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A Prospective Study to Compare the Suture Technique (Continuous Versus Interrupted) in Prevention of Burst Abdomen

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Background: *Wound dehiscence after laparotomy remains a serious complication. Postoperative complete wound dehiscence, being an unfortunate and also a very serious complication, is associated with a high morbidity and mortality rate despite the most sophisticated intensive care these patients receive today.*
Aims: *The present study was undertaken to assess the proportion of burst abdomen in post midline laparotomy patient using interrupted X suture versus continuous suture technique in sheath closure.*
Materials and Methods: *A prospective randomised study was designed wherein a total of 100 patients undergoing midline laparotomy at one of the surgical units at S.M.S. Hospital Jaipur were recruited randomly after taking written informed consent. In the study group of 50 cases, sheath closure was done by using interrupted X suture and the same was compared with an equal number of control group (n = 50) in which sheath closure was done by continuous suture technique.*
Results: *There was 01 burst abdomen (out of total 48) in the study group, whereas 08 burst abdomen (out of total 49) was observed in the control group. The RR (Relative Risk) of burst abdomen in study group was 0.127. (p value 0.0246).*
Conclusion: *The interrupted X suture technique is better than continuous suture technique in prevention of burst abdomen in both emergency as well as elective laparotomy.Emergency laparotomy is associated with higher rate of burst abdomen as compared to elective laparotomy, but by using interrupted X suture technique in closure of sheath wound dehiscence can be prevented up to some extent.*
Key Words*: Wound dehiscence, Burst abdomen, Sheath closure*

I. Introduction

Wound dehiscence is the parting of the layers of a surgical wound. Either the surface layers separate or the whole wound splits open. It presents as a mechanical failure of wound healing of surgical incision.Wound dehiscence, also known as burst abdomen or wound disruption, carries a substantial morbidity rate. In addition there is an increase in cost of care both in terms of increased hospital stay, nursing and manpower cost in managing cases of burst abdomen.Incidence of Post laparotomy wound dehiscence/burst abdomenvaries from center to center. While the incidence of wound dehiscence has been reported as 1 – 3% in most centers across the world[1,2,3,4], some centers in India have recorded an incidence rate of burst abdomen as high as 10 – 30%[5,6,7].

Wound dehiscence is multifactorial in etiology, conditioned by local and systemic, as well as pre-, intra-, and post operative factors[8,9,10]. Post operative complete wound dehiscence being an unfortunate and also a serious complication, is associated with high morbidity and mortality rate[8-12], despite the most sophisticated intensive care these patient receive today.

Wound dehiscence is related to the technique of closure of abdomen and the suture used[13]. While the choice may not be so important in elective patient who are nutritionally adequate, do not have any risk factor for dehiscence and are well prepared for surgery, however it may prove crucial in emergency patient who often have multiple risk factors for developing dehiscence[14]. The present study was undertaken to assess the proportion of Burst abdomen in post midline laparotomy patients, using Interrupted X suture versus Continuous suture technique in sheath closure.

II. Materials and Methods

This present study was a hospital based randomized, interventional comparative analysis of two different suture techniques.A total of 100 patients undergoing midline laparotomy at oneof the surgical units at S.M.S. Hospital, Jaipur were recruited randomly (through the chit box method) after taking written informed consent and were equally divided into 50 cases each in the study group (interrupted X suture) and control group (continuous suture).All the patients scheduled to undergo a midline laparotomy for emergency or elective reasons were included in the present study. Patientsyounger than 16 years of age, patients who had undergone a

previous laparotomy for any condition(or had a incisional hernia or burst abdomen at presentation) and patients who required a re – exploration in post op course were excluded from the present study.Sheath closure was done by the same observer in all the cases, with similar suture material and similar tension in suture, with the similar technique of knot tying. The diagnosis of wound dehiscence was made as per protocol.

