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Original Research Article

A COMPARATIVE STUDY OF OUTCOME OF MIDLINE VS PARAMEDIAN INCISION IN PERITONITIS

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Abstract

Background: Perforation peritonitis is a life threatening condition and frequently encountered surgical emergency. Exploratory laparotomy is the commonly performed in emergency to eliminate the cause of infection. The choice of incision depends upon the pathology and personal preference of the surgeon. In adults, vertical incisions are used for exploratory laparotomy either midline or paramedian incision. **Materials and Methods:** A prospective randomised controlled study was conducted to compare the outcome of midline incision and paramedian incision in peritonitis patients undergoing exploratory laparotomy. The comparison was in terms of time taken for opening and closure, accessibility of pathology and post-operative wound complications with respect to wound infection, wound dehiscence, burst abdomen and incisional hernia. The study was conducted at department of general surgery at our institute and included a total of 50 cases which were randomized into two groups A(midline) and B (Paramedian) of 25 cases respectively. Midline and Paramedian incisions were performed in patients undergoing exploratory laparotomy, as per standard techniques. Mean time taken for midline incision opening and closure was less as compared to paramedian incision. Post-operative complications were recorded and follow up for incisional hernia was done for 6 months. **Result & Conclusion:** Time taken for opening and closure of paramedian incision was more than midline incision while wound complications were more in midline incision group. Midline incision approach was easier while paramedian incision provided easy access to right lateral pathology.

INTRODUCTION

Peritonitis is life threatening condition. Perforation peritonitis is frequently encountered surgical emergency in tropical countries like India, most commonly affecting young men in the prime of life as compared to the west where the mean age is between 45-60 years.[1] In majority of cases the presentation to the hospital is late with well-established generalized peritonitis with purulent / faecal contamination and varying degree of septicemia. During surgery, the most important steps are the eradication of the infection focus and cleaning of the abdominal cavity. For this purpose, a range of surgical approaches have been developed in recent decades.[2-4] One of the most commonly employed treatment options is to perform exploratory laparotomy to eliminate the cause of infection.

Exploratory laparotomy is the commonest major operation performed by the general surgeon in emergency settings worldwide. Traditionally, in adults vertical incisions are used for exploratory laparotomy. Here the skin incision is made in the midline through skin, subcutaneous fat, linea alba and peritoneum. The disadvantage of this incision is the greater risk for post-operative wound dehiscence and hernia formation due to relatively avascular nature of linea alba and the lack of musculofascial enforcement.[5] Moreover, incision is easy to perform, exposure of the abdomen is excellent and extensions can easily be made superiorly or inferiorly, providing access to the whole abdominal cavity, including the retro peritoneum. An alternative for the standard midline incision is the paramedian incision. It has the advantages of minimal risk of post-operative wound disruption owing to the greater fascial strength and vascularity. The paramedian incision can be muscle retracting or muscle

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splitting.[6,7] This technique is more complex than the midline incision, resulting in increased opening time8 and blood loss. Exposure of the abdomen is better on the side of the incision than on the contralateral side. The possibilities for extending the incision superiorly are limited by the coastal margin. The basic rule in surgery is to make a liberal incision which is adequately placed to allow a comfortable access to the area of operation. The important is that the incision should allow proper exposure and access of area and ensures that the surgeon is comfortable.

The present study is taken up to compare the outcome in midline incision and paramedian incision in patients undergoing exploratory laparotomy due to peritonitis.

Aims and Objectives

To compare the outcome of median vs paramedian incision in terms of:

1. Accessibility and Extensibility
2. Local wound infection
3. Wound dehiscence
4. Wound healing
5. Development of incisional hernia

MATERIALS AND METHODS

The study was conducted on patients undergoing exploratory laparotomy due to peritonitis, admitted in department of general surgery, at our institute during July 2021 to December 2021. The study was prospective, observational and comparative including 50 patients undergoing laparotomy due to peritonitis. They were divided into two equal groups of 25 each as follows:

Group A (Midline Incision Group)

Group B (Paramedian Incision Group)1

Inclusion Criteria

- All patients with peritonitis who underwent exploratory laparotomy.
- All patients giving written & informed consent for enrollment in the study.

