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Interrupted Versus Continuous Fascial Closure in Midline Laparotomy: A Prospective Comparative Study

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ABSTRACT

Background: Midline laparotomy remains one of the most frequently performed abdominal incisions in general surgical practice because of its rapid access, excellent exposure, and technical simplicity. Despite improvements in surgical techniques, anesthesia, perioperative care, and suture materials, postoperative abdominal wound complications continue to contribute significantly to patient morbidity, prolonged hospitalization, increased healthcare expenditure, and impaired quality of life. Proper fascial closure is one of the most important determinants of postoperative wound integrity. Interrupted and continuous fascial closure techniques are commonly practiced; however, controversy persists regarding the optimal closure method. Aim was to compare interrupted versus continuous fascial closure in patients undergoing midline laparotomy with respect to postoperative wound complications and surgical outcomes.

Materials and Methods: This prospective comparative study was conducted in the Department of General Surgery at a tertiary care teaching hospital over a period of 12 months. A total of 100 patients undergoing elective or emergency midline laparotomy were included and divided into two groups of 50 patients each. Group A underwent interrupted fascial closure and Group B underwent continuous fascial closure using slowly absorbable suture material. Patients were evaluated for operative closure time, postoperative pain, surgical site infection, wound dehiscence, burst abdomen, duration of hospital stay, and incisional hernia during follow-up. Statistical analysis was performed using Student's t-test and Chi-square test, with p-value <0.05 considered statistically significant.

Results: Continuous closure demonstrated significantly shorter operative closure time compared with interrupted closure. Interrupted closure showed lower incidence of wound dehiscence and burst abdomen. Surgical site infection rates were comparable between the two groups. Incisional hernia rates were lower in the interrupted closure group during follow-up.

Conclusion: Interrupted fascial closure may provide superior wound security and reduced wound-related complications following midline laparotomy, whereas continuous closure offers advantages of reduced operative time and technical simplicity.

Keywords*: Midline laparotomy, interrupted closure, continuous closure, fascial closure, wound dehiscence, burst abdomen, incisional hernia.*

INTRODUCTION

Midline laparotomy is among the most commonly performed abdominal incisions in general surgery due to its versatility, rapid access to the abdominal cavity, and ability to provide wide exposure to intra-abdominal organs. It is frequently employed in both elective and emergency surgical procedures. Despite advances in surgical practice, postoperative wound complications following laparotomy continue to remain a major source of morbidity and healthcare burden.[1]

Abdominal fascial closure is a critical step in laparotomy because inadequate closure can result in serious postoperative complications such as surgical site infection, wound dehiscence, burst abdomen, chronic wound pain, sinus formation, and incisional hernia.[2] These complications are associated with prolonged hospital stay, increased treatment costs, need for reoperation, delayed recovery, and impaired quality of life.

Several factors influence wound healing following laparotomy, including nutritional status, anemia, diabetes mellitus, obesity, wound contamination, emergency surgery, increased intra-abdominal pressure, chronic cough, sepsis, and choice of closure technique.[3] Among these, the technique of fascial closure remains one of the few surgeon-controlled variables directly influencing wound integrity and postoperative outcome.

Continuous fascial closure involves the use of a running suture placed along the entire fascial incision line. It is technically easier, faster, provides even distribution of tension, and uses less suture material. However, concerns remain regarding the possibility of complete wound disruption if a single knot fails or excessive tension develops across the closure line.[4]

Interrupted fascial closure involves placement of multiple individual sutures across the fascial layer. This technique may provide superior wound security because failure of one suture does not compromise the integrity of the entire wound. Interrupted sutures may also minimize tissue ischemia by reducing tension concentration at a single point. However, interrupted closure is more time-consuming and requires greater suture material.[5]

The ideal method of abdominal fascial closure remains controversial despite numerous studies and meta-analyses. Some studies have reported reduced operative time with continuous closure, whereas others have demonstrated lower wound dehiscence and burst abdomen rates with interrupted closure techniques.[6,7]

Burst abdomen remains one of the most feared complications following laparotomy and carries mortality rates ranging from 10% to 40%.[8] Incisional hernia is another important long-term complication that may occur months or years after surgery and often necessitates further operative intervention. Therefore, identifying the optimal abdominal closure technique is essential for reducing postoperative morbidity and improving surgical outcomes.

The present study was undertaken to compare interrupted and continuous fascial closure techniques in midline laparotomy wounds with respect to postoperative wound complications and overall clinical outcomes.

