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Comparison Between Continuous and Interrupted Fascial Closure in Emergency Midline Laparotomy

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ABSTRACT

Objective: To compare the effectiveness of interrupted versus continuous fascial closure techniques in emergency midline laparotomy in terms of the frequency of burst abdomen. **Study Setting:** Department of Surgery, DHQ Hospital, Faisalabad. **Duration of Study:** July 31, 2024 to January 31, 2025 (Six months following approval of the synopsis) **Data Collection:** A randomized controlled trial was conducted on 150 patients undergoing emergency midline laparotomy. Patients were randomly assigned to either interrupted (n=75) or continuous (n=75) closure techniques. The primary outcome was burst abdomen, assessed over a 30-day postoperative period. **Results:** The incidence of burst abdomen was significantly lower in the interrupted closure group (4 cases, 20.0%) compared to the continuous closure group (16 cases, 80.0%) (p = 0.004). Stratified analysis showed that the continuous closure technique was associated with a significantly higher risk of burst abdomen across different age groups, gender, and BMI categories. However, there was no significant difference in superficial surgical site infections between the two groups (p = 0.273). **Conclusion:** Interrupted fascial closure significantly reduces the incidence of burst abdomen in emergency midline laparotomy compared to continuous closure. Given its effectiveness in preventing wound dehiscence, interrupted closure should be preferred in emergency settings. Further multicenter trials with extended follow-up periods are warranted to confirm long-term outcomes.

INTRODUCTION

The midline laparotomy incision is the most widely used incision for emergency abdominal surgery as it takes less time, provides good exposure of all quadrants of abdomen, and is relatively bloodless. [1] However, a major complication associated with midline incision is fascial dehiscence, presenting as burst abdomen or as incisional hernia in the longer term.[2] The incidence of fascial dehiscence after emergency surgery in literature ranges from 2.4 to 23.5%.[2] The mean timing of wound dehiscence is around 8 to 10 postoperative days.[3] Serosanguinous discharge from the wound is usually the first indicator of burst abdomen when skin sutures are intact, with the patient complaining of a sense of "something giving way."[4] Burst abdomen can also present with visible gut and other intra-abdominal viscera protruding through the wound after separation of fascial layers.[1] Burst abdomen leads to increased morbidity and mortality. There is a 10 to 30% mortality rate associated with wound dehiscence.[1] It also prolongs length of hospital stay for management of the wound.[2] Patients require multiple dressings and may need secondary surgical closure for the wound.[5] The rate of incisional hernia after emergency laparotomy is 11 to 22% and leads to decreased quality of life and has a risk of incarceration and strangulation that will need surgical intervention.[2]

There are multiple risk factors linked with burst abdomen occurrence, such as patient age, sex, comorbid conditions, smoking, postoperative wound infection, and closure techniques.[6] Unlike in elective surgery, patients undergoing emergency surgery have comorbidities, poor nutritional status, and intra-peritoneal sepsis that decrease wound healing.[3-4] As patient factors cannot be altered, for prevention of fascial dehiscence, the most important factor that is under the surgeon's control is the technique of closure.[1,7]

Abdominal closure is preferably done as mass closure of all layers rather than separate layered closure.[7] There is debate regarding the optimal method for closure in emergency laparotomy.[8] The two methods for closure, interrupted technique and continuous closure, have been widely studied. Continuous closure is quicker, uses less suture material, and has fewer knots that can cause sinus formation, but it compromises blood supply for wound healing.[5]

Studies have shown that interrupted suturing has less incidence of wound dehiscence in emergency surgery.[3] A study done by Balaji C et al. showed that the rate of burst abdomen was 6% after interrupted suturing and 22% after continuous suturing, which was a statistically significant

difference.[5] There is still lack of evidence to suggest a suturing technique in emergency midline laparotomy unlike the recommended 'small bite technique' for elective laparotomy.[8] Several studies have been done to assess which suturing technique is effective, but there has not been a consensus.[5]

