CONTINUOUS VERSUS INTERRUPTED CLOSURE OF MIDLINE WOUND IN EMERGENCY LAPAROTOMIES IN TERMS OF WOUND DEHISCENCE

Gulab Noor[1], Gul Sharif[1], Zaffar Iqbal[2], Mussarat Hussain[3], Arshad Amin[2], Ziaullah[2]

ABSTRACT

OBJECTIVE: To compare the efficacy of continuous versus Interrupted closure of midline wound in emergency laparotomies in terms of wound dehiscence.

MATERIAL AND METHODS: This study was conducted at department of surgery, PGMI Lady Reading Hospital, Peshawar. All selected patients were admitted through emergency department and were divided into two groups,continues closure group and interrupted closure group,based on type of abdominal wound closure after laparotomy.Study design was randomized control trial and the duration of study was 6 months in which a total of 180 patients were observed using 80% power and 95% confidence level, under WHO software for sample size determination.

RESULTS: In this study the results were analyzed as in continuous closure group mean age was 54 years was SD ± 1.26 where as in interrupted closure group mean age was 56 years was SD ± 1.376. In continuous closure group 62% patients were male and 38% patients were female where as in interrupted closure group 60% patients were male and 40% patients were female. Continuous closure group was effective in 73(80%) patients where as interrupted closure group was effective in 79(88%) patients.

CONCLUSIONS: Interrupted closure in laparotomy is better than continuous closure in terms of less wound dehiscence/ burst abdomen.

KEY WORDS: Continuous closure, Interrupted closure wound dehiscence, emergency laparotomies.

INTRODUCTION

Laparotomies always remain commonly encountered procedures in a surgical department. Surgical wound dehiscence after laparotomy remains a serious complication. It presents a mechanical failure of wound healing of surgical incisions. Post laparotomy wound dehiscence occurs in 0.25% to 3% of laparotomy patients and immediate operation is required .[1]The type of abdominal closure may play an important role. During the surgical procedures, measure to reduce the risk of infections and hypoxia in the tissue and also, chronic pulmonary disease, ascites, jaundice, anemia, emergency surgery, type of surgery, postoperative coughing, and wound infection are the important factors for the postoperative wound healing process.[2]

Evaluation of the risk factors related to wound dehiscence, as an essential element, before and after surgery prevent postoperative complications among women.[3]Many trials and new techniques were developed to prevent or at least reduce the risk of wound Dehiscence, but burst abdomen remains a formidable morbidity.[4]The combination of suture technique and material is of high relevance for the prevention of fascia dehiscence and, moreover, constitutes the main factor directly controllable by the surgeon. However, a recent cross-sectional study among surgeons at institutions participating in a large multicenter trial revealed a lack of consensus regarding abdominal wall closure strategies .[5]

According to a trial, excessive tension should not be placed on the sutures and wounds must always be closed with a suture of proper length. [6] Patients with extensive widespread generalized peritonitis and metastatic abdominal tumours need special attention regarding wound closure.[7]

Factors leading to abdominal wound dehiscence can be categorized into

Pre Operative, Peri Operative and Post Operative[5.] Pre operative factors include Age, Gender, Nutritional status, obesity anemia, diabetes, Uremia, irradiation drugs, Malignancy and chronic airway disease. [5, 3]

Among the peri operative factors the important site of incision technique of closure, suture material used, drain site and position of the stoma with relation to the incision[5].Significant postoperative factors include

[1] Department of Accident & Emergency, Lady Reading Hospital, Peshawar - Pakistan.
[2] Department of Gynae, Gajju Khan Medical College, Sawabi, KPK - Pakistan.
[3] Department of Surgery, Lady Reading Hospital, Peshawar - Pakistan.

Address for correspondence:
Dr. GULSHARIF
Senior Registrar Accident & Emergency, Lady Reading Hospital, Peshawar, Pakistan.
E-mail: gulafridi1@yahoo.com

wound infection, hematoma prolonged ileus, persistent cough, constipation hiccough, excessive vomiting and ascities. [5]

METHODOLOGY

This study was conducted at department of surgery, PGMI Lady Reading Hospital, Peshawar. Study design was randomized control trial and the duration of study was 6 months in which a total of 180 patients were observed using 80% power and 95% confidence level, under WHO software for sample size determination. More over non probability consecutive sampling technique was use for sample collection. Inclusion criteria was, all patients prepared to undergo emergency laparotomy for acute abdomen, fire arm injuries, blunt trauma etc, age 15 years and above and both sexes Excluaion criteria was those patients who have burst abdomen at presentation, severely malnourished with body mass index less than 15, Obesity, Diabetes Mellitis, Anemia, Chronic Pulmonary disease, Jaundice and Ascitis .These act as confounders and if included will introduce bias in the study results.

