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Original Research Article

A clinical study of continuous and interrupted fascial closure in emergency midline laparotomy at a tertiary care centre

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ABSTRACT

Background: Commonest approach in emergency open abdominal surgeries remains to be midline laparotomy because it is simple, saves time and causes minimal blood loss. Optimal technique for laparotomy wound closure has been a topic of debate since long. Risk factors for development of incisional hernia and burst abdomen are wound infection, systemic illnesses of patient and closure technique. Factors related to patients like age, gender, body mass index (BMI), systemic illnesses are not modifiable when an emergency laparotomy is the only option. Hence closure technique is one factor where surgeon has total control, which can bring down the incidence of burst abdomen and incisional hernias.
Methods: Prospective study conducted in 150 patients who underwent emergency midline laparotomy from December 2014 to February 2016 in Krishna Rajendra Hospital attached to Mysore Medical College and Research Institute, Mysore, Karnataka, India with 6 months' follow-up after surgery.
Results: Most of patients in the study belonged to 30-40-year group and were males (78%). Gastrointestinal perforation peritonitis (52%) was the single most common indication for emergency midline laparotomy. In the continuous and interrupted groups, post-operative wound infection was found in 54.6% and 34.6%, wound dehiscence was found in 16% and 6.6% and incisional hernia in 14.4% and 4% respectively.
Conclusions: Interrupted suturing is superior to continuous technique in emergency midline laparotomy wound closure in terms of complications and post-operative morbidity.

Keywords: Continuous, Emergency laparotomy, Fascial closure, Intermittent

INTRODUCTION

To open the abdomen through the midline is quick and bloodless. The incision can run along the whole length of linea alba providing adequate length and thus the ability to retract with ease. This is particularly important in case of explorative laparotomy. Hence midline laparotomy remains the most common approach in the emergency setting.

Principles of midline laparotomy wound closure are essentially the same for closure of any surgical incision, Minimization of tissue damage being the important factor. A 4: 1 ratio of suture bites versus suture advancement has been advocated and evidence suggests that smaller fascial bites may decrease the incidence of dehiscence and ventral hernia.[1,2] Layered closure of the abdominal wall to include separate layered closure of the peritoneum and subcutaneous tissues in addition to the skin and fascia is discouraged, and mass closure is preferred. A continuous suture of slowly absorbable suture material is the recommended method of closure in elective abdominal surgery, although there is little evidence to guide closure in the emergency setting.[3]

Risk factors for development of incisional hernia and burst abdomen are wound infection, systemic illnesses of patient and closure technique. Factors related to patients like age, gender, body mass index (BMI), systemic illnesses and habits like smoking and alcoholism are not modifiable when an emergency laparotomy is the only option. Hence closure technique is one factor where surgeon has total control, which can bring down the incidence of burst abdomen and incisional hernias.

This study assesses the continuous and interrupted suturing techniques in midline laparotomy wound closure during emergency in terms of wound infection, wound dehiscence and incisional hernia.

METHODS

The study was conducted in the department of surgery, K.R. hospital attached to Mysore Medical College and Research Institute, Mysore, Karnataka, India during December 2014 to February 2016. The study includes 150 patients who presented with acute surgical condition and underwent emergency midline laparotomy. The patients were randomly divided into two groups of 75 each.

The first group underwent continuous mass closure of the laparotomy wound with prolene 1 while the second group underwent intermittent mass closure with prolene1. The patients were followed up for 6 months. The patients were observed post operatively for any wound infection, wound dehiscence and followed up at 2, 4 and 6 months for persistent pain and incisional hernia. Exclusion criteria are known diabetic state Immunocompromised status Previous midline laparotomy.

RESULTS

Out of 150 patients, 117 (78%) were males and 33(22%) were females (Figure 1). The study included patients aged 19-65 with majority belonging to 30-40 age group. The most common cause for laparotomy was Gastro-intestinal perforation found in 78 patients (52%) next was intestinal obstruction in 46 patients (30.67%), blunt trauma abdomen in 19 patients (12.67%) and other causes in 7 patients (4.67%) (Figure 2).

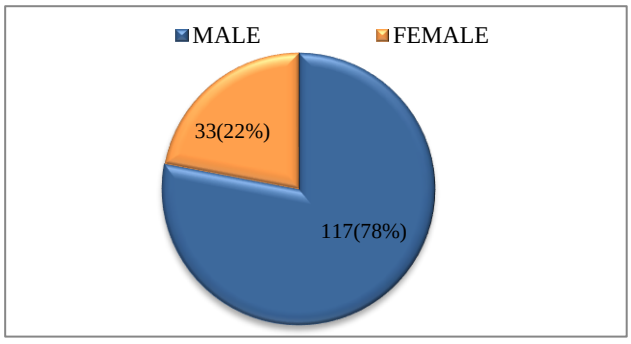

Figure 1: Sex ratio.

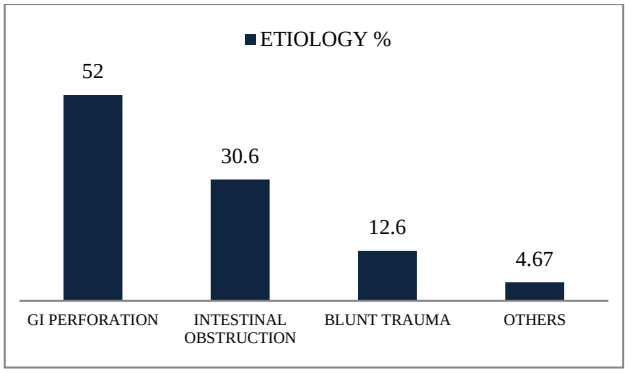

Figure 2: Final diagnosis after laparotomy.

