e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(11); 614-617

Original Research Article

Continuous Rectus Closure versus SMEAD JONES Intermittent Rectus Closure in Midline Laparotomy Wounds: A Comparative Evaluation

Karthik K[1], Ahemadi Firdous Nikhat[2], Ranjana D Telkar[3]

[1]Assistant Professor, Department of General Surgery, MNR Medical College, Sangareddy, Telangana
[2]Assistant Professor, Department of General Surgery, MNR Medical College and Hospital, Sangareddy, Telangana
[3]Assistant Professor, Department of ENT, MNR Medical College and Hospital, Sangareddy, Telangana

Received: 25-08-2023 / Revised: 28-09-2023 / Accepted: 30-10-2023
Corresponding author: Dr. Ranjana D Telkar
Conflict of interest: Nil

Abstract:

Introduction: The efficacy of midline laparotomy is contingent upon the use of precise surgical methods and the subsequent careful closure of the abdominal wall, which serves to facilitate optimum wound healing and minimise the likelihood of problems. The present comparative study was designed to assess continuous rectus closure versus SMEAD JONES intermittent rectus closure in midline laparotomy wounds.

Material and methods: Sixty-four participants required midline laparotomy above 18 years of age were recruited. Participants were randomly allocated to Group S managed with SMED JONES interrupted closure and group C managed with continuous rectus closure. Post-operative follow up was done at the end of 1st week, 4th week, 3rd month and 6th month of post-operative period.

Results: Ruptured abdomens occurred in roughly 12.5% of group S patients and 9.38% of group C patients by the end of the first week after surgery. After 4 weeks, 15.62 percent of group S patients and 6.2 percent of group C patients had incisional hernias; after 3 months, 9.38 percent of group S patients and 3.13% of group C patients developed incisional hernias; and after 6 months, 18.75 percent of group S patients and 9.38 percent of group C patients developed incisional hernias.

Conclusion: The SMEAD JONES midline laparotomy wound closure technique, which is superior to continuous rectus closure, resulted in a considerable decrease in the incidence of wound infection, wound dehiscence, and incisional hernia.

Keywords: SMED JONES Midline Laparotomy, Continuous Rectus Closure, Incisional Hernia, Wound Infection, Wound Adhesion.

Introduction

Exploratory laparotomy performed across the midline is essential for the diagnosis and treatment of several potentially fatal abdominal diseases [1]. Closing the abdominal wall carefully thereafter to ensure good healing and minimise problems is crucial to the success of these surgeries. The surgeon's objective is to avoid incisional hernias and acute wound dehiscence, both of which may occur after surgery [2]. A strong and infection-proof wound closure is essential. In order to do this, the closure must be quick, effective, tension- and ischemia-free, patient- and surgeon-friendly, and aesthetically pleasing. Therefore, one has to adhere to wound closure guidelines [3]. The risk of developing incisional hernia after median laparotomy is between 5-20%.

Different closure approaches have focused on improving patient outcomes by closing the rectus sheath, a crucial anatomical component. In order to avoid wound dehiscence after an emergency midline laparotomy, several researches have compared different closure methods and suture materials.

There has been no discernible difference between the continuous and SMED JONES techniques in terms of the danger of burst, according to studies conducted in the West. Most patients in emergency rooms in India have many risk factors, including malnutrition and intraperitoneal sepsis that has persisted for an extended period of time. Therefore, it is crucial that we determine the most secure means of abdominal closure [5, 6]. The continuous method of closure provides for quick closure with fewer knots, decreasing the likelihood of sinus formation. The risk of abdominal dehiscence may be reduced by using interrupted closure, according to a review of the relevant literature [7]. With reference of above literature, the present study was

designed to assess continuous rectus closure versus SMEAD JONES intermittent rectus closure in midline laparotomy wounds.

