

An Effective Technique of Mass Closure in Midline Abdominal Incision

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Wound closure is an important aspect of any surgical procedure especially midline laparotomy because of high incidence of complications. The ideal closure technique should combine strength to prevent wound rupture with elasticity to adapt to increased intra-abdominal pressure. To find out better closure technique and minimize wound dehiscence, this study was conducted on 120 patients in North Surgical Unit, Mayo Hospital, Lahore, operated in emergency and elective operation theatres. These patients were divided into group A (n=60) and B (n=60). In group A, interrupted figure of eight technique and in group B continuous mass closure was done with Prolene No.1 R/B. Patients were assessed regarding wound dehiscence. There was dehiscence in two patients (1.66%) in group A and six patients (5%) in group B. The results showed that interrupted mass closure is better than continuous closure if all other factors are similar.

Key words: Laparotomy, mass closure, prolene, wound dehiscence

Laparotomy is one of the common procedures both in emergency and elective situation. One of the serious post operative complications in cases of laparotomy wound is dehiscence. After the laparotomy is made it is the duty of the surgeon to make every effort to ensure smooth healing of such wounds as quickly, reliably and securely as possible. Even in the best surgical hands and in the best centres in the world, the incidence of wound disruption is 1-2% and mortality rate 15-20%.

Although several systemic factors e.g.; hypoproteinaemia, obesity, uraemia, malignancy and increased age have been associated with increased incidence of wound disruption and the local mechanical factors such as suture breaking, knot slipping, the intact suture cutting out of tissues or protrusion of gut or omentum in between the stitches, wound infection, abdominal distension and pulmonary complications appear to be more important factors for burst abdomen/wound dehiscence.

The technique of abdominal closure is still a controversial topic. The ideal method should be quick, easy and it should give the same results in the hands of trainees as that of the surgical masters. Mass closure of all layers except skin and subcutaneous tissue is considered to be the superior method. It is thought that the wound heals by forming blocks of the fibrous tissue. Most of the studies favor concept that mass closure of the midline incision is a better choice. There is controversy regarding interrupted versus continuous fascial closure.

It is our routine practice in North Surgical Unit of Mayo Hospital, Lahore to close the midline abdominal incision with polypropylene (Prolene) by both continuous and interrupted figure of eight mass closure technique in emergency laparotomy wound. We have found it to be very successful and effective. So this technique will be compared with the continuous mass closure technique using the same suture (Polypropylene).

Patients and methods:

The study was conducted in North Surgical unit of Mayo Hospital, Lahore. A total of 120 patients underwent laparotomies through midline abdominal incision in emergency and elective operation theatre. The types of wound were clean, clean contaminated, and contaminated. These patients were divided into two equal groups comprising 60 patients in each.

In these cases mass closure was performed with prolene No.1 suture. The closure were tension free taking about 1.5cm bite from wound margin and 1cm to 1.5cm apart from the next suture embracing all layers of abdominal wall except skin and subcutaneous tissue, which were closed either at the same time or left open (in contaminated cases) till infection settled. The suture length to wound length ratio in continuous mass closure was equal to 4:1 or more. In figure of 8 interrupted mass closure, the sutures were applied inside out first so that the knots were buried in order to avoid mechanical irritation of their cut ends.

Criterion to assess the results was wound dehiscence. First dressing was opened after 48 hours and thereafter the wound was daily examined and dressed till the stitches were removed. Wound dehiscence was suspected when there was serosanguous discharge and was confirmed when there was visible gap between the edges of the wound or abdominal viscera or omentum were lying in front.

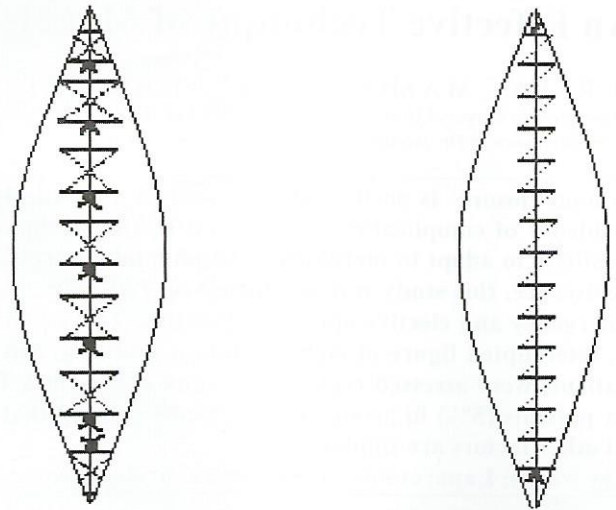
Wound dehiscence occurred in six cases (5%) in continuous mass closure technique. In interrupted mass closure only two patients had wound dehiscence (1.33%). There was an extra expenditure in interrupted mass closure because of use of one extra prolene suture and it was more time consuming (10 minutes more) as well. Though continuous closure was bit cheaper and less time consuming but there was more chances of wound complications especially wound dehiscence.

All patients were operated under GA and were prepared by povidon. A consistent antibiotic policy was adopted. Wounds belonging to the category of clean, clean contaminated, contaminated / dirty wound will be included in this study.

