ORIGINAL ARTICLE

Comparison between Mass Closure and Layered Closure in Major Abdominal Laparotomies

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ABSTRACT

Aim: To compare the number of complications after continuous layered closure with continuous mass closure in major laparotomies and to describe the frequency and types of complications after each procedure.

Methods: This comparative study was conducted in Surgery Department, Ibn-e-Siena Hospital, Multan from September 2013 to August 2014. A total of 50 patients were included in the study divided in two equal groups.

Results: In group-A, 17(70%) were male and 8(30%) were female while in group-B there were 16(64%) were male and 9(36%) were female patients. Age of the patients varied from 13 to 30 years. In group-A 11(44%) patients were from elective laparotomies and 14(56%) from emergencies, while in group-B 8(32%) patients were from elective operations and 17(68%) were emergency. In group-A wound dehiscence occurred in 2 98%) patients out of 25 whereas in group-B occurred in none of 25 patients.

Conclusion- Using non-absorbable monofilament polyprophylene (prolene) is better than the conventional layered closure with regard to gain of early and late wound strength.

Key words: Laparotomies, Paramedian, Haemorrhage.

INTRODUCTION

Since 19th century when surgeons started performing surgery, they have to inflict wound on their patients and it is their duty to endeavour constantly to get these wounds to heal as quickly, reliably and severely as possible. The behavior of surgical wound is now largely predictable. Many of the factors influencing on healing process can be moderated by the exercise of surgical sciences and to that extent a healed, uncomplicated wound is the only accepted outcome[1]. Yet every surgeon has disquienting experience of seeing wound dehiscence either complete or incomplete. Peritoneal adhesions and chronic discharging sinuses develop in some surgical wounds and even though it is due to circumstances beyond his control. It is a tragedy for the patient leading to high morbidity and mortality.

Factors such as improved pre and postoperative support of the patient, improved method of anaesthesia and the use of antibiotics should decrease the incidence of wound dehiscence and adhesion formation but still these wound complications are not uncommon[2]. The reported incidence of wound dehiscence after abdominal surgery is from 0.2 to 5.8% and is certainly more frequent after emergency surgical procedures. The incidence is definitely related to age and is reported in contrast 5.4% for those over 45 years. The mortality rate of wound disruption is 22-50%[3].

Wound dehiscence is more common after longitudinal than transverse incisions because transverse incisions are not in line of shearing forces to which abdominal wall is subjected. However, transverse incisions do not give easy access to a difficult operative procedure[4]. Wound dehiscence results from increased intra-abdominal pressure in early postoperative period and poor wound healing. Factors associated with increased intra-abdominal pressure included prolonged postoperative ileus or adhesive obstruction, ascities, repeated retching and vomiting, persistent hiccough and cough paroxysms[5].

The objective of the study was to compare the number of complications after continuous layered closure with continuous mass closure in major laparotomies and to describe the frequency and types of complications after each procedure.

MATERIAL AND METHODS

This comparative study was conducted in Surgery Department, Ibn-e-Siena Hospital, Multan from September 2013 to August 2014. A total of 50 patients were included in the study divided in two equal groups. Patients of both sexes, age above 13 years and with history of peritonitis less than 24

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hours were included in the study. All descriptive and inferential statistics were calculated by SPSS-10.

RESULTS

In group-A, (layered closure) 17(70%) were male and 8(30%) were female while in group-B (mass closure) there were 16 (64%) were male and 9(36%) were female patients. Age of the patients varied from 13 to 30 years. In group-A 11(44%) patients were from elective laparotomies and 14(56%) from emergencies, while in group-B 8(32%) patients were from elective operations and 17(68%) were emergency. In both groups 6(24%) had paramedian incisions while 19(76%) had midline incisions. The category of wound in the group-A clean wound were 12(48%) and clean contaminated were 123(52%) and in group-B clean wound were 9(36%) and clean contaminated were 16(64%) patients.

Predisposing factors are given in table 1. Primary organ and type of viscera operated were explained in table-2. In group-A wound dehiscence occurred in 2 (8%) patients out of 25 whereas in group-B occurred in none of 25 patients (Table 3)

Table 1: Distribution of risk factors

Risk factors	Group-A		Group-B	
Chest infection	0/2	0/2	0/1	0/1
Haemorrhage and anaemia shock	1/5	¼	0/2	0/2
Postop abdominal distension	0/2	0/3	0/5	0/5
Malnutrition	0/2	½	0/4	0/4
Malignancy	1/1	0/2	0/3	1/2
Jaundice	0/1	0/1	0/1	0/1

Table 2: Primary organ and type of viscera operated

Organ involved	Group-A		Group-B	
Small bowel	1/8	1/3	0/7	0/7
Gastro duodenal	0/2	0/2	0/3	0/3
Billiary	0/6	0/6	0/1	0/1
Vascular	½	0/2	0/2	0/2
Injury to liver and spleen	0/1	0/1	0/4	0/4
Colon	1/3	1/3	0/1	0/1
Miscellaneous	0/4	¼	0/8	1/8

