



A COMPARATIVE STUDY OF CLOSURE OF ABDOMINAL MIDLINE INCISION BY SMALL BITE vs. LARGE BITE

General Surgery

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ABSTRACT

Background: This study evaluates the outcomes of small bite versus large bite techniques in midline abdominal incisions. **Methods-** A prospective, randomized controlled study was conducted at Mahatma Gandhi Medical College & Hospital, Jaipur, from July 2022 to December 2024. Patients aged 21-75 undergoing laparotomy with midline incisions were included. A total of 60 patients were randomly assigned to two groups: Group A (small bite technique, USP 2-0 PDS II) and Group B (large bite technique, USP 1 double loop PDS II). Demographic data, presenting features, and baseline investigations were recorded. Early postoperative complications, such as surgical site infections (SSIs) and wound dehiscence, were monitored. Follow-up lasted six months for late complication assessment, with incisional hernias confirmed through clinical and radiological evaluation. **Conclusion-** This study aims to determine the effectiveness of suture techniques in midline laparotomies, contributing to improved surgical outcomes.

KEYWORDS

incisional hernia, midline laparotomy, burst abdomen

INTRODUCTION

Incisional hernias remain a common complication following laparotomy, despite advancements in surgical techniques and a better understanding of abdominal wall anatomy. Prevention has become a key focus, especially considering the suboptimal long-term outcomes of incisional hernia repairs. Two effective preventive strategies include prophylactic mesh augmentation (PMA) and improved suture techniques for laparoscopy closures.

An incisional hernia is defined as any detectable or palpable gap in the abdominal wall near a surgical scar, either through clinical examination or imaging, often leading to discomfort, intestinal obstruction, or strangulation. Factors such as infections, obesity, advanced age, and conditions increasing intra-abdominal pressure contribute to its development, with 5-11% of patients experiencing incisional hernias after abdominal surgery, often within the first two years.

Understanding the principles of wound closure, including speed, tension-free closure, and infection prevention, is vital to minimize the risk of complications. Surgical site infections (SSI), occurring in up to 15% of abdominal surgeries, significantly increase the likelihood of incisional hernias and wound dehiscence. Several factors, including suture technique and material choice, are under the surgeon's control and can influence outcomes. The small-bite suture technique, which has shown promise in reducing SSI and hernia rates, is gaining popularity but requires further study, especially in emergency settings, where the risk of wound complications is higher.

This study aims to evaluate the outcomes of laparotomy closure by examining both early (wound dehiscence, SSI) and late complications (incisional hernias).

METHODOLOGY

After obtaining IEC approval, we conducted a prospective, randomized controlled study at Mahatma Gandhi Medical College & Hospital, Jaipur, from July 2022 to December 2024. We included patients of both sexes undergoing midline abdominal surgery and who provided written informed consent.

Study Population:-

Patients aged 21-75 undergoing laparotomy with midline incision.

Inclusion Criteria:- Patients consenting to participate.

- Aged 21-75 years.

Exclusion Criteria:

- Previous incisional hernia or fascial dehiscence.

- BMI ≥ 25 kg/m².

- Collagen disorders.

- Pregnant women.

Sample Size:- 60 patients were randomly divided into two groups:

- Group A: Small bite technique (USP 2-0 PDS II, 31 mm needle, 5 mm bites, 5 mm spacing).

- Group B: Large bite technique (USP 1 double loop PDS II, 48 mm needle, 1 cm bites, 1 cm spacing).

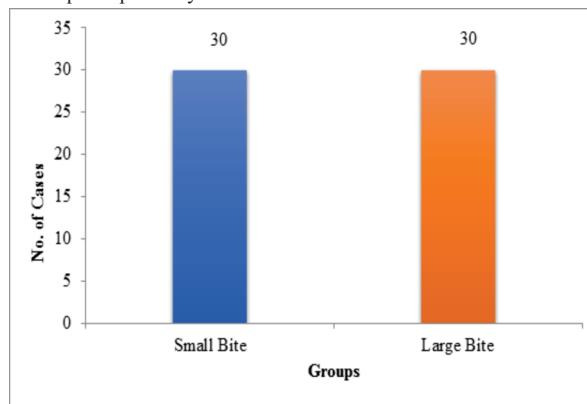
All patients underwent evaluation, and clinical outcomes were compared. Demographic data, presenting features (e.g., abdominal swelling and pain), and baseline investigations (CBC, USG abdomen) were recorded. Early postoperative complications, such as surgical site infections (SSIs), wound dehiscence, and vessel injuries, were noted. Follow-up lasted six months for late complication detection, with incisional hernias confirmed via clinical findings and radiological assessment.