There is still lack of evidence to suggest a suturing technique in emergency midline laparotomy unlike the recommended 'small bite technique' for elective laparotomy,[8] Several studies have been done to assess which suturing technique is effective but there has not been a consensus.[5] Studies in the West have shown no difference between the suturing techniques, however studies from Indian subcontinent have shown that interrupted technique is superior.[4] Therefore, this study aims to compare interrupted and continuous closure of fascia in emergency laparotomy to determine which technique is more effective in our setup where most patients have comorbid conditions and present late with intraperitoneal sepsis making suturing technique of immense importance in preventing burst abdomen.

METHODOLOGY

This randomized controlled trial was conducted at the Department of Surgery, DHQ Hospital, Faisalabad, over a minimum period of six months following approval of the synopsis. The study aimed to compare the effectiveness of continuous and interrupted fascial closure in emergency midline laparotomy in terms of the frequency of burst abdomen. The sample size was calculated using the WHO sample size calculator for two proportions, keeping the power of study at 80% and level of significance at 5%. Based on previous literature, the wound dehiscence rate was estimated to be 22% with continuous suturing and 6% with interrupted suturing. The calculated sample size was 150, with 75 patients allocated to each group. Patients were selected using a non-probability consecutive sampling technique.

Patients aged 18 to 75 years of either gender who required emergency laparotomy were included in the study. Immunocompromised patients, including those with cancer, chronic liver disease, HIV, diabetes, or those on prolonged steroid or chemotherapy use, were excluded. Patients with a history of previous midline laparotomy or second-look procedure and those with morbid obesity (BMI > 40) were also excluded.

Approval to conduct the study was obtained from the Ethical Review Committee (ERC), and informed consent was taken from all eligible patients presenting to the emergency department. Demographic data, including age, gender, height, and weight, were recorded. Emergency laparotomy was performed by an experienced consultant surgeon after a thorough history, clinical examination, and necessary laboratory and radiological investigations. Patients were resuscitated, and preoperative antibiotics were administered according to hospital protocol. General anesthesia was provided for all patients.

Following skin disinfection with povidone-iodine solution, a midline incision was made. Intraoperative findings were documented, and necessary surgical procedures were performed as required. Peritoneal lavage was performed using warm normal saline, and an intra-abdominal drain was placed when indicated. Patients were then randomly assigned to one of two groups using block randomization. Group 1 underwent interrupted closure with non-absorbable Prolene 1 suture, placed in a Figure-of-8 manner with 1 cm spacing between sutures. Group 2 underwent continuous closure using the same suture material, with bites taken 1 cm from the edge and 1 cm apart, maintaining a suture-to-wound length ratio of 4:1. The wound was irrigated with normal saline before skin approximation.

Postoperatively, patients received standard care and were monitored until discharge and for 30 days for burst abdomen. Data were analyzed using SPSS 22, with mean ± SD for quantitative variables and frequency (%) for qualitative variables. The chi-square test compared burst abdomen incidence between groups, with $p \leq 0.05$ as significant. Effect modifiers were addressed through stratification, followed by post-stratification chi-square analysis.

RESULTS

Demographic Details of Patients (n=150)