Average post operative hospital stay in both groups was 9 days ranges from 5 days to 23 days. In group A average post-op hospital stay was 9 days as compared to 8 days in Group B. patients who stayed longer time in hospital were with either wound infection or wound dehiscence. Wound dehiscence was closed after improving his general condition with tension sutures.

Table 1 Sex distribution in emergency/elective procedures

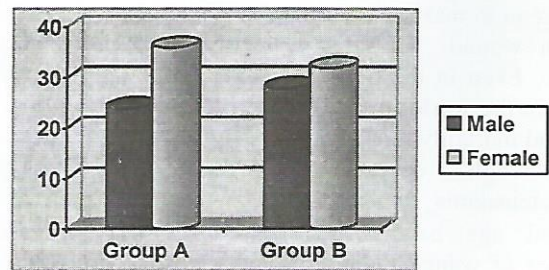
| Sex | Group A | Group B |
|--------|----------|-------------|
| Female | 24(40%) | 28 (46.67%) |
| Male | 36(60 %) | 32 (53.33%) |
| Total | 60 | 60 |



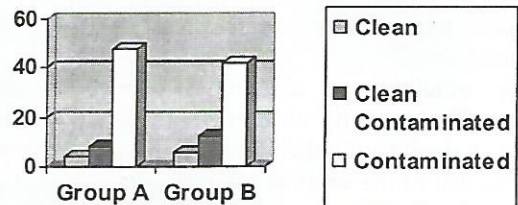
Interrupted Closure

Continuous Closure

Sex distribution in procedures



Types of Wounds



Wound Complications

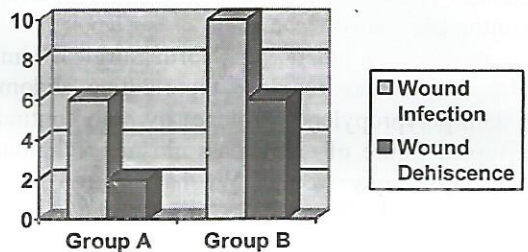


Table 2. Various indications for both the procedures

| Indications | Group A | Group B | Total |
|--------------------------|------------|------------|-------|
| FAI | 30 (50 %) | 32 (53.3%) | 62 |
| Stab | | | |
| Blunt trauma | | | |
| Appendicular perforation | 8 (13.33%) | 10 (16.6%) | 18 |
| DU perforation | 6(10%) | 6(10%) | 12 |
| Enteric perforation | 4(6.66%) | 2(3.3%) | 6 |
| Others | 12(20%) | 10(16.6%) | 22 |
| Total | 60 | 60 | 120 |

Table.3. Types of wound

| Types of wound | Group A | Group B |
|--------------------|-----------|---------|
| Clean | 4(6.66%) | 6(10%) |
| Clean contaminated | 8(13.33%) | 12(20%) |
| Contaminated | 48(80%) | 42(70%) |
| Total | 60 | 60 |

Table 4. Wound complications

| Wound Complication | Group A | | Group B | |
|--------------------|-----------|------------|-----------|------------|
| | Elec-Tive | Eme-rgency | Elec-tive | Eme-rgency |
| Wound infection | 0 | 6(10%) | 0 | 10(16.6%) |
| Wound dehiscence | 0 | 2(3.33%) | 0 | 6(10%) |

Discussion:

As surgery evolved through generations of discovery, experience, and evolution to become a science, the healed and uncomplicated surgical wound came to be regarded as the only acceptable outcome of an operation. Nevertheless, postoperative wound complications are by no means uncommon and continue to worry the surgeon.

A suture technique can be judged to be satisfactory only when it gives acceptable results in general use and not simply in the hands of selected surgeons. Ideally one would regard only a zero rate of dehiscence and herniation as acceptable, but this is perhaps an unattainable goal. The ideal suture material and the proper method of wound closure should minimize the risk of:

- Wound dehiscence
- Wound infection
- Incisional hernia
- Suture sinus formation.
- Postoperative pain and discomfort

These wound complications account for the majority of postoperative sequelae resulting in extended hospitalization. The purpose of the present study was to judge the suitability of interrupted mass closure in comparison with continuous mass closure and the criteria for assessment were the various perioperative problems and the above mentioned postoperative complications.

Conclusion:

It is very much within the means of a surgeon to prevent the development of burst abdomen from taking place, even in the presence of predisposing factors responsible for poor wound healing (e.g. poor nutrition, cirrhosis of liver, uraemia, prolonged steroid therapy, infection and malignancy) and cutting through of suture material (post-operative paralytic ileus, and persistent cough). A marked reduction in the incidence of burst abdomen can be achieved by utilizing a proper suture material and by employing a correct technique of abdominal closure

The study proves the efficacy of mass closure of midline abdominal wound with prolene using interrupted figure of eight as compared to continuous mass closure

technique. Although it is more time consuming and a bit costly but also there is minimum chance of wound disruption. The continuous mass closure technique is less time consuming and economical but there are chances of wound complications especially wound disruption. In our study two out of 60(3%) patients developed wound disruption. It is suggested that wound complications especially burst abdomen can be significantly reduced in emergency surgery (clean contaminated and contaminated cases) laparotomy wounds are closed using the interrupted figure of eight mass closure technique

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