III. Continuous Closure

Continuous closure was performed using no. 1 vicryl suture, care being taken to place each bite 1.5 to 2 cm from the linea alba edge with successive bites being placed 1 cm from each other. The edges of linea alba was gently approximated without strangulation with an attempt to keep a suture to wound length ratio of 4:1 as shown in figure 1.

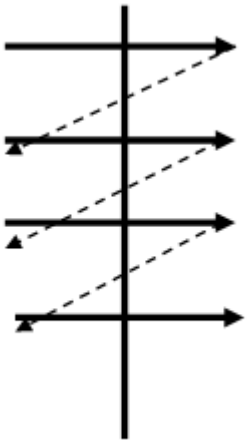

Fig. 1: Shows the continuous suture closure of sheath

IV. Interrupted Closure

Interruptedclosure[15] was performed using no. 1 vicryl suture, as shown in Figure 2. A large bite was taken outside – in 2cm from the cut edge of linea alba. The needle emerged on the other side from inside out diagonally 2 cm from the edge and 4 cm above or below the first bite. This strand was subsequently crossed or looped around the free end of suture (Figure 2) and continued outside – in, diagonally at 90º to the first diagonal. The two end tied just tight enough to approximate the edges of linea alba taking care not to include bowel or omentum between the edges. This created two X like crosses-one on the surface and another deep to linea alba. The next X suture was placed 1 cm away from the previous one. Henceforth, in a 14 cm long wound, 3 X-sutures were applied.

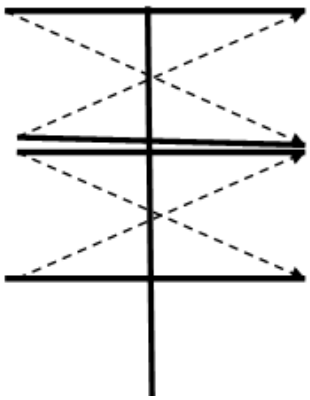

Fig. 2: Shows interrupted X suture closure of sheath

The final parameters (outcome) that were observed in the followup for the duration of 15 days were as follows:

1. Patient discharged with normal wound healing
2. Wound infection but no wound dehiscence
3. Wound dehiscence
4. Death

Tabulated data was analyzed statistically by using Paired t – test, Pearson chi – square test and Fishers test.

V. Results

Table 1 shows the incidence of wound dehiscence between Continuous suture and Interrupted X suture Group

		Wound infection	Wound dehiscence	Normal healing
Continuous suture	Emergency Group (A)	8 (32%)	5 (20%)	12 (48%)
	Elective Group (B)	6 (25%)	3 (12%)	15 (63%)
Interrupted X suture	Emergency Group (C)	9 (38%)	1 (4%)	14 (58%)
	Elective Group (D)	0	0	24 (100%)

8 cases of burst abdomen out of a total 49 cases in continuous group as compared to only 1 case of burst abdomen out of 48 cases in interrupted X suture group were reported in the present study.

The Relative Risk (Risk in interrupted/Risk in continuous)of burst abdomen is 0.127, p – Value 0.024, which is statistically significant.

In the continuous suture group (Group A+B), the incidence of wound infection was 29% (n = 14 cases), where as the incidence of wound infection in Interrupted X suture group (Group C+ D) was only 19% (n = 9 cases), a difference that is statistically significant ($p<0.05$).