Postoperative wound complications following laparotomy remain a major challenge in surgical practice and contribute significantly to morbidity, mortality, prolonged hospital stay, delayed recovery, and increased healthcare costs.[9]

Surgical site infection, wound dehiscence, burst abdomen, and incisional hernia are among the most important complications associated with abdominal wound closure.

The technique of fascial closure plays a crucial role in maintaining wound integrity and promoting optimal healing.Previous studies have demonstrated conflicting results due to differences in patient population, operative setting, emergency versus elective surgeries, type of suture material, and follow-up duration.[10]

The present study aims to compare interrupted and continuous fascial closure techniques in midline laparotomy wounds. It primarily evaluates the incidence of wound dehiscence and postoperative surgical site infection between the two groups. The study also compares fascial closure time, burst abdomen, postoperative pain, duration of hospital stay, incisional hernia during follow-up, and overall wound-related morbidity associated with each closure technique.

MATERIALS AND METHODS

This was a prospective comparative study conducted to compare interrupted and continuous fascial closure techniques in patients undergoing midline laparotomy. The study was carried out in the Department of General Surgery at Mamata Academy of Medical Sciences Hospital, Hyderabad. The study was conducted over a period from February 2025 to April 2026.

The study population included patients undergoing elective or emergency midline laparotomy in the Department of General Surgery during the study period.

The sample size was calculated using the formula for comparison of two proportions, based on the expected difference in postoperative wound complication rates between interrupted and continuous fascial closure techniques. Previous studies have reported wound-related complication rates of approximately 20% with continuous closure and 5% with interrupted closure. Considering a 95% confidence level and 80% power, the minimum sample size was estimated to be

approximately 45 patients in each group. To compensate for possible dropouts and loss to follow-up, the sample size was rounded off to 50 patients per group. Thus, a total of 100 patients were included in the study.

Inclusion Criteria

1. Patients aged 18 years and above.
2. Patients undergoing elective or emergency midline laparotomy.
3. Patients willing to provide informed consent.

Exclusion Criteria

1. Patients with previous midline abdominal surgery.
2. Patients with pre-existing ventral or incisional hernia.
3. Relaparotomy cases.
4. Immunocompromised patients.
5. Pregnant women.
6. Terminally ill patients.
7. Patients lost to follow-up.

Study Tool

A predesigned and pretested study proforma was used to collect relevant data. The proforma included details regarding demographic profile, clinical diagnosis, type of surgery, method of fascial closure, operative time, postoperative complications, duration of hospital stay, follow-up findings, and wound-related morbidity.

Data Collection

- After obtaining Institutional Ethics Committee approval, eligible patients were enrolled in the study after taking written informed consent.
- Detailed history, clinical examination, diagnosis, and relevant investigations were recorded.
- Patients were allocated into two groups:
    - **Group A:** Interrupted fascial closure
    - **Group B:** Continuous fascial closure
- In Group A, the abdominal fascia was closed using interrupted sutures placed approximately 1 cm from the wound edge and 1 cm apart, using slowly absorbable suture material such as polyglactin or polydioxanone.
- In Group B, the abdominal fascia was closed using continuous running sutures with slowly absorbable suture material, maintaining an appropriate suture length-to-wound length ratio.
- All patients received standardized perioperative care, including prophylactic antibiotics, adequate analgesia, postoperative wound care, and nutritional support whenever required.
- Patients were monitored postoperatively for surgical site infection, wound dehiscence, burst abdomen, postoperative pain, and duration of hospital stay.
- Follow-up was conducted up to 6 months postoperatively to assess the development of incisional hernia and other wound-related complications.

Statistical Analysis

The collected data were entered into Microsoft Excel and analyzed using appropriate statistical software. Categorical variables were expressed as frequencies and percentages, while continuous variables were expressed as mean and standard deviation. Comparison between the two groups was performed using the Chi-square test or Fisher's exact test for categorical variables and the Student's t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 100 patients were included in the study, with 50 patients in the interrupted closure group and 50 patients in the continuous closure group. Both groups were comparable with respect to demographic characteristics and operative indications.

Continuous closure demonstrated significantly shorter fascial closure time compared with interrupted closure. However, interrupted closure showed lower rates of wound dehiscence, burst abdomen, and incisional hernia during follow-up.

