

Abdominal Wound Dehiscence in Interrupted Versus Continuous Closure of Rectus Sheath after Midline Emergency Laparotomy Incision

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ABSTRACT

Objective To find out frequency of abdominal wound dehiscence in interrupted versus continuous closure of rectus sheath after midline emergency laparotomy incision.

Study design Randomized control trial.

Place & Duration of study Department of Surgery, Dow University of Health Sciences / Civil Hospital, Karachi, from February 2015 to January 2016.

Methodology Patients with diagnosis of acute abdomen secondary to peritonitis / gut perforation underwent laparotomy through midline incision in emergency operation theater. A total of 88 patients were randomly allocated into two groups. In group A, closure of abdominal wound (rectus sheath) was done with interrupted method taking the sutures 1cm apart and 1cm away from the edges of incision while in group B, the closure was done with continuous method. Polypropylene suture was used for closure. Final outcome was measured after 30 days.

Results The average age of the patients was 29.89±5.89 year. Frequency of abdominal wound dehiscence was significantly high in group A (Interrupted) as compare to group B (Continuous) (20.5% vs 4.5% - p=0.024).

Conclusion Continuous closure technique is a superior method of closure as it resulted in less wound dehiscence and its relative ease of application in short time.

Key words Emergency laparotomy, Abdominal wound dehiscence, Rectus sheath.

INTRODUCTION:

Abdominal wound dehiscence is a major surgical complication after midline laparotomies in any surgical ward. According to international literature, the frequency of abdominal wound dehiscence is 0.2% to 3.5% with a mortality rate up to 45%.¹⁻² Our local data showed even higher frequency ranging from an 3.8% to 14.7%. The problem is worst after midline

laparotomy in emergency setup with a frequency of 7.9 % to as high as 17.4%.³⁻⁵

In order to prevent this potentially fatal complication, there is always an ongoing discussion on ideal method of closure of rectus sheath. Two most commonly practiced methods are interrupted and continuous suturing but no consensus has been developed on these yet.⁶ Many studies have been conducted to compare the effectiveness and safety of both the methods with contrasting results.

There are number of studies comparing the methods of abdominal closure after elective laparotomy, but there is lack of data which specifically addressed the issue in patients undergoing emergency laparotomy.⁷ In this study we planned to compare the two methods of abdominal wound closure with

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respect to abdominal wound dehiscence specifically including patients who underwent emergency laparotomy through midline incision.

METHODOLOGY:

This randomized controlled trial was conducted in the Department of Surgery, Dow University of Health Sciences / Civil Hospital Karachi, from February 2015 to February 2016. Sample size was calculated by using WHO formula and estimated sample size was 88.⁸ Non probability consecutive sampling technique was used. Patients of either gender aged 15-40 years admitted through emergency department with the diagnosis of acute abdomen were included in the study. Patients undergoing laparotomies in elective setting and previously operated patients were excluded.

Informed consent was taken. Information regarding age, gender and provisional diagnosis was recorded. The diagnosis of acute abdomen secondary to peritonitis / gut perforation was confirmed by thorough history and clinical examination, supplemented by radiological examination (X-rays and CT scan abdomen) provided that the general hemodynamic status of the patient was stable. Patients with confirmed diagnosis were explored in emergency operation theater using a midline incision.

Patients were divided into two groups randomly by envelope method. All patients received third generation cephalosporin and metronidazole with one dose of each preoperatively. In group A, closure of abdominal wound (rectus sheath) was done with interrupted method taking the sutures 1cm apart and 1cm away from the edges while in group B, the closure was done with continuous method, using 1-0 polypropylene suture. Thorough abdominal wash with warm saline was done and a drain was placed in all patients before closure of the abdomen. Early mobilization was encouraged from second postoperative day. Patients were followed for one month and final outcome was measured after 30 days.

Data was entered on the predesigned performa which included demographic features (age and gender) provisional diagnosis, method of closure and outcome (after 30 days).

Statistical analysis was performed using statistical software SPSS version 17. Frequencies and percentages were calculated for gender and outcome variable i.e. wound dehiscence (yes/no). Chi-square test was applied to compare wound dehiscence in both the groups taking p-value less than or equal to 0.05 as significant.

RESULTS:

A total of 88 patients were included in this study. The number of patients in each group was 44. The average age of the patients was 29.89±5.89 year. Out of 88 patients, 51 (58%) patients were male and 37 (42%) female. Provisional diagnosis of acute abdomen (peritonitis) was made at operation while final diagnosis and disease pattern of all patients after exploratory laparotomy is presented in table I. Majority of patients (n=.34/88 - 38.6%) had gut perforation while 24 (27.3%) patients had traumatic gut injury due to penetrating abdominal wounds (gunshots / stabs).

