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A COMPARATIVE STUDY OF SINGLE LAYER INTERRUPTED CLOSURE VERSUS SINGLE LAYER CONTINUOUS WITH INTERMITTENT ABERDEEN'S KNOTS CLOSURE OF LAPAROTOMY WOUNDS

Surgery

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ABSTRACT

To compare the two techniques, single layer interrupted closure and continuous with intermittent Aberdeen's knots technique for midline laparotomy fascial wound closure. 100 midline laparotomy cases were compared as two groups (A and B) of 50 each .Comparison regarding Operative time ,Ease of applicability and postoperative complication such as like seroma, wound infection, wound gaping, burst abdomen, suture sinus formation, stitch granuloma, and incisional hernia were done according to clinical examination.Every surgeon found easy mode of application in group B, while almost equal surgeons found group A technique to be moderate /difficult as compared to other conventional methods with P value 0.0000 which was highly significant. Also continuous closure with intermittent Aberdeen's knots took significantly lesser time making it a faster, easier and better option. The result for post operative complications as seen in our study for seroma formation (Chi=4.76, P=0.029, <0.05), wound infection (chi=5.316, P=0.021<0.05), suture sinus formation (chi=6.383, P=0.012<0.05), Stitch granuloma (chi=6.383,P=0.012<0.05),indicated that single layer continuous with intermittent Aberdeen's knots closure has significantly lesser complications. Also complications such as incisional hernia (chi=0.211,P=0.646),burst abdomen (chi=0.00,P=1.00),and wound gaping (chi=0.00,P=1.00),were equally seen in both techniques of closure adding that single layer interrupted closure offers no added advantage over newer technique.

KEYWORDS

Midline laparotomy; Ease of applicability; Suturing technique; Aberdeen's knots; Interrupted

INTRODUCTION

When tissue has been disrupted severely that it cannot heal naturally without complications or possible disfiguration, it must be held in opposition until the healing process provides the wound with sufficient strength to withstand stress without mechanical support.[1]Abdominal incision is very important as regards to incision, technique of repair and use of newer suture material.[2,3,4,5] and has created great interest to the surgeons. Ideal method of abdominal closure should be technically so simple that the results are as good as in the hands of a trainee as in those of master surgeons. It should be free of complications and comfortable to the patient. The wound failure (dehiscence and ventral hernia) and other post operative complications such as incisional hernia, suture sinus formation, stitch granuloma, and wound infection may result from an improper choice of suture material[2] or improper technique...The ideal technique and suture material[5] for wound closure is yet to be decided and is modified frequently.Here in this study, we have tried to highlight our result of two different techniques of abdominal fascial closure-simple interrupted suture and continuous with intermittent aberdeen knot by using absorbable PDS suture material in midline laprotomies on the basis of operating time,ease of applicability and post operative morbidity.

Aims And Objectives:-

- To compare the Operative time ,Ease of applicability and the post operative complications ,like seroma, wound infection, wound gaping, stitch granuloma,suture sinus formation, burst abdomen and incisional hernia.

Materials and Methods:

- The present study was conducted on 100 patients admitted for abdominal surgical problems needing either elective or emergency surgery in the Department of Surgery, JA Group of Hospitals and GR Medical College, Gwalior (MP) during September 2014 to August 2015. 50 were randomized to have Single layer Interrupted closure abdominal wall technique and 50 with Single layer Continuous with Intermittent Aberdeen's knots closure and they were grouped as group A and B respectively.

Criteria for selection:

- Patients aged 15-75 years
- Patients posted for laparotomy, either elective or emergency.
- Patients who undergo surgery with midline incisions.

Exclusion criteria:

- Patients with co morbid conditions like, immunocompromised patients, patients on cancer chemotherapy, immunotherapy and on long term steroids.
- Patients who died within 7 days after surgery.
- Patients who underwent surgery by other than midline incision.
- Patients who underwent second laparotomy or relaparotomy.
- Patients who needed ventilator support.
- Patient who were lost in follow up before 6 months.

Data collection and Statistical Analysis

The data were collected directly from the patient in the form of history and clinical examination. The follow-up and documentation of postoperative wound complications were done according to the pro forma.Analysis was done using incidence rates and unpaired t test for continuous numerical values, and chi square test for categorical values. Tables were analyzed using SPSS software.

Result:

Single layer interrupted closure is a traditionally used technique for closure of laparotomy fascial wounds known for ages, and have its own benefits, but the recent evolution of newer techniques had proven better results than the conventional technique .Our study has added to the same proving Single layer continuous with intermittent Aberdeen's knots closure as better replacement to conventional techniques.
Result for preoperative stats are shown in table 1

Table 1 Comparison of preoperative condition

Preoperative condition	Group A	Group B
Mean Age	39.7200	35.7400
Males: females	3:1	3:1
Elective :Emergency	18:32	18:32

In our study, more males had undergone laparotomy in comparison to females because certain diseases such as peptic perforation, enteric perforation, and some malignancy are more common in males due to bad habits, life style, and genetic reasons. In both groups, more emergency cases were done with midline laparotomies in comparison to elective because in most elective cases laparoscopic surgery is a better option than conventional laparotomy.