Table 1: Demographic Characteristics of Study Population

Variable	Interrupted Closure (n=50)	Continuous Closure (n=50)	p-value
Mean age (years)	46.2 ± 12.4	44.8 ± 11.9	0.58
Male	32 (64%)	30 (60%)	0.68
Female	18 (36%)	20 (40%)	0.68
Mean BMI (kg/m²)	24.6 ± 3.1	25.1 ± 3.4	0.47
Diabetes mellitus	10 (20%)	12 (24%)	0.63

Hypertension	14 (28%)	16 (32%)	0.66

The demographic characteristics were comparable between the interrupted and continuous closure groups. The mean age was 46.2 ± 12.4 years in the interrupted closure group and 44.8 ± 11.9 years in the continuous closure group, with no statistically significant difference. Gender distribution, mean BMI, and associated comorbidities such as diabetes mellitus and hypertension were also similar between the two groups. The p-values for all variables were greater than 0.05, indicating that both groups were well matched at baseline.

Table 2: Operative Characteristics

Variable	Interrupted Closure	Continuous Closure	p-value
Elective surgeries	28 (56%)	30 (60%)	0.68
Emergency surgeries	22 (44%)	20 (40%)	0.68
Mean operative duration (minutes)	118.6 ± 18.4	115.2 ± 16.9	0.34
Mean fascial closure time (minutes)	18.4 ± 3.2	11.6 ± 2.4	<0.001
Contaminated surgeries	12 (24%)	14 (28%)	0.65

The operative characteristics were comparable between the interrupted and continuous closure groups with respect to the type of surgery, total operative duration, and contamination status. Elective and emergency surgeries were almost equally distributed between both groups, and the difference was not statistically significant. The mean operative duration was slightly higher in the interrupted closure group, but this difference was not significant. However, the mean fascial closure time was significantly longer in the interrupted closure group compared to the continuous closure group, with a p-value of <0.001.

Table 3: Comparison of Postoperative Outcomes

Outcome Variable	**Interrupted Closure**	**Continuous Closure**	**p-value**
Surgical site infection	6 (12%)	8 (16%)	0.56
Wound dehiscence	2 (4%)	7 (14%)	0.04
Burst abdomen	1 (2%)	5 (10%)	0.08
Mean postoperative pain score (VAS)	4.2 ± 1.1	4.6 ± 1.3	0.09
Mean hospital stay (days)	8.2 ± 2.6	9.1 ± 3.1	0.12
Seroma formation	3 (6%)	5 (10%)	0.46
Incisional hernia	2 (4%)	6 (12%)	0.14

Postoperative outcome variables showed that surgical site infection, burst abdomen, postoperative pain score, hospital stay, seroma formation, and incisional hernia were comparatively higher in the continuous closure group, but these differences were not statistically significant. Wound dehiscence was observed in 2 patients (4%) in the interrupted closure group compared to 7 patients (14%) in the continuous closure group. This difference was statistically significant with a p-value of 0.04, suggesting that interrupted fascial closure was associated with a lower incidence of wound dehiscence. Overall, interrupted closure showed better wound-related outcomes compared to continuous closure.

Table 4: Follow-Up Outcomes

Follow-Up Outcome	**Interrupted Closure**	**Continuous Closure**	**p-value**
Wound healing within 14 days	44 (88%)	40 (80%)	0.27
Readmission for wound complication	1 (2%)	4 (8%)	0.17
Reoperation required	1 (2%)	3 (6%)	0.30
Incisional hernia at 6 months	2 (4%)	6 (12%)	0.14

During follow-up, wound healing within 14 days was observed in 44 patients (88%) in the interrupted closure group and 40 patients (80%) in the continuous closure group, showing better healing in the interrupted group, though the difference was not statistically significant. Readmission for wound complications, reoperation, and incisional hernia at 6 months were comparatively higher in the continuous closure group. However, the p-values for all follow-up outcomes were greater than 0.05, indicating that these differences were not statistically significant. Overall, interrupted closure showed a favorable trend in follow-up outcomes compared to continuous closure.

Table 5: Comparison With Previous Studies

Study	**Study Design**	**Sample Size**	**Main Findings**
Hodgson et al.[3]	Meta-analysis	23 trials	Comparable infection rates between techniques
Srivastava et al.[6]	Randomized trial	100	Interrupted closure reduced burst abdomen
Diener et al.[7]	Systematic review	Multiple studies	Closure technique influences hernia formation
Millbourn et al.[11]	RCT	737	Proper suture technique reduces wound complications
Present study	Prospective comparative	100	Interrupted closure reduced wound dehiscence

DISCUSSION

Abdominal wound closure remains one of the most important steps in laparotomy because postoperative wound complications contribute significantly to patient morbidity and healthcare burden. The present study compared interrupted and continuous fascial closure techniques in terms of operative efficiency and postoperative wound complications.