Materials and Methods

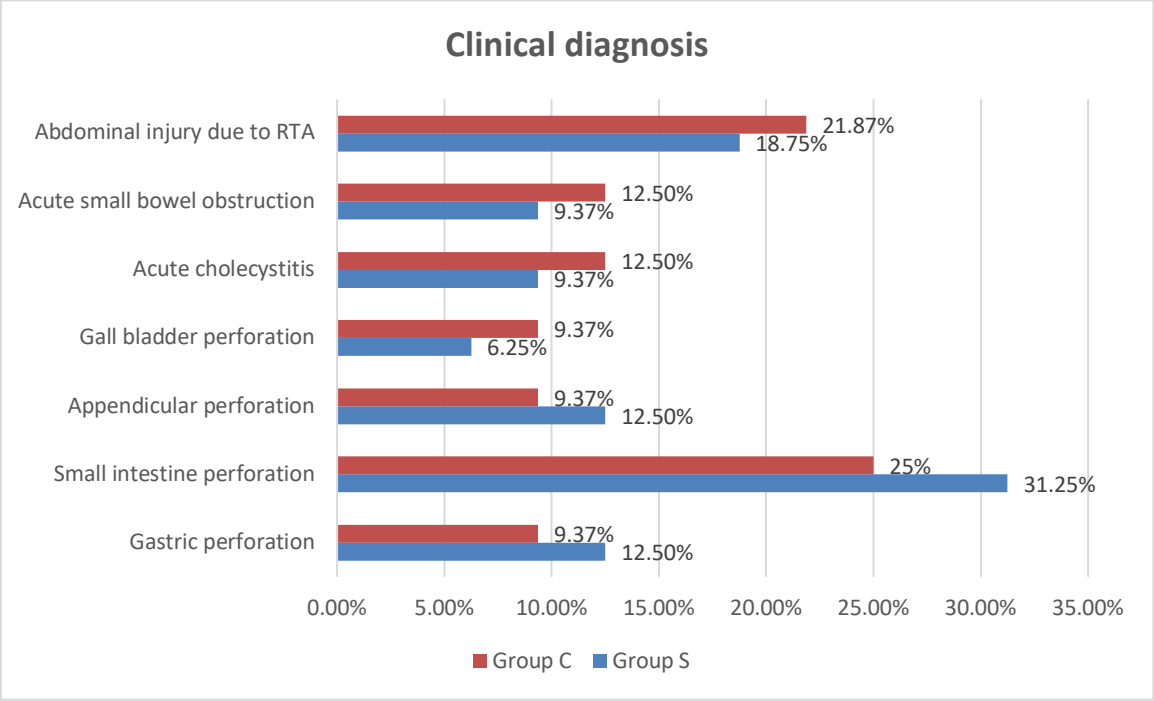
The presents study was conducted in the Department of General surgery, MNR Medical College and Hospital, Sangareddy from April 2022 to June 2023. A source of 64 participants required midline laparotomy were recruited. Participants above 18 years of age, require midline laparotomy surgery and willing to participate were included. Participants with below 18 years of age, pregnancy, with systemic disorders and not willing to participate were excluded. Written informed consent was obtained from all the participants and study protocol was approved by institutional ethics committee. The study participants were randomly allocated to two groups. Group 1 participants were managed with SMED JONES interrupted closure and group 2 participants were managed with continuous rectus closure. Inpatient postoperative follow up was done until one week to check for the burst abdomen. Outpatient post-operative follow up was done at the end of 6th week and end of 6th month. During follow up chances for the incisional hernia was assessed.

The collected data was analysed by using SPSS version 23.0. Categorical variables were represented in the form of frequency and percentages. Chi-square test was used to compare the study variables between two groups. The $p<0.05$ was considered as statistically significant outcome.

Results

Table 1: Clinico-demographic details of study participants

Parameter	Group S (n=32)		Group C (n=32)		Chi-square value	P value
	Frequency	Percentage	Frequency	Percentage		
Age						
18-30	02	6.25%	01	3.125%	3.901	0.0878
31-40	02	6.25%	03	9.37%		
41-50	09	28.12%	10	31.25%		
51-60	12	37.5%	13	40.62%		
>60	07	21.87%	05	15.62%		
Gender						
Male	22	68.75%	19	59.37%	1.256	0.138
female	10	31.25%	13	40.62%		
Comorbidities						
With	10	31.25%	12	37.5%	0.362	0.274
With out	22	68.75%	20	62.5%		



Graph 1: Clinical diagnosis among study participants in both groups

Table 2: Comparison of post-operative outcome during follow up between study groups