Exclusion Criteria

- Immunocompromised patients having diabetes mellitus, HIV or malignancies.
- Patients who won't give consent for the Study.

Detailed history, general physical examination, local examination, routine investigations and radiological examination were done. Complete monitoring of the vital signs done. Wound was inspected daily for any discharge and other factors contributing to wound sepsis like anemia and hypoproteinemia, malnutrition, jaundice and uraemia were noted and taken care of accordingly. Any wound dehiscence (partial or complete), type of discharge, watery or pus, were noted. The stitches were removed after 10-14 days depending upon the condition of the wound. Recordings were compiled, compared and analyzed statistically. Data collected were entered into microsoft excel365 spreadsheet. Statistical analysis was performed using SPSS (Statistical Package for theSocial Science) software version 22. Data was described in terms of range, mean ±Standard deviation (±SD), median, frequencies (number of cases) and relative frequencies (percentage) as appropriate. Data analysis of numerical data done by using t square test and non-numerical data by chi square test. A probability value (p value) less than 0.05 was considered statistically significant.

RESULTS

In our study we found that mean age of patients was 33.7 years varying from 17-66 years in group A whereas it was 39.8 years varying from 16-66 years for group B. Majority 20 (80%) patients in group A and group B were male. The mean time taken for midline opening was 2.98 min and for closure of incision was 10.28 min, while for paramedian opening it was 11.57 min and for closure it was 13.77min. There was significant difference found between these groups as p value was <0.05.

Table 1: Time taken for incision and closure mean in minutes

Time taken	Midline	Paramedian	p value
Opening	2.9(1.9-4.2 min)	11.5 (7.5-14 min)	0.001
Closure	10.2 (5-14.2 min)	13.7 (10-17 min)	0.001
Total time	11.1	25.2	

Table 2: Comparison between midline and paramedian incision

Number of cases	GROUP A (MIDLINE)	GROUP B (PARAMEDIAN)	p value
No. Of patients	25	25	
Wound infection	8	4	0.026
Wound dehiscence	6	3	0.299
Burst abdomen	5	0	0.018
Incisional hernia	3	0	0.074
Mortality	2	0	0.149

Table 3: Incision Time (in Mins)

Study	Group A	Group B	P value
Sharma S et al	3.76	9.09	0.00
Karlatti S et al	2.7	10.2	<0.05
Our Study	2.98	11.57	0.001

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Table 4: Closure Time (IN MINS)

Study	Group A	Group B	P value
Sharma S et al	7.14	12.77	0.00
Karlatti S et al	10.2	12.8	<0.05
Our Study	10.28	13.77	0.001

Table 5: Comparison of incidence of burst abdomen and incisional hernia (in %)

Study	GROUP A		GROUP B	
	Burst abdomen	Incisional hernia	Burst abdomen	Incisional hernia
Sharma S et al	2	3	3	2
Karlatti S et al	0	7.5	1.25	1.25
Our study	20	12	0	0

We observed that majority of patients in group A and group B were of Small Bowel Perforation 15(60%) and 18 (72%) respectively, followed by Gastric Perforation, Large bowel perforation, Traumatic perforation and Ruptured liver abscess.

We found that 8 (32%) patients in group A and 4(16%) patients in group B had wound infection while in 17(68%) patients of group A and 21(84%) patients in group B had no wound infection. There was statistically significant difference found between these groups.

Wound dehiscence was seen in 6(24%) patients of group A and 3(12%) patients of group B, which was not statistically significant.

Burst abdomen occurred in 5(20%) patients of group A and no patient in group B and was statistically significant.

The mean hospital stay for group A was 12.5 days and for group B it was 8.72 days. The p value was <0.05 and was statistically significant.

Incisional hernia developed in 3(12%) patients in group A and no patient in group B. There was no statistically significant difference found between these groups. During the course of study 2 patients died in group A with no mortality in group B.