Statistical Analysis

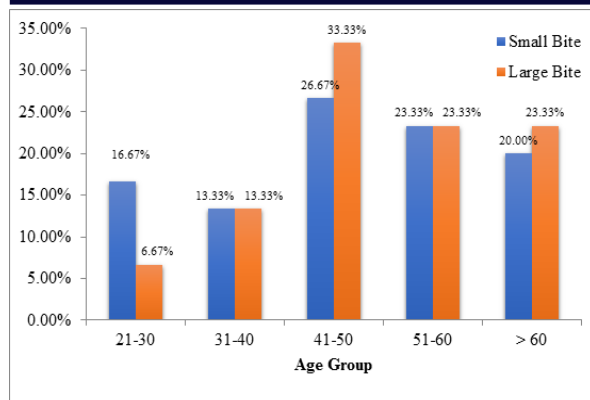
The quantitative data were represented as the mean $\pm$ SD. Categorical and nominal data were expressed as percentages. Quantitative data were analyzed using the t-test, while non-parametric data were analyzed using the Mann-Whitney test, and categorical data were analyzed using the chi-square test. The significance threshold for the p-value was set at <0.05 . All analyses were performed using SPSS software version 23.

RESULTS

Present study included a total of 60 cases operated for acute abdomen having had closure of midline laparotomy wound. Out of total 60 cases, 30 each were operated from by large bite and small bite technique respectively.

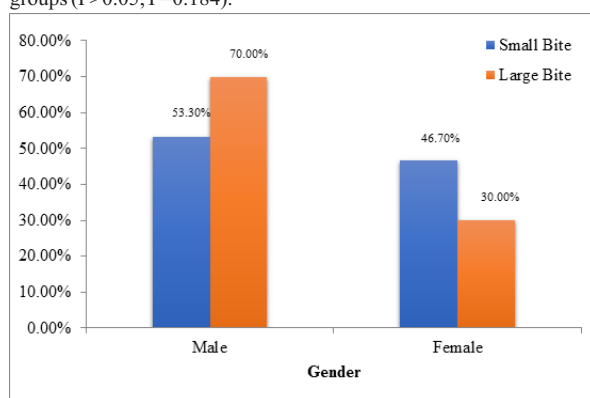


Graph 1: Group Distribution Of Study Cases



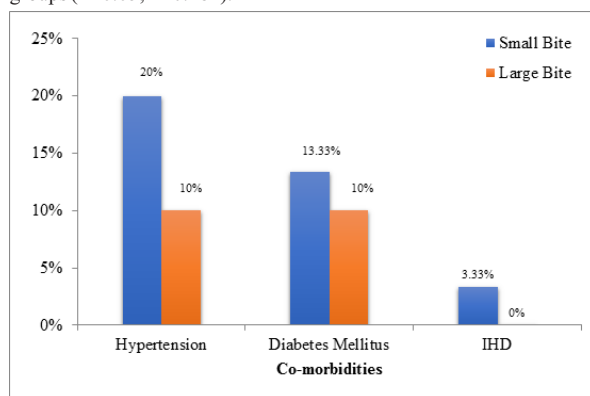
Graph 2: Age Distribution Of Both The Groups

Out of the total 60 cases with emergency laparotomy, the male category in both the groups were highest. Using chi-square test, this results was statistically not significant difference between both the groups ($P>0.05$; $P=0.184$).



Graph 3: Gender Distribution Of Both The Groups

Associated co-morbidities included hypertension (15%), diabetes (11.66%) and history of IHD (1.66%). Using chi-square test, this results was statistically not significant difference between both the groups ($P>0.05$; $P=0.481$).



Graph 4: Distribution Of Study Groups As Per Presence Of Co-morbidities

Table 1: Distribution Of Study Groups As Per Indications Of Surgery

Indications	Group A: Small bite		Group B: Large bite		Total	
	No.	%	No.	%	No.	%
Gastric Perforation	9	30.00%	12	40.00%	21	35.00%
Appendicular Perforation	5	16.67%	7	23.33%	12	20.00%
Blunt Trauma	4	13.33%	5	16.67%	9	15.00%

Duodenal Perforation	4	13.33%	4	13.33%	8	13.33%
Obstructed Hernia	5	16.67%	2	6.67%	7	11.67%
Ileal Perforation	3	10.00%	0	0.00%	3	5.00%
Total	30	100.0%	30	100.0%	60	100.0%
Pearson's Chi-square	2=42.133					
P-value	0.012 (S)					