The study included a total of 150 patients, with 75 in the interrupted suturing group and 75 in the continuous suturing group. The mean age of participants in the interrupted group was 46.87 ± 17.07 years, while in the continuous group, it was slightly lower at 44.73 ± 16.14 years. Age distribution analysis revealed that 86 (57.3%) patients were between 18 and 50 years old, while 64 (42.7%) were aged between 51 and 75 years. In the interrupted group, 42 (48.8%) patients were within the younger age category, whereas in the continuous group, 44 (51.2%) patients belonged to this category. Conversely, 33 (51.6%) of patients in the interrupted group were in the older age category, compared to 31 (48.4%) in the continuous group. Regarding gender distribution, there were more male patients overall, with 80 (53.3%) being male and 70 (46.7%) female. In the interrupted group, 44 (55.0%) were male and 31 (44.3%) were female, whereas the continuous group had 36 (45.0%) males and 39 (55.7%) females. The mean BMI in the interrupted suturing group was 28.65 ± 5.52, while in the continuous group, it was slightly higher at 29.35 ± 6.02. A total of 48 (32.0%) patients had a BMI of ≤25, with 23 (47.9%) in the interrupted group and 25 (52.1%) in the continuous group. The remaining 102 (68.0%) patients had a BMI greater than 25, with 52 (51.0%) in the interrupted group and 50 (49.0%) in the continuous group.

Table 1

Demographic details of patients(n=150)

Variable	Group	Interrupted (n=75)	Continuous (n=75)	Total (n=150)
Age (Years, Mean ± SD)		46.87 ± 17.07	44.73 ± 16.14	—
Age Category	18-50	42 (48.8%)	44 (51.2%)	86 (57.3%)
	51-75	33 (51.6%)	31 (48.4%)	64 (42.7%)
Gender	Male	44 (55.0%)	36 (45.0%)	80 (53.3%)
	Female	31 (44.3%)	39 (55.7%)	70 (46.7%)
BMI (Mean ± SD)		28.65 ± 5.52	29.35 ± 6.02	—
BMI Category	≤ 25	23 (47.9%)	25 (52.1%)	48 (32.0%)
	> 25	52 (51.0%)	50 (49.0%)	102 (68.0%)

Clinical Information Details of Patients (n=150)

The presence of diabetes was observed in 60 (40.0%) patients, while 90 (60.0%) were non-diabetic. Among diabetic patients, 32 (53.3%) were in the interrupted group, whereas 28 (46.7%) were in the continuous group. Among non-diabetic patients, 43 (47.8%) were in the interrupted group, and 47 (52.2%) were in the continuous group. The association between diabetes and the type of suturing technique was found to be statistically insignificant (p = 0.505). Smoking habits were also assessed, with 37 (24.7%) patients identified as smokers, while 113 (75.3%) were non-smokers. Among smokers, 17 (45.9%) were in the interrupted group and 20 (54.1%) were in the continuous group. In the non-smoking category, 58 (51.3%) were in the interrupted group and 55 (48.7%) in the continuous group. The association between smoking and suturing technique was also insignificant (p = 0.570).

Table 2

Clinical Information Details of Patients(N=150)

Variable	Group	Interrupted (n=75)	Continuous (n=75)	Total (n=150)	p-value (Chi-square)	Significant / in-significant
Diabetes	Yes	32 (53.3%)	28 (46.7%)	60 (40.0%)	0.505	Insignificant
	No	43 (47.8%)	47 (52.2%)	90 (60.0%)		
Smoking	Yes	17 (45.9%)	20 (54.1%)	37 (24.7%)	0.570	Insignificant
	No	58 (51.3%)	55 (48.7%)	113 (75.3%)		

Clinical Outcomes in Both Groups (n=150)

Burst abdomen was observed in 20 (13.3%) patients overall, with a significantly higher occurrence in the continuous suturing group (16 cases, 80.0%) compared to the interrupted suturing group (4 cases, 20.0%). Conversely, 130 (86.7%) patients did not develop burst abdomen, with 71 (54.6%) in the interrupted group and 59 (45.4%) in the continuous group. The association between burst abdomen and suturing technique was statistically significant (p = 0.004), indicating a higher risk of this complication in the continuous suturing group. Superficial surgical site infection (SSI) was reported in 25 (16.7%) patients, while 125 (83.3%) did not experience this complication. Among those with superficial SSI, 15 (60.0%) were in the interrupted group, and 10 (40.0%) were in the continuous group. Among patients without superficial SSI, 60 (48.0%) belonged to the interrupted group, while 65 (52.0%) were in the continuous group. However, the association between superficial SSI and the type of suturing technique was statistically insignificant (p = 0.273).