Follow-up period	Group S N (%)	Group C N (%)	Chi-square value	p-value
End of 1st week				
With Burst abdomen	04 (12.5%)	03 (9.38%)	0.683	0.0614
Without burst abdomen	28 (87.5%)	29 (90.62%)		
End of 4th week				
With incisional hernia	06 (18.75%)	03 (9.38%)	0.596	1.085
Without incisional hernia	26 (81.25%)	29 (90.62%)		
End of 3rd month				
With incisional hernia	05 (15.62%)	02 (6.25%)	0.872	0.468
Without incisional hernia	27 (84.38%)	30 (93.75%)		
End of 6th month				
With incisional hernia	03 (9.38%)	01 (3.13%)	0.362	0.207
Without incisional hernia	29 (90.62%)	31 (96.88%)		

Discussion

The majority of participants fell within the age range of 51-60 years, with 37.5% in group S and 40.62% in group C. This was followed by the age range of 41-50 years, with 28.12% in group S and 31.25% in group C. Participants beyond the age of 60 accounted for 21.87% in group S and 15.62% in group C. No statistically significant correlation was found between age and gender in the two research groups ($p>0.05$). The majority of participants in group S were men, accounting for 68.75% of the group, whereas in group C, males made up 59.37% of the participants. 31.25% of individuals in group S and 37.5% of those in group C were reported to have comorbidities. Nevertheless, the Pearson's chi-square analysis revealed no statistically significant association between comorbidities and study groups ($p>0.05$) (Table 1).

The diagnosis of small intestine perforation was common in 25% of group C and 31.25% of group S. This was followed by abdominal injury caused by road traffic accidents, which occurred in 21.87% and 18.75% of the groups, respectively. Acute small bowel obstruction was observed in 12.50% of group C and 9.37% of group S. Acute cholecystitis was present in 12.50% of group C and 9.37% of group S. Appendicular perforation occurred in 9.37% of group C and 12.50% of group S. Gastric perforation was seen in 9.37% of group C and 12.50% of group S. Lastly, gall bladder perforation was found in 9.37% of group C and 6.25% of group S (Graph 1).

At the end of the first week following surgery, about 12.5% of individuals in group S and 9.38% of those in group C had ruptured abdomen. The occurrence of incisional hernia was noted in 18.75% of individuals in group S and 9.38% in group C, 15.62% in group S and 6.25% in group C, and 9.38% in group S and 3.13% in group C at the conclusion of the 4th week, 3rd month, and 6 months post-surgery, respectively. The Pearson's chi-square analysis revealed no statistically significant correlation between postoperative complications and study groups at the end of the 1st week, 4th week, and 6th month ($P>0.05$). Nevertheless, a significant correlation was seen at the conclusion of the third month after the surgical procedure ($P<0.05$) (Table 2). The study conducted by Selvaraj V et al. had a total of 80 patients, who were separated into two groups. Group A, also known as the study group, used the SMED JONE approach, whereas Group B, the control group, employed the continuous technique.

The study group exhibited a substantial reduction in the incidence of postoperative wound infection (40% to 67.5%) and wound dehiscence (12.50% to 47.5%). The intervention group exhibited a reduction in the length of hospitalisation (1.75 weeks and 2.275 weeks) and a drop in the incidence of incisional hernia development (12.50% and 37.50%) compared to the control group [8]. In a study conducted by Aghara CB et al., 100 patients were randomly assigned to two groups: group A, which was handled using the modified SMED JONES approach, and group B, which was managed using the standard continuous closure technique. The study indicated that the most prevalent reason for laparotomy was pre-pyloric/duodenal perforation, accounting for 52% in group A and 48% in group B. The second most frequent indication was traumatic perforation of the jejunum or ileum. The occurrence of wound infection, wound dehiscence, reoperation owing to dehiscence, and incidence of incisional hernia was higher in group B compared to group A. The average length of hospitalisation was substantially shorter in group A (9.68 days) compared to group B (14.68 days) [9]. Sringeri R et al. randomly selected 100 instances for inclusion in their study. Group A received traditional closure using a polypropylene number 1 loop suture, whereas group B underwent closure using the modified SMED JONES approach. The incidence of wound infection was 32.4% and 12.3% in group A and group B, respectively. The occurrence of wound

dehiscence was 14.9% and 1% in group A and group B, respectively. The average length of hospital stay was 15 days and 20 days in group A and group B, respectively [10].