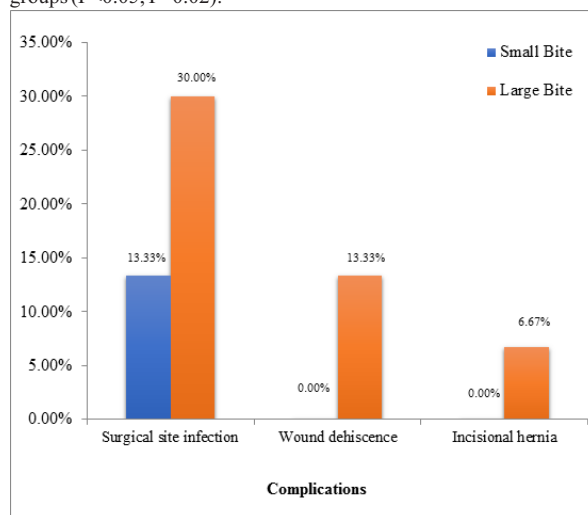
Most common indications for emergency laparotomy was gastric (35%) and appendicular perforation (20%). Other indication included blunt trauma (15%), duodenal perforation (13.33%), obstructed hernia (11.67%) and ileal perforation (5%). Using chi-square test, this results was statistically significant difference between both the groups ($P<0.05$; $P=0.012$).

Presenting signs and symptoms in study cases were maximum tachycardia (65%) followed by abdominal tenderness (61.7%), abdominal distension (55%), guarding (48.3%), pallor (36.7%), fever (35%), bradycardia (18.3%), hypotension (22.5%) and tachypnoea (6.7%). Using chi-square test, this results was statistically significant difference between both the groups in terms of abdominal distension ($P=0.039$) and tenderness ($P=0.003$).

Table 2: Distribution Of Study Groups As Per Incidence Of Complications

Complications	Group A: Small bite		Group B: Large bite		Total		P value
	No.	%	No.	%	No.	%	
Surgical site infection	4	13.33%	9	30.00%	13	21.67%	2=4.643 P=0.02 (NS)
Wound dehiscence	0	0.00%	4	13.33%	4	6.67%	
Incisional hernia	0	0.00%	2	6.67%	2	3.33%	

Overall high incidence of complication was associated with large bite technique. Incidence of surgical site infection was 30% and 13.33% in large and small bite group cases respectively while wound dehiscence and incisional hernia incidence was 13.33% and 6.67% in large bite group as compared to 0% in small bite group. Using chi-square test, this results was statistically significant difference between both the groups ($P<0.05$; $P=0.02$).



Graph 5: Distribution Of Study Groups As Per Incidence Of Complications

SUMMARY

1. Present study included a total of 60 cases operated for acute abdomen having had closure of midline laparotomy wound. Out of total 60 cases, 30 each were operated by large bite and small bite technique respectively.
2. The maximum patients from the age group of 41-50 years in both the

groups and similar number of patients in both groups from the age group of 31-40 years and 51-60 years.

3. The average age for Group A was 47.57 ± 14.644 years and for Group B was 49.87 ± 11.649 years ($P > 0.05$; $P = 0.503$).

4. Out of the total 60 cases with emergency laparotomy, the male category in both the groups were highest ($P > 0.05$; $P = 0.184$).

5. Associated co-morbidities included hypertension (15%), diabetes (11.66%) and history of IHD (1.66%) ($P > 0.05$; $P = 0.481$).

6. Most common indications for emergency laparotomy was gastric (35%) and appendicular perforation (20%). Other indication included blunt trauma (15%), duodenal perforation (13.33%), obstructed hernia (11.67%) and ileal perforation (5%) ($P < 0.05$; $P = 0.012$).

7. Presenting signs and symptoms in study cases were maximum tachycardia (65%) followed by abdominal tenderness (61.7%), abdominal distension (55%), guarding (48.3%), pallor (36.7%), fever (35%), bradycardia (18.3%), hypotension (22.5%) and tachypnoea (6.7%). This results was statistically significant difference between both the groups in terms of abdominal distension ($P = 0.039$) and tenderness ($P = 0.003$).

8. Overall high incidence of complication was associated with large bite technique ($P < 0.05$; $P = 0.02$).

9. Incidence of surgical site infection was 30% and 13.33% in large and small bite group cases respectively while wound dehiscence and incisional hernia incidence was 13.33% and 6.67% in large bite group as compared to 0% in small bite group.

CONCLUSION

In conclusion, for midline laparotomy incisions, the effectiveness of 5mm suture technique is higher when compared to the traditional bites suture closure. The complications associated with small bite technique especially incisional hernia and wound dehiscence are found to be much more reduced, also the pain and/or adverse events are also found to be not associated with it. Thus, the small bite technique should be preferred for midline incisions over the standard closure technique.