Overall 11 (12.5%) out of 88 patients developed complete wound dehiscence during the follow up period of 30 days. The frequency of abdominal wound dehiscence was significantly high in group A (Interrupted) as compared to group B (Continuous) (20.5% vs 4.5% - p=0.024).

DISCUSSION:

Laparotomies either elective or in emergency, are commonly performed in surgical practice. These are usually done through a midline incision. Despite advances in perioperative care, suture material and technique, abdominal wound dehiscence is still a major complication. This results in high morbidity and mortality.⁹ Data from Pakistan show a much higher incidence of abdominal wound dehiscence.³⁻⁵ This data is comparable to that reported in a study from India which showed overall frequency of wound dehiscence as 9.87%.¹⁰

In our study the frequency of burst abdomen was 12.5% which is comparable to other studies from the region. The higher frequency of abdominal wound dehiscence after emergency laparotomy is due to the fact that patients presenting in emergency rooms have different patho-physiological characteristics. They usually have acute and severe illness, often neglected or misdiagnosed by primary health care physicians and delayed presentation with advanced disease or sepsis. Due to the same reason many studies have considered emergency surgery as a major risk factor for abdominal wound dehiscence.^{1,5,11-12}

The closure of the midline laparotomy wound aims at bringing the wound edges together with the least tissue damage so that adequate healing can occur. Uncomplicated surgical wound is regarded as the only acceptable outcome of an operation.¹³ The healing of any surgical wound is greatly influenced by the technique of the closure of the wound and suture material.¹⁴ The ideal suturing method should

Table I: Disease Pattern

Disease Pattern	No of patients (n)	Percentage (%)
Abdominal Gunshot wound	21	23.9%
Tuberculous gut perforation	13	14.8%
Typhoid ileal perforation	07	7.9%
Perforated appendix	04	4.5%
Colorectal carcinoma	05	5.7%
Perforated duodenal ulcer	08	9.1%
Ischemic / gangrenous bowel	03	3.4%
Stab wound	03	3.4%
Volvulus (sigmoid/cecal)	04	4.5%
Iatrogenic uterine / gut perforation	02	2.3%
Ruptured ectopic pregnancy	03	3.4%
Ruptured ovarian cyst	01	1.1%
Biliary peritonitis	02	2.3%
Ruptured liver abscess	04	4.5%
Miscellaneous	08	9.1%
TOTAL	88	100%

prevent wound dehiscence and incisional hernia, with minimal wound infection and postoperative pain.

Most commonly practiced methods of wound closure are interrupted and continuous mass closure techniques. A meta-analysis concluded that there is no difference in the incidence of wound dehiscence with respect to suture material or method of closure.¹⁵ Similar results were found in another study.¹⁶ Conversely, Fagniez et al in their multi-center randomized prospective trial of 3135 patients, comparing continuous versus interrupted suture, found that the overall dehiscence rate was 1.6% in continuous suture group versus 2% in the interrupted suture group.¹⁷ This was significantly higher. A study from Tanzania showed that continuous suturing technique was associated with low incidence of wound dehiscence ($p=0.003$) as compared to interrupted suturing.¹⁸ We had similar results with high rate of wound dehiscence after interrupted closure which is statistically significant. The higher rate is due to the fact that only patients with peritonitis were operated in emergency.

Number of randomized controlled trials and meta-analyses comparing the methods of abdominal fascial closer after elective laparotomies are available but there is limited studies specifically addressing the

issue in emergency cases. Majority of the studies recommended the use of continuous suture closure of the linea alba over the interrupted suture closure technique. This is because of the fact that the former can be accomplished more rapidly and secondly, the later can result in the lower wound strength because of tight knotting.¹⁹ Continuous suturing usually distribute tension equally over a continuous line. Whipple and Elliott pointed out that tying sutures too tightly cause strangulation of the tissue with ischemic necrosis.²⁰ This was the most common error in abdominal wound closure.

CONCLUSION:

Continuous closure technique is superior method of abdominal fascial (rectus sheath) closure after emergency laparotomy with significantly low rates of dehiscence.

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Author's Contributions:

Urooj Akmal: Conception, study design and writing of the manuscript.

Abdul Qaiyoume Amini: Study design, literature search and manuscript writing.

Shahida Parveen Afridi: Review and final approval of the manuscript.

Conflict of Interest:

The authors declare that they have no conflict of interest.

Source of Funding:

None

How to cite this article:

Akmal U, Amini AQ, Afridi SP. Abdominal wound dehiscence in interrupted versus continuous closure of rectus sheath after midline emergency laparotomy. *J Surg Pakistan*. 2016;21(3):97-101. Doi:<http://dx.doi.org/10.21699/jsp.21.3.5>.