



## Short-Term Outcome of Laparoscopic Intraperitoneal Hernioplasty of Incisional Hernia in Khulna Medical College Hospital

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### Abstract

**Background:** Herniorrhaphies that apply a large prosthetic mesh appear to have a lower failure rate, but extensive dissection of soft tissue contributes to an increased incidence of wound infections and wound-related complications. The method of laparoscopic incisional hernia repair was developed in the early 1990s. This technique is based on the same physical and surgical principles as the open underlay procedure. Therefore, this operation has increased in popularity promising shorter hospital stay, improved outcome and fewer complications than traditional open procedures. The aim of the study was to see the short-term outcome of laparoscopic intraperitoneal hernioplasty of incisional hernia in Khulna medical college hospital. **Material & Methods:** This study was prospective single-centered observational study carried out at the department of surgery; Khulna Medical College Hospital included 30 patients of incisional hernia those who underwent laparoscopic intraperitoneal on lay mesh (IPOM) technique using polypropylene mesh and the mesh was fixed with Tacker. The duration of the period from January, 2013 to June, 2013. Data was collected by researcher himself with face-to-face interview using a prepared structured questionnaires & checklist and analyzed on SPSS 22. **Results:** The study was done on 30 patients among which 13 (43.3%) were male and 17 (56.6%) were female patients. Among them the maximum male and female came from 41-50 years age group. Among the 30 patients 16 belonged vertical incisional hernia, whereas 13 patients belonged transverse incisional hernia and the size of the defect of hernia in 27 were medium (defect is 5-10cm) and in 3 were small (defect is <5cm). 21 patients underwent emergency surgery, whereas 9 patients underwent elective surgery for different diseases previously. Every patient in this study group had some predisposing factors to appear incisional hernia. Of them, 16 (53.33%) patients were suffering from Diabetes mellitus, 6 (20%) patients were suffering from chronic cough 2 (6%) patients from chronic retention of urine, 4(13.33%) from chronic constipation and 8 (26.67%) patients from immunocompromised condition due to diseases or drugs taken by them. In case of preoperative complication, only 1 (3.3%) patient each experienced omental haemorrhage, visceral haemorrhage, bowel injury and open conversion whereas 2 (6.6%) patients featured port site bleeding. As postoperative complication, the study shows that 4 (13.3%) patients developed paralytic ileus in followed by port site infection in 3(10%) patients. **Conclusion:** Laparoscopic hernioplasty is safe and convenient repair in short-term in our clinical setup. But to reach a precise conclusion a long-term case control study with conventional mesh hernioplasty in multiple centres should be done.

**Keywords:-** Herniorrhaphies, Laparoscopic, Incisional hernia.

## INTRODUCTION

An incisional hernia is a protrusion of viscous or part of viscous through a previous surgical incision or scar which occurs due to improper healing or excessive strain on the healing tissue. It is a common complication following abdominal surgery and is a significant cause of morbidity. Advances in anesthetic techniques, adequate prevention and treatment of infection following surgery and use of new suture materials have reduced the incidence of incisional hernia. Nevertheless, incisional hernia still occurs in 3 to 20 percent of patients undergoing a laparotomy.<sup>[1]</sup> The management of patients with incisional hernia continues to test the skill and judgment of general surgeons. Treatment involves further major surgery either open suture repair or open mesh repair or laparoscopic mesh repair. Before introduction of knitted polypropylene mesh in early 1960s, the most incisional hernias were repaired by direct suture techniques.<sup>[2]</sup> The reported rate of recurrence for direct suture technique is between 7 and 44 percent.<sup>[3]</sup> In fact, frustration with what was considered an unacceptable risk of recurrence following primary suture closure led other surgeons to introduce the concept of a tension free closure, achieved by suturing segments of a prosthetic material (e.g., polypropylene mesh) to the fascial wound edges. The knitted monofilament polypropylene mesh was introduced into clinical practice in 1963. Since then, various studies reported that the mesh repair of incisional hernia shows a recurrence rate of 0 - 10 percent with a follow up period of at least 12 months, which is markedly less than those for suture repairs. But unfortunately, such transabdominal approaches carry with them

