

Original Research Article

Short term outcome of midline laparotomies in view abdominofascia closer

Chinmay S. Gandhi*, Dajiram G. Mote, Zahid Shivani, Kalyan Kumar Sama

Department of General Surgery, Bharati Vidyapeeth Deemed to be University Medical College and Hospital, Maharashtra, India

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*Correspondence:

Dr. Chinmay S. Gandhi,

E-mail: chinmaygandhi00@yahoo.co.in

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ABSTRACT

Background: This is a prospective non randomized observational comparative study for surgical site infections and surgical site occurrences after laparotomy fascia closer with two different techniques. Regular bite remains the standard of care in most hospitals. Laparotomies were done for elective and emergency cases.

Methods: There were two techniques used to close abdominal wall fascia. The present study has evaluated small bite abdominal closer verses regular bite closer. Author and his team had used small bite fascia closer technique for all laparotomies, while other group of surgeons utilized regular bite fascia closer.

Results: Out of 26 laparotomies in short bite closer, 8 had surgical site infections and surgical site occurrences, while 26 laparotomies in regular bite closer group had 15 patients with surgical site infections and surgical site occurrences. There is significant reduction in surgical site infection and surgical site occurrences observed in small bite abdominal closer group.

Conclusions: It is recommended all laparotomies elective or emergent should be closed with small bite technique as it reduces surgical site infections and surgical site occurrences.

Keywords: Laparotomy closer, Small bite closer, Regular bite closer, Surgical site infection, Surgical site occurrences

INTRODUCTION

The laparotomies done through midline are common surgical operation for gaining quick and safe access to the abdominal cavity during elective and emergency abdominal procedures.

The patients undergoing midline laparotomies are at significant risk of post-operative complications surgical site infection and surgical site occurrences like wound dehiscence, incisional hernia and bowel obstruction. There are various techniques for abdominal fascial closer. Regular bite closer is the technique followed in many hospitals. Recently small bite technique is advocated to

reduce surgical site infection, surgical site occurrences and incisional hernias in elective laparotomies.^{1,2}

Objectives

Objective of the present study is to compare short term outcome of small bite abdominal closer against regular bite abdominal closer. Short term results like surgical site infection and surgical site occurrences will be compared.

METHODS

This is prospective non randomized observational cohort study carried out at Bharati Vidyapeeth deemed to be university medical college & hospital, Sangli. The study

was carried out from November 2019 to April 2021. All midline laparotomies closed with small bite or regular bite technique at our hospital are included in the study. This study comprises all emergency and elective cases. Those operated outside department of surgery are excluded. Author and his group had done small bite closer of abdominal fascia. We have compared the short-term outcome of small bite verses regular bite for abdomen fascia closer. SPSS 22 software was used to analyse the data.

Fifty-two laparotomies done in surgery department were eligible for inclusion in the study. Out of these fifty-two, twenty-six laparotomies closer were done by small bite technique and twenty-six were done by regular bite technique. Authors and his group used 2.0 polydioxanone on 32 mm needle for small bite abdominal closer. Small bite technique includes Isrealssons self-locking knot, suturing was done with 5 to 7mm from edge of fascia and 5mm distance between two bites., continuous suturing was done to close fascia and at the end Aberdeen knot was taken. Suture length was minimal four times the length of laparotomy wound. Other group of surgeons had used regular bite closer of laparotomies with no.1 loop ethilone laparotomy fascial closer was done one cm. from edge and one cm. distance between two bites in regular bite closer technique.

Surgical wounds comprising of clean, clean contaminated, contaminated and dirty cases on exploratory laparotomies. Classification of wounds is done according to CDC. All patients were followed up for surgical site infections and surgical site occurrences for the period of one month postoperative. Surgical site infections were grouped into superficial, deep and organ space. CDC guidelines about classification of surgical site infection were followed. Patients with wound dehiscence and burst abdomen were considered surgical site occurrences in the present study.

RESULTS

It was observed that there were significantly less SSI & SSO in small bite abdominal fascia closer group. The p value is 0.0255 ($p < 0.05$) by using standard error of difference between two proportions.

Even in emergency laparotomies it was found that there was significant reduction of SSI and SSO in small bite abdominal fascia closer group. The value of $p < 0.0001$ by using standard error of difference between two proportions. Small bite had significantly less SSI and SSO of 34% in emergency cases compared to 70% in regular bite emergency cases.

Emergency surgery formed the bulk of laparotomies in both groups. Short bite had 30.76% of patients with SSI and SSO. Regular bite had 57.69% of patients with SSI and SSO.

Table 1: Age group and patients of midline laparotomies.

Age group (years)	N
≤20	4
21-50	25
≥51	23
Total	52

Table 2: Gender distribution in two abdominal closer group.