After approval taken from the hospital ethical committee, All patients meeting the inclusion and exclusion criteria who were undergoing emergency laparotomy was enrolled in the study and was admitted through emergency and were divided into two groups,continues closure group and interrupted closure group,based on type of abdominal wound closure after laparotomy .

Demographic characteristics were recorded. Complete history was taken and complete general physical, systemic examination and all mandatory investigations was done. After necessary resuscitation, nil by mouth, they were put on operating table for emergency procedure.

All laparotomies were performed by the same experienced surgeon. Same suture material of prolene No. 1 with a length of at least 4 times the length of the wound was used in both groups. Post operatively the patient was followed till 15th post operative day for wound dehiscence.

All information was recorded on a pre designed proforma. Strictly exclusion criteria were followed to control confounders and bias in the study results. Wound dehiscence was confirmed by a fellow surgeon.

All the analysis was done in SPSS 10.0 or high version. Chi square test was applied in which P-value < 0.05 was considered statistically significant.

RESULTS

Age distribution among two groups was analyzed as in continuous closure group 8(9%) patients were in age range < 20 years, 23(26%) patients were in age range 21-40 years, 32(35%) patients were in age range 41-60 years and 27(30%) patients were above 60 years. Mean age was 54 years was SD ± 1.26. Where as in interrupted closure group 9(10%) patients were in age range < 20 years, 23(26%) patients were in age range 21-40 years, 30(33%) patients were in age range 41-60 years and 28(31%) patients were above 60 years. Mean age was 56 years was SD ± 1.376. (Table No 1).

Gender distribution among two groups was analyzed as in continuous closure group 56(62%) patients were male and 34(38%) patients were female. Where as in interrupted closure group 54(60%) patients were male and 36(40%) patients were female.

Efficacy among two groups was analyzed as continuous closure group was effective in 73(80%) patients and was not effective in 17(19%) patients where as interrupted closure group was effective in 79(88%) patients and was not effective in 11(12%) patients (Table No 2).

Stratification of efficacy with age distribution among two groups was analyzed as in 73 effective cases of continuous closure group, 8 patients were in age < 20 years, 20 patients were in age 21-40 years, 24 patients were in age 41-60 years and 21 patients were in age > 60 years. Where as in interrupted closure group 9 patients were in age < 20 years, 20 patients were in age 21-40 years, 26 patients were in age 41-60 years and 24 patients were in age > 60 years.

Stratification of efficacy with gender distribution

Table 1: Age distribution (n=180)

AGE	CONTINUOUS CLOSURE	INTERRUPTED CLOSURE	TOTAL
< 20 years	8(9%)	9(10%)	17
21-40 years	23(26%)	23(26%)	46
41-60 years	32(35%)	30(33%)	62
> 60 years	27(30%)	28(31%)	55
Total	90	90	180
Mean and SD	54 years ± 1.26	56 years ± 1.37	

Chi square test was applied in which P value was 0.438

Table 2: Efficacy (n=180)

EFFICACY	CONTINUOUS CLOSURE	INTERRUPTED CLOSURE	TOTAL
Effective	73(81%)	79(88%)	152
Not Effective	17(19%)	11(12%)	28
TOTAL	90	90	180

Chi square test was applied in which P value was 0.212

among two groups was analyzed as in 73 effective cases of continuous closure group, 45 patients were male and 27 patients were female. Where as in interrupted closure group 47 patients were male and 33 patients were female.

DISCUSSION

Wound dehiscence is a very serious complication of abdominal surgery. It has a high mortality rate. Despite good medical care, better sterilization techniques and availability of better suture material, abdominal wound dehiscence continues to be a major post operative problem. The burst abdomen is associated with high morbidity of up to 40% and mortality of up to 18% in elderly or malnourished patients in whom a burst represents a final additional insult to their already stressed physiology.[8]

Our study shows that continuous closure group was effective in 81% patients and wound dehiscence was found in 19% patients where as interrupted closure group was effective in 88% patients and wound dehiscence was found in 12% patients. Similar finding were also observed in another study conducted in India in which wound dehiscence occurs in 4.55% of laparotomy patients in modified technique compared to wound dehiscence occuring in 15.70% of laparotomy patients in continuous technique of midline abdominal wound closure.[9] In study done by Murtaza B[10] had also coted similar results as wound dehiscence occurs in 10% of laparotomy patients in modified technique compared to wound dehiscence occuring in 20% of laparotomy patients in continuous technique of midline abdominal wound closure.