several risks, including injury to the viscera that are adherent to the under surface of the herniated fascial edges, foreign body infection, the formation of dense adhesions to adjacent underlying viscera, alimentary tract fistulation and the often-frustrating experience that one encounters if later forced to incise through the material in search of the abdominal cavity.<sup>[4]</sup> In this regard, the use of laparoscopic technique appeared as challenging, though it may prove advantageous. In 1993 the first laparoscopic repair of an incisional hernia was reported. Since then, laparoscopic repair of incisional hernia has gradually gained acceptance.

This surgical approach is well away from the previous surgery site, is tensionless and uses prosthetic materials for closing the defect and reinforcing the local tissues. This technique has been started recently and practiced commonly in Khulna Medical College Hospital. There are very few studies available on this operation in Bangladesh as it is a relatively new technique in our context. Therefore, the ultimate aim of this study was to observe short term outcome of laparoscopic intraperitoneal incisional hernia repair.

## MATERIAL AND METHODS

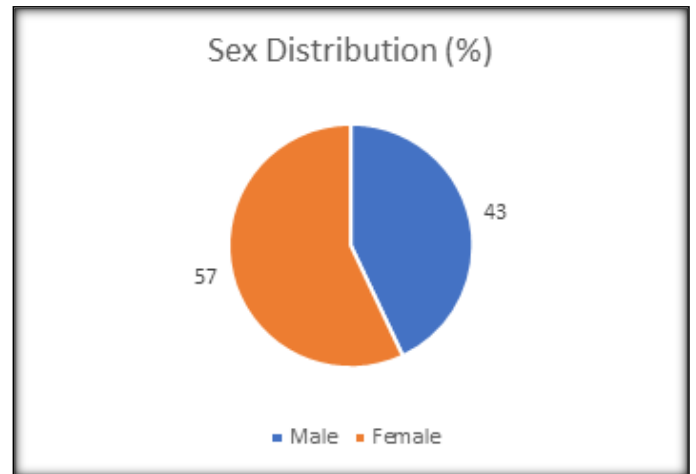
This is a single centered prospective observational study. This study was carried out on 30 patients the find out about the population including male and female patients in the Department of Surgery, Khulna Medical College Hospital, Khulna, Bangladesh. The duration of the period from January 2013 to June 2013. The operations were done with proper optimization of patients and by the consultant surgeons of the Khulna Medical College Hospital. The postoperative pain,

tenderness was recorded by the pain scoring, tenderness scoring tool and visual analogue scale. All patients during their staying period in hospital were interviewed daily and after discharge at home all were followed-up for subsequent two months through direct or indirect communication. Besides, the SSI were observed by Southampton grading system, postoperative pain and tenderness were measured by using pain and tenderness scoring tools, patient's satisfaction in early postoperative period was calculated through Visual Analogue Scale. And the lengths of hospital stay as well as total costs separately in both uneventful and complicated outcomes were recorded. So, the short-term outcomes of the IPOM technique in incisional hernia repair were measured by the recorded data analysis. After collection, the data were checked and cleaned, followed by editing, compiling, coding and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. The choice of treatment was made by the patient after a full discussion with the multidisciplinary team consisting of Transfusionists. Statistical evaluation of the results used to be got via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