Gender	Small bite closer	Regular bite closer
Male	14	14
Female	12	12
Total	26	26

DISCUSSION

Surgical site infection & surgical site occurrences increase burden on health care system. SSI are responsible for prolonged hospital stay, ICU stay, increased drugs requirement, which ultimately increases cost of treatment. SSI also leads to more incisional hernia occurrences.^{3,4} Surgical site occurrences like burst abdomen, wound dehiscence and incisional hernias increase reoperations and may increase morbidity and mortality. The incidence of all types of SSI following abdominal surgery can reach 15 to 25%. This rate of SSI in emergency abdominal surgeries increases as it involves contaminated, dirty wounds. Prolonged surgery, comorbidities and high ASA score of the patients are the confounding factors. The SSI in emergency cases may reach upto 35%.

There are many preventable interventions proposed over past many years in an attempt to reduce SSI, SSO and incisional hernias. Single layer mass closer of abdominal wall reduced surgical site infection, sinus formation and burst abdomen according to Chowdhary et al.⁵ PDS monofilament suture compared to proline suture has less wound dehiscence, surgical site infections, sinuses according to Cameron et al, Krukowaski et al Patel et al in 2017.⁶⁻⁸ less fistulas, palpable knot, chronic pain and incisional hernia are other benefits of monofilament PDS. Israelsson in 1994 recommended the small bite suturing technique rather than suture material (PDS or nylon) for reduction of wound problems after abdominal fascia closer.⁹ Milbourn et al suggested continuous suture and length of suture should be at least 4 times abdominal wound length as important parameters of abdominal wound healing.^{10,11} After review of all these publications, author thinks that small bite continuous closer of midline fascia 5 to 7 mm from edge and 5mm between the two bites using monofilament 2.0 PDS having suture length minimum 4 times wound length and self-locking knots will reduce SSI, SSO and incisional hernia.

Table 3: Type of operation (emergency or elective) in a given abdominal closer type with % of SSI and SSO.

Abdominal closer type	Emergency operation with SSI and SSO		Elective operation with SSI and SSO	
Small bite	23	8 (34.78%)	3	0
Regular bite	20	14 (70%)	6	1 (16.6%)

Table 4: Wound class in abdominal closer type, contaminated and dirty wound dominated in both closer types.

Parameters	Clean wound	Clean contaminated wound	Contaminated wound	Dirty wound
Small bite abdominal closer technique	3	5	5	13
Regular bite abdominal closer technique	4	3	5	14

Table 5: Type of SSI and SSO with abdominal closure type.

Parameters	Total number of patients	SSI N (%)	Superficial SSI N (%)	Deep SSI N (%)	Organ space SSI N (%)	Burst abdomen N (%)
Small bite abdominal closer	26	8 (30.76)	8 (100)	0	0	0
Regular bite abdominal closer	26	15 (57.69)	7 (46.66)	3 (20)	4 (26.66)	1 (6.6)

The author tried to validate small bite abdominal fascia closer against more traditional regular bite closer. These cases were done when corona pandemic was at peak and surgeons were doing surgeries on emergency basis (Table 3). 43 laparotomies out of 52 were done for emergency basis and emergency surgery is high risk for surgical site infections.

Wound type across all laparotomies is shown in (Table 4). Due to more emergency cases, dirty and contaminated cases formed major bulk of laparotomies performed. In small bite closer group, there were 8 superficial surgical site infections and there were no deep or organ space surgical site infections and burst abdomen. Where as in group comprising twenty-six cases of large regular bite fascia closer, had 15 surgical site infection and surgical site occurrences. Out of 15 there were 7 superficial surgical site infections, 3 deep, 4 organ space and 1 burst abdomen. There were significant less surgical site infections and surgical site occurrences in small bite fascia closer group, $p < 0.0255$ (Table 5). Similar outcome of small bite abdominal closer technique is also observed by Dereenberg et al, De Vries et al and Tolstrup et al with continuous small bite abdominal fascia closer.^{2,12,13}

Albertsmeier et al in ESTOIH trail revealed the short-stitch technique for abdominal wall closure potentially reduces the rate of burst abdomen. Furthermore, ultra-long-term absorbable elastic suture material appears to be associated with low wound infection and overall complication rates.¹⁴ Also in present series of small bite

abdominal closer technique no case of burst abdomen was noticed with reduced cases of surgical site infections observed. Study by Kushner et al showed that the small bite technique had better abdominal wall perfusion. This finding may help explain the better healing and reduction in surgical site infections and surgical site occurrences with the small bite closure technique.¹⁵ Longer follow-up studies and multicentric studies will help in validating usefulness of small bite abdominal closer technique in all laparotomies, emergency or elective

CONCLUSION

In our study small bite abdominal closer reduced surgical site infection and surgical site occurrences compared to regular bite abdominal closer and also small bite abdominal closer reduced surgical site infection and surgical site occurrences not only in elective cases but also in emergency laparotomies.

Recommendations

It is recommended that all laparotomies elective or emergent should be closed with small bite technique as it reduces surgical site infections and surgical site occurrences.

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