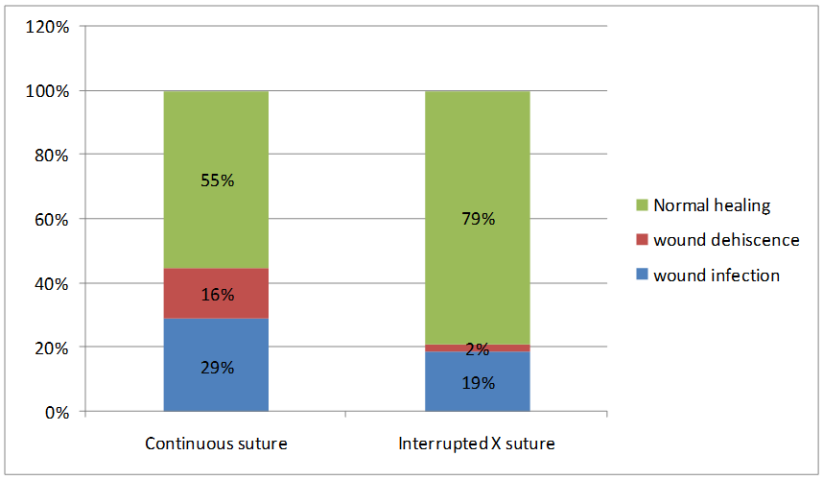

Figure 3 shows incidence of wound infection, wound dehiscence between continuous & interrupted X suture group

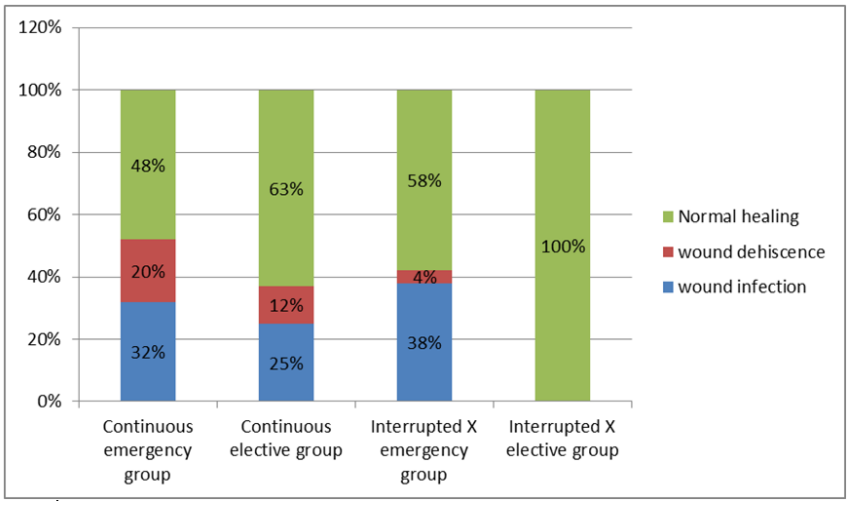

Figure 4 Shows group wise incidence of wound infection, wound dehiscence & normal healing among the sub groups of continuous & interrupted X suture

VI. Discussion

Abdominal wound dehiscence and hernia are the major causes of morbidity following any laparotomy whether elective or emergency. Theoretically two factor may be concerned in the causation of burst abdomen ,either the intra abdominal pressure is too great or the wound is too weak .However the intra abdominal pressure is frequently not within surgeons control but wound must be made sufficiently strong to withstand this pressure. During the postoperative period a wound must depend for its strength on following things

1- Cohesion of the healing tissue
2- The bandage and dressing
3- Suture

Immediately after operation wound must depends on entirely on suture and dressing .in our study most of burst abdomen occurred in emergency surgery. In a continuous suturing cutting out of even a single bite of tissue lead to opening of entire wound. So there were 8 burst abdomen in the continuous group where as only one burst abdomen in interrupted x suture group. The relative risk in interrupted x suture group for of burst abdomen was 0.127(p value0.024).so this present study underscore the fact that interrupted X suture technique has a better outcome than continuous suture preventing burst abdomen.

The low burst abdomen in elective laparotomy group can be explained by correction of anaemia, malnutrition before surgry,no intraabdominal sepsis and less intra abdominal pressure

VII. Conclusion

The interrupted x suture technique is better than continuous suture technique in prevention of burst abdomen in both emergency as well as elective mid line laparotomy, with the burst abdomen rate of 2% in interrupted X suture as compared to 12% burst abdomen in continuous suture technique.

Emergency laparotomy is associated with higher rate of burst abdomen as compared to elective laparotomy (12% wound dehiscence in emergency laparotomy as compared to 6% in elective laparotomy) but by using interrupted x suture technique in closure of sheath, the rate of wound dehiscence can be prevented to some extent.

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