⁶ There are further health care-related costs, through increased hospital stay, repeated surgery, nursing care costs, and drug treatment¹⁵. Because of these factors, there is international interest in reducing the rate of SSI.⁷ Open wounds should always be irrigated with normal saline on daily bases to decrease the load of contamination. Indeed, reduced rates of SSI are seen in more in delayed closure of abdomen. While these infected surgical site wounds exhausts health care system of treatments.

It is observed that rates of SSI get decreased when are closed later after 3 to 5 days with decreasing number of

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bacteria by daily washing with normal ²⁶. It is the matter of record, that daily cleansing of wound with normal saline gives good granulation of wound to close.⁸

However the most recent systematic review and meta-analysis comparing the efficacy of delayed primary closure by including only randomized controlled trials (RCTs) found no benefit of delayed primary closure compared to primary closure ³⁰. So the perplexed reports in literature are not drawing clear guide lines.

So, this study was designed to evaluate as primary closure versus delayed primary closure in dirty abdominal surgeons.

MATERIALS AND METHODS

100 patients of both genders from 18-62 years in age, who underwent in exploratory laparotomy for gut perforation or intra-abdominal abscess by two units of surgery at tertiary care academic hospitals of Liaquat University of Medical and Health Science (LUMHS) Jamshoro and Peoples University of Medical and Health Science (PUMHS) Nawabshah from March 2014 to May 2016 were involved in this prospective interventional randomized control (RCT), after having informed consent as per described policy. Patients with uncontrolled diabetes mellitus, H/O previous abdominal surgery, intra-abdominal collections or having chronic liver disease and advanced malignancy were not included in this study.

Variables including patients demographic, clinical characteristics, reasons for subsequent laparotomy and post-operative complications compared in both groups were selected for analysis.

Study population was divided into A and B Groups, based on having primary closure and delayed primary closure respectively. The randomization of patients' samples was simple by alternating technique. While samples were of equal size in each group to maintain balance.

Interventions: After having rehydration, every patient received prophylactic antibiotic (3rd generation cephalosporin/cefotaxime) 1gm intra venously (I/V) half hour before induction of anaesthesia and surgery, then 12 hourly along with metronidazole (500mg) and analgesic (Diclofenac Sodium 50-75mg) (I/V) 8 hourly daily. The antibiotics were changed after culture and sensitivity (C/S) reports. Vitals were recorded twice daily and wounds were also observed for signs of infection once a day.

Procedure

- After all aseptic measures exploratory laparotomy was done in every patient.
- Peritoneal cavity contaminants were taken for C/S test and then were sucked.
- Definitive surgery with meticulous hemostasis was offered.

- Copious peritoneal lavage was done with 3 - 6 liters of normal saline.
- Deep abdominal wall (musculoperitoneal layer) was closed with continuous inter locking stitches with non-absorbable monofilament number 0 - 1 suture having tension free edges.
- Superficial wound was again irrigated with normal saline.
- So the patient were enrolled either in wound open or closed.
- The left over wounds were packed with povidone-iodine soaked gauze pieces and primary closed wounds were dressed with dry gauze.
- All these surgeries were carried out by qualified consultant surgeons.

Post-operatively: All open wounds were cleansed and dressed with Eusol daily for 5-7 days and then when wound was without any bloody or purulent discharge and having granulation was closed (delayed primary closure) and was dressed with dry gauze.

Stitches were removed on 7th and 15th post-operative day in group A and B respectively.

Discharge: When the condition of patient was satisfactory.

Outcome Observation duration: 3 months.

Follow up: At 10th day after discharge then fortnightly for 03 months.

Definition: Dirty abdomen means infection present in operational field before laparotomy secondary to traumatic wounds with retained devitalized tissue or existing clinical infection with or without perforated viscera.

Primary outcomes: SSI

- Inflammation (Pain, swelling, tenderness).
- Exudate.

Secondary outcomes:

- Length of hospital stay (days).
- Incisional hernia.

Data Collection: Demographics information, pre-operative and post-operative data including operating time, volume of blood transfused and reason / nature of disease were collected and recorded on specially designed form of this study by Registrars and Residents of both units accordingly.

Statistical Analysis: Was performed using SPSS software version 18.0 (SPSS Inc. Chicago Illinois) for windows ordinal variable were analyzed using χ^2 test, nominal variable were analyzed with fisher exact test, and $P < 0.05$ was set for statically significance.

RESULTS

Patient Population: A total of 100 patients met the inclusion criteria, 06 patients were drop out in follow up. Hence, remaining 94 patients from both hospitals were included in this study analysis.