There is no consensus regarding ideal wound closure after laparotomy. Many randomized trials in the West have reported equal wound complication rates following the use of continuous or interrupted monofilament fascial closure[11]. Gupta H et al[12] found greater dehiscence risk in the interrupted group, though the difference was significant only in the "contaminated wounds" subgroup. However, the details of the interrupted suturing technique were not described. As a result abdominal fascia closure is performed according to the surgeon's individual preference rather than according to evidence-based data.

The specific technique of interrupted suturing is of crucial importance and either a figure-of-eight or double horizontal mattress of Professor Hughes' technique should be employed to provide a secure repair. Three meta-analyses have previously been reported on this same issue[9,10,12]. However, they all included only a small number of studies comparing continuous and interrupted methods of suturing, ranging from six to eight. Srivastaya A et al[13] included only studies with at least 100 patients and a minimum follow-up of 1 year. Srivastaya A et al[13] in a clinical review, found that a majority of disruptions occurred between the 6th and 9th day after surgery. Moreover, in the meta-analysis by McNeil PM et al[14], only three out of six studies had used similar suture material in the two comparison arms. In the meta-analysis by Colonbo M et al[15] there were three such studies out of seven, while Srivastava A et al[13] had included only one such study. As a result, they could not perform same-group comparisons like continuous absorbable versus interrupted absorbable, and continuous nonabsorbable versus interrupted nonabsorbable. Meta-analysis by Himanshu Gupta et al[12] was the most comprehensive and up-to-date, including 23 trials. It described a significantly lowered risk of wound dehiscence in interrupted abdominal closure demonstrating that of 2.17% in the interrupted group as compared to 14.8% in the continuous group. Incisional hernias occurred with same frequency with both the techniques.

In study done by Chandra SA et al[10] patients undergoing emergency laparotomy, with multiple factors adverse to healing, suffered from burst in 8.13% of cases. Different local authors have reported burst abdomen to occur in 5% to 30% of emergency cases[16,17]. 30% burst abdomen was reported in infected cases by Professor Naithani's unit from Allahabad. Malnutrition and diseases like tuberculosis, typhoid and cancer are the main cause. This was illustrated very obviously in our study as most of the dehiscences were observed in patients diagnosed to have tuberculosis or typhoid. Many patients undergoing emergency laparotomy suffer from one of these co-morbid conditions.

In study done by Khan NA et al[9], there were 11 bursts in the continuous arm of suturing (13.75%) whereas only 2 early dehiscences took place (2.50%) with the interrupted technique, indicating a much lower risk of burst with interrupted method of closure. This difference is clinically and statistically significant. How-

ever burst abdomen results from a multitude of factors and the suturing technique is only one of them. Apart from advancing age other confounding agents were the degree of contamination, cough or simultaneous involvement of chest by infection or tuberculosis, anemia etc. We tried to remove these biases by selecting similar groups. Only those cases with contamination were selected from penetrating abdominal injuries to match with cases of acute abdomen having fecal peritonitis. Cough and anemia were treated appropriately with medications or transfusion. These results indicate that our patients seem to do better with interrupted closure techniques and are comparable with other studies.

In a continuous suturing cutting out of even a single bite of tissue leads to opening of the entire wound. This is the probable explanation for a high prevalence of burst in our emergency group. There were 8 bursts in the continuous arm of suturing (dehiscence risk = 14.8%) whereas only 1 dehiscence took place (dehiscence risk = 2.17%) with the X-technique, indicating a much lower risk of burst with interrupted method of closure. This difference is clinically and statistically significant.

CONCLUSION

Interrupted closure in laparotomy is better than continuous closure in terms of less wound dehiscence/ burst abdomen. However, requirement of increased estimated time and cost of surgery make it unpopular among surgeons. Also, in the long run, stitch sinus formation and irritation of knots to the patient has limited its use.

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