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ORIGINAL ARTICLE

Comparison of continuous versus modified continuous SMEAD jones "far-near-near-far" suturing technique for abdominal wall closure in emergency midline laparotomy wound in terms of wound dehiscence.

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ABSTRACT… Objective: To compares the frequency of wound dehiscence in emergency midline laparotomy wound closure using the modified continuous Smead-Jones technique to the continuous method. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Surgery, Allied Hospital Faisalabad. **Period:** December 20, 2022, to June 20, 2023. **Methods:** Every one of the one hundred patients having an emergency exploratory laparotomy gave written informed consent. They were split into two groups at random: Group A received continuous closure using prolene #01 suture bites placed 1 cm from the margin and 1 cm apart, and Group B received a modified Smead-Jones technique where suture bites were taken 1.5 cm from the wound margin and 0.5 cm linea alba on either side with prolene # 01 with suture placed 2cm apart. Wound dehiscence was checked following operational definitions. **Results:** The study's mean age was determined to be 40.18+13.53 years for Group A and 41.18+13.33 years for Group B. Males made up 58.0% (n = 29) of Group A and 72.0% (n = 36) of Group B, while females made up 42.0% (n = 21) of Group A and 28% (n = 14) of Group B. The mean wound dehiscence was 28% in Group B and 10% in Group 2. The p-value for this study was 0.022. **Conclusion:** When compared to the traditional continuous abdominal wound closure technique, the wound dehiscence rate was significantly lower with the modified continuous smead-jones abdominal wound closure method.

Key words: Midline Incision, Peritonitis, Wound Dehiscence.

INTRODUCTION

The most common access route for emergency laparotomies is a midline incision because of its ease of use, quickness, bloodlessness, and superior exposure.[1] Abdominal wound dehiscence happens when an abdominal wound partially or fully reopens, potentially allowing abdominal contents to protrude.[2] Wound dehiscence according to the degree of separation can be categorized as partial or complete. During partial dehiscence, only the outermost layers or a subset of the tissue layers reopen but fascial layer remain intact.[3] All of the layers of a wound separate when it dehisces completely, revealing any organs that may have protruded from the divided wound as well as the underlying tissue.[4] An emergency laparotomy frequently results in abdominal wound dehiscence in cases of peritonitis. Reducing post-operative morbidity and mortality requires its prevention. For over a century and will likely continue, researchers have been trying to find the best laparotomy technique.[5] Several patients and surgical-related factors, including closure technique, incision, postoperative nausea and vomiting, anemia, jaundice, obesity, diabetes mellitus, hypoproteinaemia, immune suppression, malignancy, and wound infection, can result in wound dehiscence. Abdomen burst remain a major reason of morbidity and mortality following laparotomy, especially in emergency scenarios.[6] Wound dehiscence demands daily dressing, more frequent follow-up visits, and unfavorable scar formation thereby increasing financial cost and affecting the quality of life of the patient.[7]

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Abdominal wound dehiscence is correlated with up to 18% mortality and up to 40% morbidity in elderly and malnourished patients; the incidence of this condition ranges from 0.4% to 3.5% according to published literature.[8] In these patients, the burst abdomen is the final insult to a physiology already under stress. 90% of cases show up before the 15th day following surgery. Although it can occur one to thirty days following surgery, commonly happens around 5 to 8 day post operatively.[9]

Laparotomy incisions can be closed using a variety of methods, including mass, layer-by-layer, interrupted, and continuous closure.[10] The optimal abdominal closure technique is technically simple and quick, minimize the risk of wound inflammation and infection, is cause minimal discomfort for patients, and maintains tensile strength with good tissue approximation throughout the healing process.

According to the reference study's statistics, wound dehiscence occurred in 14.9% of patients with continuous abdominal wall closure and 1% of patients with modified continuous smead-jones abdominal wall closure.[11] When Raxith et al. compared the risk of wound dehiscence between continuous and modified continuous smead-jones abdominal wound closure during emergency laparotomy, they discovered a statistically significant difference.

METHODS

Following ethical review committee approval (912), 100 patients who met the inclusion criteria and had emergency exploratory laparotomies in the Department of Surgery at Allied Hospital Faisalabad were chosen for a randomized control trial. Patients were divided into two groups at random. Patients in Group A underwent a continuous closure technique using prolene No.1 suture bites spaced 1 cm apart and 1 cm from the margin. Patients in group B underwent a modified Smead-Jones technique in which suture bites were placed 2 cm apart, 1.5 cm from the wound margin, and 0.5 cm from the linea alba on each side using prolene No.1. The researchers entered all pertinent data in proforma. Following the operational definition, patients' wound dehiscence was assessed postoperatively. The data that was gathered was examined using SPSS version 23. Constant variables were compared using the independent t-test and their means and standard deviations were examined. We computed the frequency and percentage for each qualitative variable, including wound dehiscence and gender. To compare wound dehiscence between the two groups, the chi-square test was employed. Effect modifiers governed by stratification, such as gender and age. A chi-square post-stratification analysis was performed.