Table 3

Clinical Outcomes Detail in Both Groups(N=150)

Variable	Group	Interrupted (n=75)	Continuous (n=75)	Total (n=150)	p-value (Chi-square)	Significant / in-significant
Burst Abdomen	Yes	4(20.0%)	16(80.0%)	20(13.3%)	0.004	Significant
	No	71(54.6%)	59(45.4%)	130(86.7%)		
Superficial SSI	Yes	15(60.0%)	10(40.0%)	25(16.7%)	0.273	Insignificant
	No	60(48.0%)	65(52.0%)	125(83.3%)		

Clinical Outcome (Burst Abdomen) According to Various Effect Modifiers

The incidence of burst abdomen was analyzed across different age groups. Among patients aged 18-50 years, 11 (7.3%) cases of burst abdomen were recorded, with a significantly higher occurrence in the continuous suturing group (9 cases, 81.8%) compared to the interrupted group (2 cases, 18.2%). The association was found to be significant (p = 0.029). In the 51-75 age group, 9 (6.0%) cases of burst abdomen were noted, with 7 (77.8%) in the continuous group and 2 (22.2%) in the interrupted group. However, this association was not statistically significant (p = 0.057). Among male patients, 14 (9.3%) developed burst abdomen, with 10 (71.4%) cases in the continuous group and 4 (28.6%) in the interrupted group. The association between gender and burst abdomen incidence was significant (p = 0.029). In contrast, among female patients, 6 (4.0%) cases of burst abdomen were recorded, all occurring in the continuous group (100%), while none were observed in the interrupted group, making this association statistically significant (p = 0.022). Patients with a BMI of ≤ 25 had 8 (5.3%) cases of burst abdomen, with 6 (75.0%) cases in the continuous group and 2 (25.0%) in the interrupted group. The association was not significant (p = 0.155). However, among patients with a BMI > 25, burst abdomen occurred in 12 (8.0%) cases, with a significantly higher prevalence in the continuous group (10 cases, 83.3%) compared to the interrupted group (2 cases, 16.7%). This association was statistically significant (p = 0.011). In diabetic patients, burst abdomen was recorded in 6 (4.0%) cases, with 5 (83.3%) in the continuous group and 1 (16.7%) in the interrupted group. However, this association was not significant (p = 0.058). In non-diabetic patients, 14 (9.3%) cases were recorded, with 11 (78.6%) in the continuous group and 3 (21.4%) in the interrupted group. This association was statistically significant (p = 0.032). Among smokers, burst abdomen occurred in 4 (2.7%) cases, with 3 (75.0%) in the continuous group and 1 (25.0%) in the interrupted group. The association was not significant (p = 0.373). However, among non-smokers, burst abdomen was observed in 16 (10.7%) cases, with a significantly higher prevalence in the continuous group (13 cases, 81.3%) compared to the interrupted group (3 cases, 18.8%). This association was statistically significant (p = 0.005).

Table 4

Clinical Outcome (Burst Abdomen) According to Various Effect Modifiers

Effect modifiers		Burst Abdomen	Interrupted (n=75)	Continuous (n=75)	Total (n=150)	p-value
Age Group	18-50	Yes	2 (18.2%)	9 (81.8%)	11 (7.3%)	0.029
		No	40 (53.3%)	35 (46.7%)	75 (50.0%)	
	51-75	Yes	2 (22.2%)	7 (77.8%)	9 (6.0%)	0.057