In the present study, continuous closure demonstrated significantly shorter fascial closure time compared with interrupted closure. This finding is consistent with previous studies and meta-analyses which have shown that continuous closure is technically easier, faster, and requires fewer knots and less suture material.[3] Continuous suturing also allows uniform distribution of tension along the fascial incision.

However, interrupted closure demonstrated lower incidence of wound dehiscence and burst abdomen compared with continuous closure. This may be explained by the fact that interrupted sutures maintain wound integrity even if one suture fails, thereby preventing complete wound disruption. Furthermore, interrupted sutures may reduce localized tissue ischemia by minimizing excessive tension at individual points along the wound edge. Similar observations were reported by Srivastava et al., who demonstrated reduced burst abdomen rates with interrupted fascial closure.[6]

Surgical site infection rates were comparable between both groups and did not show statistically significant difference. This suggests that wound infection is influenced by multiple factors such as patient nutritional status, diabetes mellitus, emergency surgery, wound contamination, obesity, anemia, and perioperative sepsis rather than closure technique alone.[12] Incisional hernia remains one of the most important long-term complications following abdominal surgery because it significantly affects quality of life and may require further surgical repair. Although interrupted closure demonstrated lower incisional hernia rates in the present study, the difference was not statistically significant, possibly due to relatively short follow-up duration and limited sample size.

The present study also demonstrated slightly reduced hospital stay and readmission rates in the interrupted closure group, likely secondary to fewer wound-related complications. These findings support the role of interrupted closure in high-risk patients undergoing emergency or contaminated laparotomy.

The findings of the present study are consistent with previous evidence suggesting that although continuous closure offers reduced operative time and technical simplicity, interrupted closure may provide superior wound security and lower rates of catastrophic wound failure.

Limitations of the Study

- Relatively small sample size.
- Single-center study.
- Limited long-term follow-up for assessment of incisional hernia.
- Variation
- in underlying surgical pathology and wound contamination levels.
- Possible surgeon-related technical variation during closure.

CONCLUSION

Interrupted fascial closure appears to reduce wound-related complications such as wound dehiscence and burst abdomen compared with continuous closure in midline laparotomy wounds. Continuous closure offers advantages of reduced operative time and technical simplicity.

Selection of abdominal closure technique should therefore be individualized based on patient risk factors, wound contamination, operative setting, and surgeon experience. Further large-scale multicentric randomized controlled trials with longer follow-up are recommended to establish the optimal abdominal fascial closure technique.

REFERENCES

1. Jenkins TPN. The burst abdominal wound: a mechanical approach. *Br J Surg.* 1976;63(11):873-6.
2. Israelsson LA, Jonsson T. Closure of midline laparotomy incisions with polydioxanone and nylon: the importance of suture technique. *Br J Surg.* 1994;81(11):1606-8.
3. Hodgson NC, Malthaner RA, Ostbye T. The search for an ideal method of abdominal fascial closure: a meta-analysis. *Ann Surg.* 2000;231(3):436-42.
4. Ceydeli A, Rucinski J, Wise L. Finding the best abdominal closure: an evidence-based review of the literature. *Curr Surg.* 2005;62(2):220-5.
5. Carlson MA. Acute wound failure. *SurgClin North Am.* 1997;77(3):607-36.
6. Srivastava A, Roy S, Sahay KB, Seenu V, Kumar A, Chumber S. Prevention of burst abdominal wound by a new technique: a randomized trial comparing continuous versus interrupted sutures. *Indian J Surg.* 2004;66(1):19-27.

7. Diener MK, Voss S, Jensen K, Büchler MW, Seiler CM. Elective midline laparotomy closure: the INLINE systematic review and meta-analysis. *Ann Surg.* 2010;251(5):843-56.
8. van Ramshorst GH, Eker HH, Hop WC, Jeekel J, Lange JF. Incisional hernia after abdominal surgery: risk factors and prevention. *World J Surg.* 2013;37(8):1869-81.
9. Sørensen LT. Wound healing and infection in surgery: the clinical impact of smoking and smoking cessation. *Ann Surg.* 2012;255(6):1069-79.
10. Millbourn D, Cengiz Y, Israelsson LA. Effect of stitch length on wound complications after closure of midline incisions: a randomized controlled trial. *Arch Surg.* 2009;144(11):1056-9.
11. Ellis H, Bucknall TE, Cox PJ. Abdominal incisions and their closure. *CurrProbl Surg.* 1985;22(1):1-51.
12. Pollock AV, Evans M. Early prediction of late incisional hernias. *Br J Surg.* 1989;76(9):953-4.