RESULTS

The patients' ages were distributed as: 74.0% (n=37) in Group A and 62.0% (n=31) in Group B were between 25 to 45 years old, while 26.0% (n=13) in Group A and 38.0% (n=19) in Group-B were between 45 to 65 years old. The mean+sd was calculated as 40.18+13.53 years in Group A and 41.18+13.33 years in Group B, overall mean+sd was 40.68+13.37 years.

Gender distribution shows that 42.0%(n=21) in Group-A and 28%(n=14) in Group-B were female whereas 58%(n=29) in Group-A and 72%(n=36) in Group-B were males, overall 65%(n=65) were male and 35%(n=35) were females. (Table-II)

A comparison of wound dehiscence showed that in Group A wound dehiscence rate was 28% and 10% in Group B, the p value was 0.022. (Table-III)

		Group		Total
		A	B	
age distribution	25-45 years	37	31	68
		74.0%	62.0%	68.0%
	46-65 years	13	19	32
		26.0%	38.0%	32.0%
Total		50	50	100

Table-I. Age distribution (n=100)
Chi-square value = 1.654 p-value = 0.198

		Group		Total
		A	B	
Gender	Female	21	14	35
		42.0%	28.0%	35.0%
	Male	29	36	65
		58.0%	72.0%	65.0%
Total		50	50	100

Table-II. Gender distribution (n=100)
Chi-square value = 2.154 p-value = 0.142

		Group		Total
		A	B	
wound dehiscence	No	36	45	81
		72.0%	90.0%	81.0%
	Yes	14	5	19
		28.0%	10.0%	19.0%
Total		50	50	100

Table-III. Comparison of wound dehiscence in continuous versus modified continuous smead jones "far-near-near-far" suturing technique (N=100)
Chi-square value = 5.263
P-value = 0.022

DISCUSSION

As old as modern operative surgery itself, the topic of abdominal wound dehiscence/Burst abdomen has been discussed. The preventive measures are necessary due to the condition's perioperative mortality and long-term morbidity.

Three stages are involved in the healing process of wounds: inflammation, proliferation, and maturation phase. Fascia heals slowly, regaining up to 60% of its strength after 45 days, 75% after 120 days, and 80% after 180 days. The tensile strength can be recovered to a maximum of 90%.[11]

Any suturing technique's goal is to give the healing wound enough support without putting it under excessive strain until the healing tissues have restored their ability to withstand tension. Any suturing technique should be quick, straightforward, and simple to use. It should also provide healing tissue with adequate support until it regains half of its tensile strength. The suture technique should provide this without endangering the tissues' blood supply, making infections more likely to occur, creating tension, and compromising the abdominal wall's compliance. Suture cutting through linea alba is a major mechanism of wound dehiscence, accounting for most cases of dehiscence. The rupture of the suture caused by postoperative stress or tension on the repair is a less common occurrence.[1,12]

The interrupted double loop fascial closure technique was first proposed by Smead in 1900, and Jones popularized it in 1941. By using this method, fascial edges are approximated more securely while maintaining a high degree of elasticity and compliance. The Smead-Jones technique distributes increased tension between two loops so that the edges of the wound stay approximated and at the same time prevent sutures from cutting through.[13] The goal of the modified Smead-Jones technique, which replaces the interrupted closure method with a continuous one, is to gain the advantages of the continuous closure technique while also mitigating the drawbacks of the interrupted suturing method.[1] Badar M et al. reported a wound dehiscence rate of 2.77% in high-risk laparotomies.[12] Wound dehiscence rates were reported by Rehman et al. to be 13.75% for continuous closure and 2.5% for interrupted closure.[14] According to several writers, the percentage of laparotomy wounds that dehisce in emergency situations ranges from 5 to 30%.[15,16,17,18] In several international and regional studies it has been found that the modified smead jones technique of wound closure reduces the risk of wound dehiscence and ultimately incisional hernia formation in long run.[19,20,21,22]

In our study, abdominal wound dehiscence occurred in 10% of patients who underwent laparotomy wound closure using a modified Smead Jones technique. A study conducted at Mesologgi General Hospital found that abdominal wound dehiscence, which is more common in men (80.70%), was discovered in 34 out of 3500 laparotomies.[23] In our study, the dehiscence of abdominal wounds in males was 34.5%, whereas that of females was 19%. The mean wound dehiscence in Group A was 28%, while Group B had a wound dehiscence of 10%.

CONCLUSION

In conclusion, our research concludes that the frequency of dehiscence of the wound in "modified smead-jones technique is less than that in continuous closure technique of emergency midline exploratory laparotomy wound".

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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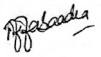
1	Afifa Saadia	Article writing & data analysis.	
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