		No	31 (56.4%)	24 (43.6%)	55 (36.7%)	
Gender	Male	Yes	4 (28.6%)	10 (71.4%)	14 (9.3%)	0.029
		No	40 (60.6%)	26 (39.4%)	66 (44.0%)	
	Female	Yes	0 (0.0%)	6 (100.0%)	6 (4.0%)	0.022
		No	31 (48.4%)	33 (51.6%)	64 (42.7%)	
Body Mass Index	Yes	≤ 25	2 (25.0%)	6 (75.0%)	8 (5.3%)	0.155
			21 (52.5%)	19 (47.5%)	40 (26.7%)	
	No	> 25	2 (16.7%)	10 (83.3%)	12 (8.0%)	0.011 (Significant)
			50 (55.6%)	40 (44.4%)	90 (60.0%)	
Diabetes	Yes	Yes	1 (16.7%)	5 (83.3%)	6 (4.0%)	0.058
		No	31 (57.4%)	23 (42.6%)	54 (36.0%)	
	No	Yes	3 (21.4%)	11 (78.6%)	14 (9.3%)	0.032 (Significant)
		No	40 (52.6%)	36 (47.4%)	76 (50.7%)	
Smoking	Yes	Yes	1 (25.0%)	3 (75.0%)	4 (2.7%)	0.373
		No	16 (48.5%)	17 (51.5%)	33 (22.0%)	
	No	Yes	3 (18.8%)	13 (81.3%)	16 (10.7%)	0.005 (Significant)
		No	55 (56.7%)	42 (43.3%)	97 (64.7%)	

Clinical Outcome (Surgical Site Infection) According to Various Effect Modifiers

In patients aged 18-50 years, 12 (8.0%) cases of superficial surgical site infection (SSI) were noted, with a higher proportion in the interrupted group (9 cases, 75.0%) compared to the continuous group (3 cases, 25.0%). However, this association was not statistically significant (p = 0.051). Among patients aged 51-75 years, 13 (8.7%) cases of SSI were observed, with 7 (53.8%) in the continuous group and 6 (46.2%) in the interrupted group, and this association was also not significant (p = 0.662). Among male patients, 17 (11.3%) cases of superficial SSI were recorded, with 11 (64.7%) cases in the interrupted group and 6 (35.3%) in the continuous group. The association between gender and SSI was not statistically significant (p = 0.365). Among female patients, 8 (5.3%) cases were observed, equally distributed between the interrupted and continuous groups (50.0% each). This association was also not significant (p = 0.730). Among patients with a BMI of ≤ 25, 6 (4.0%) cases of SSI were recorded, with a higher proportion in the interrupted group (5 cases, 83.3%) compared to the continuous group (1 case, 16.7%). However, this association was not statistically significant (p = 0.063). Among patients with a BMI > 25, 19 (12.7%) cases of SSI were observed, with 10 (52.6%) in the interrupted group and 9 (47.4%) in the continuous group, but the association was not significant (p = 0.873). Among diabetic patients, 6 (4.0%) cases of SSI were noted, with 5 (83.3%) cases in the interrupted group and 1 (16.7%) in the continuous group. This association was not statistically significant (p = 0.121). In non-diabetic patients, 19 (12.7%) cases of SSI were recorded, with 10 (52.6%) in the interrupted group and 9 (47.4%) in the continuous group, and this association was also not significant (p = 0.633). Among smokers, 4 (2.7%) cases of SSI were recorded, equally distributed between the interrupted and continuous groups (50.0% each), and the association was not significant (p = 0.863). Among non-smokers, 21 (14.0%) cases of SSI were observed, with a slightly higher proportion in the interrupted group (13 cases, 61.9%) compared to the continuous group (8 cases, 38.1%). However, this association was not statistically significant (p = 0.282).