Table-3: Incidence of would failure

Wound compli-cations	Total incidence of wound failure		Wound failure expressed in %ag	
	G-A	G-B	G-A	G-B
Wound dehiscence	2.25	0/25	8.0	-
Incisional hernia formation	2/25	0/25	8.0	4.0

DISCUSSION

The term wound dehiscence includes partial or total separation of layers of wound closure. Eviseration indicates protrusion of bowel through the separate4 edges of abdominal wound closure, an emergency situation. Despite the arguments for and against different suture materials[6], the sitting of incisions and the insistence on a metieulous surgical techniques in the closure of wound, better preoperative and postoperative care, control of infection with antibiotics, the cases of wound disruption still occur. Many clinical studies have attested to a continuing steady incidence of wound disruption to be 1% to 3% regardless of the type of suture used. It is the dreaded complication that increases the hospital stay and cost wound disruption is associated with a mortality rate of 10% to 20% despite the most sophisticated intensive care these patients receive today. The problem remains accordingly a real one, although individual “runs” have been reported in which disruption has never occurred[7].

Wound disruption has been known to occur following the used of every type of suture material, whether natural or synthetic. This is understandable. The surgeon is upset because of an unfortunate occurrence and an inanimate piece of suture material has the advantage that is cannot answer back. Although a number of systemic and local factors have been associated with an increased incidence of burst abdomen[8], attention to the technique and materials for closure is associated with low rates of wound complications.

It was found that the cause of wound dehiscence is not the poor tissues but the poor technique, too small bites, suture placed too far apart or tied too tightly predispose to disruption. A maximum zone lammatory reaction with oedema and a resultant weak area was recognized to lie in the 0.5 cm adjacent to the wound edge[9].

From the review of literature, no difference in dehiscence has been noted between various absorbable sutures or the various monofilament sutures, be absorbable or non-absorbable, In the opinion of inflammatory reaction with oedema and a resultant weak area was recognized to lie in the 0.5cm adjacent to the wound edge. Therefore it seems logical that the use of non-absorbable sutures in laparotomy closure is a better choice and is favoured in most of the resent studies[10].

Wound dehiscence usually occurs within two weeks postoperatively, often following local serosangninous discharge. At this time most of the wound strength is provided by sutures and not by wound healing, it seems logical that the type of

closure has an important role in fascial disruption[11]. Burst abdomen or postoperative evisceration may be partial or complete, depending on whether all the layers of abdominal wall have separated or either skin or peritoneum remain intact. It may occur upto 3% of laparotomy wounds, with mortality as high as 49%[12]. It was pointed out that about 50% of dehisced wound healed primarily, finish with late incisional hernia, a serosanguineous (pink) discharge from wound is a for runner or disruption in burst abdomen. The hernia may occur through a small portion of scar. Most cases of incisional hernia are asymptomatic and broad necked and do not need treatment[13].

Late incisional hernia is not always innocent. It can lead to potentially fatal complication of intestinal obstruction and strangulation. It has been found that incidence of incisional hernia continues to rise with passage of time, thus long term (10-12 years) follow up is required to determine its true incidence. The reported incidence of such hernia varies from 1.6 to 10.8%[14]. In our present study only 3 patients from group-A and 5 from group-B were between 13-20years of age. The majority of patients belonged to middle aged group (21-60 years). Only 4 patients of group-A and 3 of group-B were more than 60 years of age. As wound complications are known to occur most commonly in elderly, most of our patients were at good risk in this regard.

A mid line incision is regularly used for exploratory laparotomy in patients with abdominal trauma and does not endanger the abdominal muscle, blood supply or nerve supply or damage appomneurosis[12]. In mesogastric and hypogastric incisions a greater portion of wound dehiscence occurred after paramedian incision than midline incisions. However, low incidence of wound dehiscence and incisional hernia with paramedian incision has been reported[15]. Asymptomatic buldge develop in upto 10% of abdominal incisions and require surgical intervention[16].

Incisional hernia occurs after 3-5%ofall abdominal operations. The management is by two techniques. One is anatomical approach (Keel method). The other is implantation of prosthetic materials like marlex or mersilence[7]. Incisional hernia although a less serious complication than acute disruption, but is not always innocent. They cause discomfort, are cosmetically un-acceptable and can lead to potentially fatal complication of intestinal obstruction andstrangulation[17].

Full length incisional hernia probably represent a covert dehiscence and usually start as a symptom less partial disruption of the deep layer of abdominal wound, while the superficial layers remain intact and skin is only to heal. Consequently the hernia appears immediately, although it may not be recognized until some month[18]. These large incisional hernias are caused by failure of technique (broken sutures, knot slippage, or a suture cutting out of the tissues following an inadequate bite). The smaller incisional hernia probably results from wound sepsis or may follow the placement of a drain through the wound. The majority of incisional hernias develop in the first year after operation and are the result of interaction of a number of factors including the method of closure[19]. The early hernia is attributable to mechanical wound failure. The combined strength of the healing wound, a function of the extrinsic strength dependent on the mechanical aspect of wound closure, and the slowly increasing intrinsic strength is inadequate to withstand the forces applied and a diffuse hernia results[20].

CONCLUSION

Using non-absorbable monofilament polyprophylene (prolene) is better than the conventional layered closure with regard to gain of early and late wound strength.

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