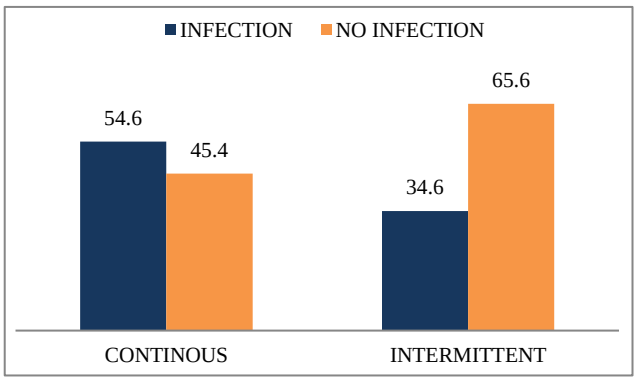

Figure 3: Post-operative infection (percentage).

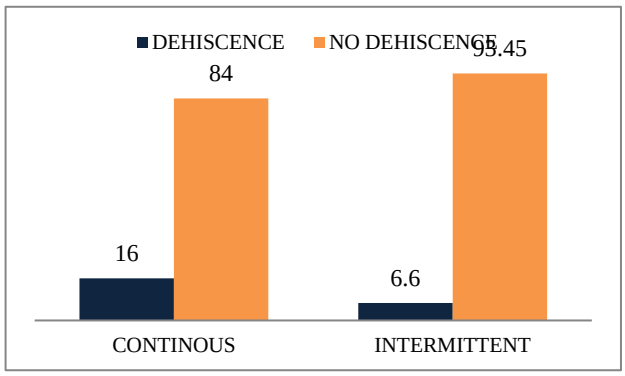

Figure 4: Wound dehiscence (percentage).

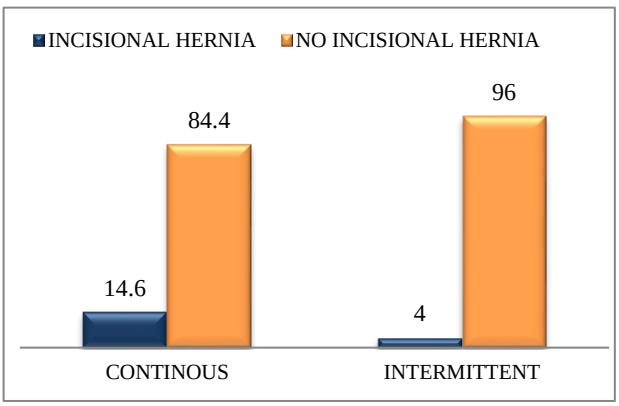

Figure 5: Incisional hernia incidence (percentage).

Post-operative infection

The study showed that out of 75 patients in first group, 41(54.67) patients developed surgical site infection while only 26 (34.67%) patients from second group had infection (Figure 3).

Wound dehiscence

Out of 150 patients in the study, 17 patients developed wound dehiscence; 12 (16%) from group 1 and 5 (6.6%) from group 2 (Figure 4)

Incisional hernia

Out of 150 patients, 14 patients developed incisional hernia during the follow up period of 6 months; 11(14.6%) from group 1 and 3(4%) patients from group 2 (Figure 5).

DISCUSSION

Abdominal wound closure can be temporary or permanent depending on the patient's condition, clinical setting and the disease process or injuring leading to surgery. In general, clean and non-contaminated wounds with healthy local tissue conditions can be closed by primary permanent closure. In a patient with a condition requiring re-exploration or a patient with abdominal compartment syndrome, temporary closure is preferred. This study assesses the continuous and interrupted method of laparotomy closure. The variables used in the study are post-operative wound infection, wound dehiscence and incisional hernia.

Table 1: Comparison with other similar studies.

	Chalya P et al[4]		Sharma A et al[5]		Seiler CM et al[2]		Present study	
	Continuous %	**Interrupted %**	**Continuous %**	**Interrupted %**	**Continuous %**	**Interrupted %**	**Continuous %**	**Interrupted %**
Wound infection	42.2	41.2	52	20	19.4	12.7	54.6	36.4
Wound dehiscence	5.4	22	32	12	3	2	16	6.6
Incisional hernia	3.4	36.7	36	8	8.4	15.9	14.6	4

Out of 150 patients in the study, 41 patients with continuous closure developed wound infection while only 26 with interrupted closure had wound infection. Out the 150 patients, 12 patients with continuous closure had wound dehiscence while only 5 patients with interrupted sutures had wound dehiscence. Incisional hernia in the follow up period of 6 months was found in 11 patients with continuous closure while only 3 patients with interrupted closure had incisional hernia.

Other similar studies (Table 1) Phillipo et al conducted a similar study and found that the incidence of wound infection in continuous and intermittent was 42.2% and 41.1%; wound dehiscence was 5.4% and 22% while incisional hernia was 3.4% and 36.7%.[4] so according to this study, continuous wound closure was better than interrupted. Ashish Sharma et al conducted a similar study and found that the incidence of wound infection in continuous and intermittent was 52% and 20%; wound dehiscence was 32% and 12% while incisional hernia was 36% and 8%.[5] So according to this study, interrupted wound closure was better than continuous.

Seiler CM et al conducted a similar study and found that the incidence of wound infection in continuous and intermittent was 19.4% and 12.7%; wound dehiscence was 3% and 2% while incisional hernia was 8.4% and 15.9%. So according to this study, interrupted wound closure was better than continuous.[2]

CONCLUSION

Thus, authors conclude that in view of post-operative wound infection, wound dehiscence and incisional hernia, interrupted fascial closure of midline emergency laparotomy is better than continuous closure.

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Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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