## RESULTS

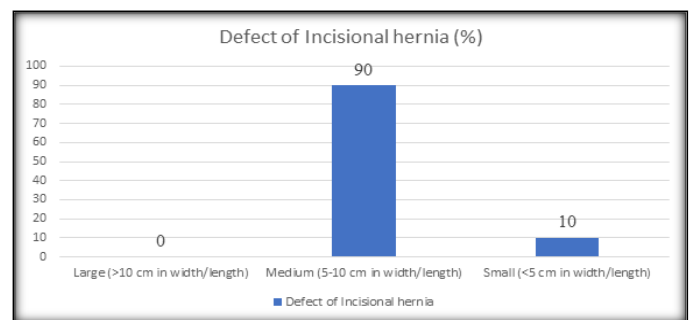
[Table 1] shows the distribution of patients according to Age and sex. Among male 0(0%) were 20-30 years, 2(6.7%) were 31-40 years, 6(20%) were 41-50 years, 4(13.3%) were 51-60 years and 1(3.3%) were >60 years. And among female 1(3.3%) were 20-30 years, 3(10%) were

31-40 years, 8(26.7%) were 41-50 years, 4(13.3%) were 51-60 years and 1(3.3%) were >60 years.



**Figure 1:** sex distribution of study population

[Figure 1] shows the distribution of patients according to sex. Approximately 57% of study population were female and 43% were male.

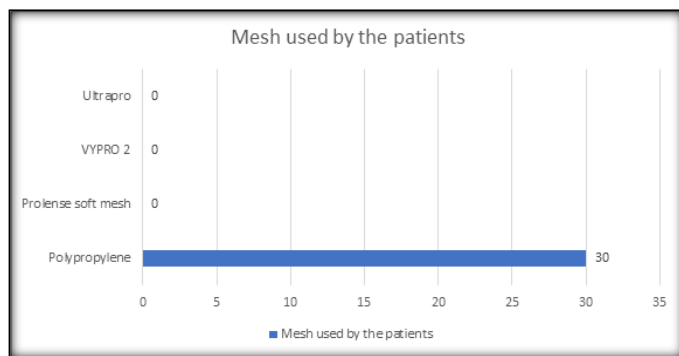


**Figure 2:** Size of the defect of incisional hernia (n=30)

[Table 2] shows the distribution of patients according to predisposing factors of the study population. Among the 30 patients of male 10(0%) were Diabetes mellitus, 04(13.33%) were Chronic cough, 2(6%) were Chronic constipation, 1(6%) were Chronic retention of urine and 6(20%) were Immunocompromisedpt. And among female 6(20%) were Diabetes mellitus, 02(6%) were Chronic cough, 04(13.33%) were Chronic

constipation, 01(3%) were Chronic retention of urine and 02(20%) were Immunocompromisedpt.

[Figure 2] shows the distribution of patients according to size of the defect of incisional hernia. The incisional hernia can be categorized into 3 groups according to the size of the defect. They are small (defect is <5cm), medium (defect is 5-10cm) and large (defect is > 10 cm). Here, there were maximum patients with incisional hernia belong to medium group and minimum from large group. The medium group belong to 27 (90%) patients, small group belong to 3 (10%) patients and finally there was no patient found in large group.



**Figure 3:** Distribution of different types of mesh used by the patients (n=30)

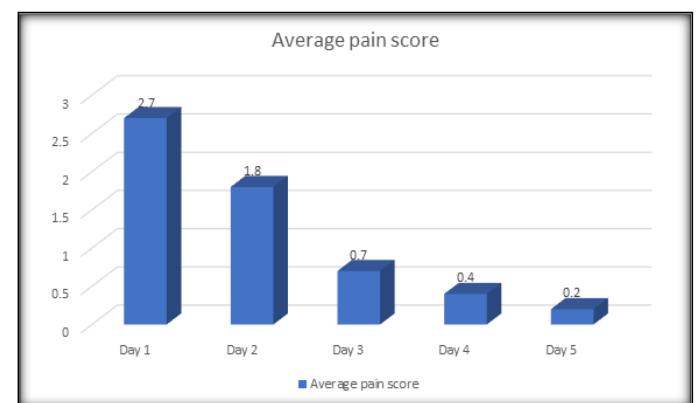
[Figure 3] shows the distribution of different types of mesh used by the patients. Out of 30 patients all the patients were treated by the polypropylene mesh.