Selvaraj V et al. found that although the duration of surgery is longer in cases using the SMEAD JONES technique, there is a lower incidence of wound infection; wound dehiscence, duration of hospital stay, and incisional hernia compared to cases using the conventional continuous technique [8]. Aghara CB et al. determined that the modified Smead Jones approach is superior to the traditional continuous closure technique for managing the closure of emergency midline laparotomy [9]. The study conducted by Sringeri R et al. used a modified version of the Smead-Jones method for laparotomy closure using a prolene loop. This modification resulted in a significantly reduced occurrence of early problems and may also decrease the occurrence of late complications. It outperformed other traditional closure approaches [10]. The study conducted by Garg S et al. found that the far near far technique for rectus sheath closure in emergency exploratory laparotomy had similar results to traditional closure approaches. There were no notable disparities seen in the duration of the operation, the time taken for closure, or the occurrence of postoperative problems [11]. A study conducted by Balaji C et al. found that the Interrupted-X approach of rectus sheath closure decreases the occurrence of wound dehiscence and the duration of hospitalisation. However, this technique requires a greater amount of suture material and more time for suturing compared to the traditional continuous closure method [12].

Conclusion

The findings of the current study indicate that the utilisation of SMEAD JONES midline laparotomy wound closure technique resulted in a significant reduction in the occurrence of wound infection, wound dehiscence, and incisional hernia. Additionally, this approach demonstrated effectiveness in minimising postoperative complications. Consequently, it can be concluded that the SMED JONES interrupted closure method is an effective and superior alternative to continuous rectus closure.

References

1. Israelsson LA, Millbourn D: Closing midline abdominal incisions. Langenbecks Arch Surg. 2012, 397:1201-7.
2. Fink C, Baumann P, Wente MN, et al.: Incisional hernia rate 3 years after midline laparotomy. Br J Surg. 2014, 101:51-4.
3. Chawla S. A comparison between mass closure and layered closure of midline abdominal incisions. Med J DY Patil Univ 2012; 5:26-7.
4. Fortelny RH. Abdominal Wall Closure in Elective Midline Laparotomy: The Current Recommendations. Front Surg. 2018; 5:34.
5. Ahi KS, Khandekar SM, Mittal SK, Chaudhary V, Sharma A, Jain A, et al. Prevention of burst abdomen by interrupted closure: a comparative study of conventional continuous versus interrupted-X-type versus hughes far-and-near interrupted abdominal fascial closure in surgical patients. ISOR J. 2017; 16:21-30.
6. Borab ZM, Shakir S, Lanni MA, et al. Does prophylactic mesh placement in elective, midline laparotomy reduce the incidence of incisional hernia? A systematic review and meta-analysis. Surgery. 2017; 161(4):1149-1163.
7. Murtaza B, Saeed S, Sharif MA. Postoperative complications in emergency versus elective laparotomies at a peripheral hospital. J Ayub Med Coll Abbottabad. 2010; 22:42-7.
8. Selvaraj V, Saravanan C, Sachin Karthik M. Comparative study of conventional closure versus smead jones technique of closure of midline laparotomy wounds after emergency midline laparotomies. IOSR-JDMS. 2022; 21(1): 30-40.
9. Aghara CB, Rajyaguru AM, Bhatt JG. Prospective comparative study of modified Smead Jones versus conventional continuous method of fascial closure in emergency midline laparotomy. Int Surg J. 2020; 7:3713-7.
10. Sringeri R, Vasudeviah T. Comparison of conventional closure versus “remodified Smead Jones” technique of single layer mass closure with Polypropylene (prolene) loop suture after midline laparotomy in emergency cases. Int Surg J. 2017; 4:3058-61.
11. Garg S, Yadav MS, Singhal K. A Clinical Comparative Study of Rectus Sheath Closure Techniques in Emergency Exploratory Laparotomy: Evaluating "Far-Near-Near-Far" vs. Conventional Closure Approach. Cureus. 2023; 15(9): e45655.
12. Balaji C, Neogi S, Ramasamy S, Vats M. Comparison of interrupted-X technique closure versus conventional continuous closure of rectus sheath: a randomized control study. Int Surg J. 2019; 6:3233-7.