Table 5

Clinical Outcome (Surgical Site Infection) According to Various Effect Modifiers

Effect modifiers		Surgical site infection	Interrupted (n=75)	Continuous (n=75)	Total (n=150)	p-value
Age Group	18-50	Yes	9 (75.0%)	3 (25.0%)	12 (8.0%)	0.051
		No	33 (44.6%)	41 (55.4%)	74 (49.3%)	
	51-75	Yes	6 (46.2%)	7 (53.8%)	13 (8.7%)	0.662
		No	27 (52.9%)	24 (47.1%)	51 (34.0%)	
Gender	Male	Yes	11 (64.7%)	6 (35.3%)	17 (11.3%)	0.365
		No	33 (52.4%)	30 (47.6%)	63 (42.0%)	
	Female	Yes	4 (50.0%)	4 (50.0%)	8 (5.3%)	0.730
		No	27 (43.5%)	35 (56.5%)	62 (41.3%)	
Body Mass Index	Yes	≤ 25	5 (83.3%)	1 (16.7%)	6 (4.0%)	0.063
			18 (42.9%)	24 (57.1%)	42 (28.0%)	
	No	> 25	10 (52.6%)	9 (47.4%)	19 (12.7%)	0.873
			42 (50.6%)	41 (49.4%)	83 (55.3%)	
Diabetes	Yes	Yes	5 (83.3%)	1 (16.7%)	6 (4.0%)	0.121
		No	27 (50.0%)	27 (50.0%)	54 (36.0%)	
	No	Yes	10 (52.6%)	9 (47.4%)	19 (12.7%)	0.633
		No	33 (46.5%)	38 (53.5%)	71 (47.3%)	
Smoking	Yes	Yes	2 (50.0%)	2 (50.0%)	4 (2.7%)	0.863
		No	15 (45.5%)	18 (54.5%)	33 (22.0%)	
	No	Yes	13 (61.9%)	8 (38.1%)	21 (14.0%)	0.282
		No	45 (48.9%)	47 (51.1%)	92 (61.3%)	

DISCUSSION

Our study compared the effectiveness of interrupted and continuous fascial closure techniques in emergency midline laparotomy, focusing on the incidence of burst abdomen and wound dehiscence. The results demonstrated a significantly lower incidence of burst abdomen in the interrupted closure group compared to the continuous closure group ($p = 0.004$). These findings contribute to the ongoing debate regarding optimal closure techniques in emergency laparotomy and reinforce the evidence that interrupted closure may be superior in reducing wound dehiscence.

Demographic analysis of our study revealed that the mean age in the interrupted group was 46.87 ± 17.07 years, while in the continuous group, it was slightly lower at 44.73 ± 16.14 years. The distribution between younger (18-50 years) and older (51-75 years) patients was comparable. Regarding gender, male patients predominated (53.3%), though the proportion was higher in the interrupted group (55.0%) than in the continuous group (45.0%). The mean BMI was also slightly lower in the interrupted closure group (28.65 ± 5.52) than in the continuous closure group (29.35 ± 6.02), though this difference was not statistically significant. These demographic characteristics align with those reported in similar studies, suggesting our population is representative of emergency laparotomy patients.

Several studies have produced findings consistent with ours. Abu-Raihan Zabd-Ur-Rehman et al.[9] reported a significantly lower wound dehiscence rate in the interrupted group (2.50%) compared to the continuous group (13.75%), reinforcing our results. Similarly, Mubeen Nasir et al.[10] demonstrated that interrupted sutures resulted in a significantly lower dehiscence rate (8%) compared to continuous closure (15%) ($p = 0.04$). Rajesh Kumar Bansiwal et al.[11] also reported a lower wound dehiscence rate in the interrupted group (5%) compared to the continuous group (12%). Additionally, Georgios Polychronidis et al.[12] in the CONTINT trial found a lower incidence of burst abdomen in the interrupted closure group (7.1%) compared to the continuous closure group (12.5%).

Matthias Mehdorn et al.[13] conducted a retrospective analysis demonstrating that interrupted sutures significantly reduced the risk of burst abdomen recurrence (OR 0.143, $p = 0.025$). Tariq Hayat Khan et al.[14] also found that interrupted closure significantly lowered the wound dehiscence rate (5.6%) compared to continuous closure (14.4%), emphasizing its effectiveness in emergency laparotomies. While the majority of studies support our findings, some provide a more nuanced perspective. Brajesh Kumar et al.[15] found no statistically significant difference in burst abdomen rates between interrupted (16%) and continuous closure (22%) ($p = 0.24$), though the trend favored interrupted closure. However, the continuous technique significantly reduced operative time ($p < 0.001$), which is an advantage worth considering.