DISCUSSION

Laparotomy is the most common surgical procedure and the ultimate aim of a surgeon is to restore the structural integrity of the tissues to as normal as possible.[9] Operative techniques used for exploratory laparotomy varies and these techniques have been evaluated through various studies. Associated with high morbidity and mortality, it continues to be a matter of concern to the surgeons, particularly in a tropical country like India.Midline incision is fast and easy to perform as compared to paramedian incision, which is more time consuming.[10]

The mean age in our study for group A was 33.7 year and for group B it was 39.8 years. The majority 80% patients in both groups were male. A similar study by Karlatti S et al,[11] found that median age of patient was 48 years varying from 24-73 years for midline incision whereas it was 54 years varying from 26-69 years for paramedian incision. Sharma S et al,[12] found that Mean age among group A (midline) was 38.6 years and in Group B (paramedian) mean age was 37.68.

In our study we found that majority 60% patients in group A and 72% patients in group B were of Small bowel perforation. Other causes found were gastric perforation, large bowel perforation, traumatic perforation and ruptured liver abscess. Sharma S et al,[12] found that most common were gastric perforations total 48% in whole study, intestinal perforation (16 %), intestinal obstruction (9%), appendicular perforation (4%), rest were duodenal, jejunal, sigmoidal, caecal and rectal perforation, ruptured liver abscess, splenic injury and a case of carcinoma colon.

In our study time taken for incision and closure of group A was 2.98 and 10.28 while for group B it was 11.57 and 13.77 respectively, which was statistically significant as p value was <0.05. In a similar study by Sharma S et al,[12] they found that in group A (midline) mean time taken to open was 3.76 minutes (range 2 to 8.58 mins)and mean time taken to close was 7.14 minutes(range 4.5 to 14 mins). In group B (paramedian) mean time taken to open was 9.09 minutes (range 5 to 13.17 mins) and mean time taken to close was 12.77 minutes (range 6.67 to 17 mins). There was significant difference in the opening time and closing time between the midline and paramedian groups. Karletti S et al,[11] in their study found that time taken for midline incision opening and closing was less than 12.9 mins in comparison to 23 mins in paramedian incision.

In our study we found that majority 32% patients in group A and 16% patients in group B had wound infection while similar study done by Blomstedt et al,[13] observed that wound infection occurred in 14% of the series with negligible difference. In study done by Guillou et al,[14] overall wound infection was 15.9%. The incidence of wound infection was 12.1% in midline incision ,10.5% in medial paramedian incision and 23% in lateral paramedian incision.

In our study wound dehiscence was seen in 24% patients of group A and 12% patients of group B while in similar study done by keill et al,[15] showed the incidence of wound dehiscence of 27.7% in midline incisionand 27.9% in paramedian incision. Shashikala V et al,[16] observed wound dehiscence in 16.67 % patients.

In our study 5 patients (20%) in group A and no patient in group B had burst abdomen. There was significant difference found between these two groups. Sharma S. et al,[12] found total 5 burst abdomen cases (2 in midline group and 3 in

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paramedian group) While Karletti et al,[11] found 1 case of burst abdomen in paramedian incision group and no incidence of burst abdomen in midline group. In our study we found that 12% patients in group A and no patients in group B developed incisional hernia. A comparable study by Sharma S et al,[12] noted two cases (2%) in paramedian incision group, in comparison to midline where 3 cases of incisional hernia (3%) were noted.

In contrast to above statistics, Karlatti et al,[11] noted total 7 cases of incisional hernia (6 cases in midline group and 1 case in paramedian group)and concluded that Paramedian incision does not prevent incisional hernia even though the incidence is less. Chances of incisional hernia development persists even after one year and hence more period of follow up is required.[17] The majority of incisional hernias develop in the 1st year after the operation and is the result of the interaction of a number of factors including the method of closure. The early hernia is attributable to mechanical wound failure. The combined strength of the healing wound, a function of the extrinsic strength dependent on the mechanical aspect of wound closure, and the slowly increasing intrinsic strength is inadequate to withstand the forces applied and a diffuse hernia results.

CONCLUSION

Accessibility in both groups were good but extensibility is more in midline incision. Paramedian incision provided easy access to pathology on lateral sides, while midline approach was easier. To conclude, Paramedian incision provided more easy access and exposure in right lateral pathologies, less wound complications, better wound healing, but more time consuming and tedious to learn. Midline incision is less time consuming, extensible but has got more wound complications without any significant difference in incidence of incisional hernia in comparison to paramedian incision. Therefore, paramedian incision is good for already diagnosed lateral pathology while midline incision should be preferred in emergency owing to its ease to perform and exposure.

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