Table 2 Results for post operative stats are shown in table 2 and table 3

	Time of closure	Ease of application		
		Easy	Moderate	Difficult
Group A	19.60	00	26	24
Group B	12.60	50	00	00

Table 3 Comparison of postoperative complication

Complications	Total N=100	Group A N=50	Group B N=50	Chi Square P value
Seroma	16	12	4	0.029
Wound Infection	14	11	3	0.021
Suture sinus	6	6	0	0.012
Stitch Granuloma	6	6	0	0.012
Wound Gaping	6	3	3	1.00
Burst Abdomen	2	1	1	1.00
Incisional Hernia	5	2	3	0.646

In our study every surgeon found easy mode of application in group B, while almost equal surgeons found group A technique to be moderate /difficult as compared to other conventional methods with P value 0.0000 which is highly significant. Also continuous closure with intermittent Aberdeen's knots took significant lesser time making it a faster, easier and better option. The result for post operative complications as seen in our study for seroma formation (Chi=4.76, P=0.029, <0.05), wound infection (chi=5.316, P=0.021<0.05), suture sinus formation[12] (chi=6.383, P=0.012<0.05), Stitch granuloma (chi=6.383,P=0.012<0.05),indicates that single layer continuous with intermittent Aberdeen's knots closure has significantly lesser complications because more suture material and knotting are used in simple interrupted technique and this gives more inflammatory reaction.Also complications such as incisional hernia (chi=0.211,P=0.646),burst abdomen (chi=0.00,P=1.00),and wound gaping (chi=0.00,P=1.00),were equally seen in both techniques of closure adding that single layer interrupted closure offers no added advantage over newer techinque.

Discussion:

A well-calculated and well-performed incision is of paramount importance to abdominal surgery. Of equal importance is a proper method of wound closure[13].Single layer interrupted closure is a traditionally used technique for closure of laparotomy fascial wounds known for ages, and have its own benefits, but the recent evolution of newer techniques had proven better results than the conventional technique .Our study has added to the same proving Single layer continuous with intermittent Aberdeen's knots[9] closure as better replacement to conventional techniques.

The overall incidence of wound gaping was 6% which was similar to Pandey et al[7] where they had 6% wound gaping using near far technique of abdominal closure.

In study done by Gurjar et al[10] group A with interrupted closure, postoperative complications were incisional hernia 3 %, wound dehiscence 4 %, and suture sinus formation[12] 1 %. In group B (continuous with intermittent Aberdeen's knots) postoperative complication were incisional hernia 5 %, wound dehiscence 4 %, and suture sinus formation 1 %. . All these complications were statistically insignificant, in both group comparisons. While the complication such as stitch granuloma 3 %, chronic wound pain[12] 3 %, and wound infection 4 % in group A was significantly less than in group B where the complication of stitch granuloma was 12 %, chronic wound pain[12] 13 %, and wound infection 13 % (*P* value 0.03, *P* value 0.018, and *P* value 0.048, respectively).The above results are highly consistent with our study.

In a meta-analysis study by Hodgson et al[6] 2000 abdominal fascial closure with a continuous nonabsorbable suture had a significantly lower rate of incisional hernia. The ideal suture is nonabsorbable, and the ideal technique is continuous[11].

In a study by Chalya et al[14] 2015, Continuous closure was associated with significant (P <0.001) less wound dehiscence and Incisional hernia than Interrupted closure.Non absorbable suture was associated with more wound pain and suture sinus formation. Also use of monofilament suture was associated with less rate of infection as compared to multifilament sutures.

The advantage of Interrupted closure technique is that even if there is infection or cut through of one stitch, it prevents the opening of the whole wound which is now achieved with continuous with intermittent Aberdeen's knots closure. So Continuous suturing with intermittent Aberdeen's knots credits enhanced wound strength, which keeps the incision edges in close approximation. The advantages of this technique are speed, an equal distribution of tension, prevention of purse string effect, less foreign material in the wound, and less wound trauma.

The ideal technique[6] for closing abdominal fascia has yet to be determined[8]. Various randomized controlled trials of abdominal fascial closure have failed to determine the best technique and the ideal suture. Results were often conflicting and have left many surgeons uncertain about the technique for abdominal fascial closure. In this study we got better results, in terms of time and ease of application, lower complication rates with continuous suturing and intermittent Aberdeen knot technique for fascial closure in both emergency and elective midline laparotomies. This is initial research and we recommended long-term follow-up.

Conclusion:

Single Layer Continuous with Intermittent Aberdeen's Knots Closure of laparotomy wounds

- Took less operative time
- Had high Ease of applicability than Interrupted closure.
- Also the incidence of postoperative complications like seroma, wound infection, Suture sinus formation, Stitch Granuloma are significantly less in Single Layer Continuous with Intermittent Aberdeen's Knots Closure .
- Therefore, Single Layer Continuous with Intermittent Aberdeen's Knots Closure technique is better than Interrupted closure of laparotomy wounds in terms of operative time, ease of application and post operative complications.

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