Conversely, some studies presented conflicting results. Arash M. Tofigh et al.[16] investigated peritoneal closure versus non-closure in elective midline laparotomy and found no significant difference in wound dehiscence rates, suggesting that other factors such as peritoneal healing might play a role. However, their study focused on elective surgeries rather than emergency laparotomies, which involve different risk factors. Similarly, Edgard Efrén Lozada Hernández et al.[17], in a systematic review and meta-analysis, highlighted the effectiveness of modified closure techniques (MCTs) such as reinforced tension line (RTL) and retention sutures in reducing incisional hernias and abdominal wound dehiscence. These findings suggest alternative approaches beyond the standard continuous versus interrupted closure debate.

Erwin Yii's systematic review[18] comparing small-bite and large-bite techniques found that small-bite closure significantly reduced the risk of incisional hernia and wound dehiscence. While our study did not focus on bite size, these findings emphasize the importance of suture technique in influencing surgical outcomes. Similarly, Eva B. Deerenberg et al.[19] in the updated guidelines for abdominal wall closure recommended small-bite continuous sutures with a suture-to-wound length ratio of at least 4:1, aligning with elective surgery recommendations. René H. Fortelny[20] reviewed various closure techniques and recommended the small-bite continuous technique in elective laparotomy, arguing that it significantly lowers the risk of incisional hernia. However, this applies primarily to elective cases, whereas our study focuses on emergency settings with different patient conditions and risk factors. Similarly, Sebastian Wolf et al.[8], in the CONIAC trial protocol, aimed to assess the efficacy of continuous suturing with or without additional interrupted retention sutures. While their results are pending, the study design acknowledges the potential benefits of incorporating both techniques.

Lastly, Suchin S. Dhamnaskar et al.[21] examined a modified continuous Smead-Jones technique versus interrupted closure in contaminated cases, concluding that the modified technique was superior in preventing dehiscence while requiring less time and suture material. This study presents an alternative approach that merits further investigation in emergency settings where contamination is a frequent concern.

Our study also assessed surgical site infection (SSI) as an outcome. The overall incidence of superficial SSI was 16.7%, with no statistically significant difference between the interrupted and continuous closure groups ($p = 0.273$). This suggests that while interrupted closure is superior in preventing burst abdomen, it does not significantly impact the rate of SSIs. Similar findings were reported by Rajesh Kumar Bansiwal et al.[11] and Brajesh Kumar et al.[15], further validating our results.

One of the key strengths of our study is its randomized controlled design, ensuring robust comparisons between the two closure techniques. Additionally, our sample size was adequate, allowing meaningful statistical comparisons. The study also included a diverse patient population with various comorbid conditions, reflecting real-world emergency surgical scenarios. However, our study has some limitations. First, the follow-up period was limited to 30 days, which does not allow for long-term assessment of incisional hernia formation, an important secondary outcome. Second, the study was conducted at a single center, which may limit the generalizability of our findings to other settings with different surgical protocols

and patient populations. Finally, variations in surgical technique, suture tension, and surgeon experience could have influenced outcomes, highlighting the need for multicenter trials with standardized closure protocols.

CONCLUSION

Overall, the majority of studies reviewed align with our findings, supporting the superiority of interrupted closure in reducing burst abdomen and wound dehiscence in emergency midline laparotomy. However, alternative techniques such as small-bite closure and modified continuous closure methods warrant further exploration. Future research should incorporate long-term follow-up and standardized patient selection criteria to provide a more definitive conclusion regarding the optimal closure technique in emergency laparotomy.

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