There were no significant differences in demographics or clinical variables between the control group A and study group B.

However, table No. 1 displays the basic characteristics of demographics, age, gender, body mass index, pre-operative co-morbidities, ASA scores, reasons for emergency exploratory laparotomy and type of surgical approaches. In both groups the experience of operating surgeons were more than 10 years.

Table No. 1:

Characteristics of patients	Group A	Group B
Sex n (%)		
Male	34	37
Female	13	10
Median Age in years	35	32
Range	(20-58)	(18-60)
ASA (n%) 1		
ASA (n%) 2		
ASA (n%) 3		
BMI, Kg/ m ² (Median)	22.1 (14.5-25.5)	24.5 (17.4-31.2)
Controlled Diabetes Mellitus	07	09
Reasons for laparotomy		
Typhoid perforation	25	27
Duodenal perforation	04	02
Abdominal tuberculosis	03	02
Penetrating abdominal trauma	08	06
Blunt abdominal trauma	05	07
Bowel gangrene	02	03

Table No. 2:

Outcomes	Group A	Group B
Fever. SSI	17 (36%)	8 (17%)
Length of total hospital stay	12.5 days	14.36 days
Re-admission	6 (13%)	9 (19%)
Mortality During hospitalization	1	2
During 3 days	1	1
Post-op. wound dehiscence	6 (13%)	2 (4.2%)
Intestinal leak/blow out	3 (6.3%)	2 (4.2%)
Incisional hernia	6 (13%)	3 (6.3%)

Age and Sex: In group A, the median age was 35 years (ranges, 20-58) with 34 (72.3%) male and 13 (27.7%) female, resulting in male to female ratio of 2.6 to 1. While in group B, the median age was 32 years (ranges, 18-60) with 37 (78.7%) males and 10 (21.3%) females, results as male to female's ratio of 3.7 to 1. In both

groups the peak age remains (20-38), that almost accounts for 50% of the cases. All cases in both groups (28(30%)) operated for either penetrating or blunt abdominal trauma were in between (21-32 years).

While, table No. 2 compares the outcomes (aims of study) in two Groups

In this plot of 94 patients, 25 (26.5%) from both groups developed wound infection.

While in group A, the incidence of SSI was 36% versus 17% of Group B. The total length of hospital stay was bit greater in group B versus A. while rate of post-operative complications and re-admission was higher in group A versus group B. Cause of death was not wound infection in both groups.

DISCUSSION

Inspite of trail blazing innovations in medicine, SSI still remains to be the most common incompatible challenge for surgeons in abdominal surgeries, and accounts for 15-25% depends on the level of contamination.⁹ Bacterial colonization on the patient's skin, alimentary tract and genital tract are the principal contributing sources that leads to SSI. SSIs are associated with greater cost, morbidity/mortality, re-admission rates, and longer hospital stay.¹⁰

In general (sum of both groups), the prevalence of SSI (26.5%) in our study is little higher in comparison to 10-20% as is reported in other studies.^{11,12} This may be because this study carries the greater number of typhoid perforations, as the incidence of SSI increases with level of contamination inspite of liberal peritoneal and wound lavage.¹³

This study exhibited multiple co-morbid conditions as multiple co-morbidities inevitably put an increased risk for developing SSI and wound infection, and has inferred the rate of SSI of 36% in primary closure compared to delayed primary wound closure (17%), which is higher. This significant inference is in same line of focus seen by other studies.^{14,15}

A Study by Usang et al,¹⁶ to assess outcome of patients with typhoid perforation, documented significant complications including SSI in patients who had a primary closure of their wound.¹⁶

Smilanich et al, observed 27% incidence of wound infection in primary closure in contrast to 3% for delayed closure.¹⁷

In this study, the wound dehiscence was 13% or 3% in primary and delayed primary wound closure respectively. While Senbanjo and Ajayi observed 2.5% rate of dehiscence of the abdominal wound¹⁸ and Fleischer et al, found that 1%.¹⁹

However, further contamination of wound from environmental bacteria during dressings can increase rates of SSI in delayed primary repair.

Our study premises that delayed primary closure experienced with decrease SSI rate in comparison to primary closure and this is in similarity to Cohn SM

and Giannotti G et al.²⁰ While the rate of incisional hernia was unacceptably high in group A (13%) versus group B (6.3%).²¹

CONCLUSION

Delayed primary closure is safe and effective with reduce rates of SSI in our part of the world, where infectious disease are on the top and hospital resources are limited.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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