[Table 3] shows the distribution of patients according to Pre hernia (Index) operations among incisional hernia patients. Among the 30 patients 21 patients underwent emergency surgery before whereas rest 9 underwent elective surgery.

[Table 4] shows the distribution of patients according to Surgical site infections among the study population. Approximately 2 patients (6.6%) out of total 30 found to develop superficial surgical site infections followed by 1 patient (3.3%) developed organ specific infection. But there was no case of deep surgical site infection found. Here surgical site infection rate was about 10% and p value was quite insignificant (> 0.05).

[Table 5] shows the distribution of patients according to Categorization of SSIs on the basis of Southampton wound grading system. Among the 30 patients 27 (90%) shown grade 0, 2 (6.6%) shown Ib and 1 (3.3%) shown grade V of categorization of SSIs on the basis of Southampton Wound Grading System.

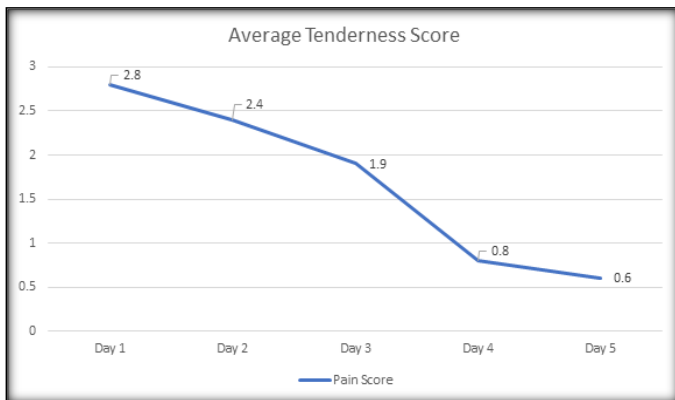
[Table 6] shows the distribution of patients according to Scoring of pain, tenderness and vas in course of postoperative management. Average pain scoring in post-operative period reveals that there was a rapid reduction of pain from postoperative Day 1 to Day 5 and from 3rd day onwards, it was less than 1. Here the p value is not significant as it is >0.05.



**Figure 4:** Average pain score in the study population after surgery (n=30)



[Figure 4] shows the distribution of Average pain score in the study population after surgery. The average pain score is rapidly declining from Day 1 to Day 5. At Day 3 it is proclaimed that the average pain score goes <1.

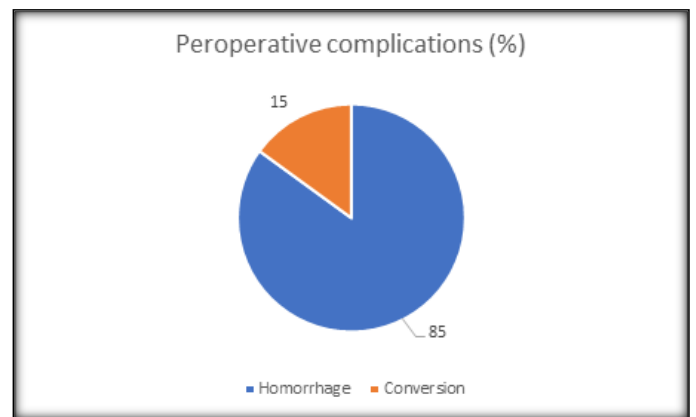


**Figure 5:** Average tenderness score in the study population after surgery (n=30)

[Figure 5] shows the distribution of Average tenderness score in the study population after surgery. Tenderness trended to decrease rapidly following surgery and was recorded less than 1 (Using the tenderness score) from 4th postoperative day.

[Table 7] shows the distribution of patients according to Preoperative & early postoperative complications. Out of 30 patients total 4 patients experiences different sorts of hemorrhage like port site omental and visceral which were 2(6.6%), 1 (3.3%), 1 (3.3%) respectively. Besides,

bowel injury occurred in 1(3.3%) and conversion needed in 1 (3.3%) patient that were depicted in the results as peroperative complications. As post operative complications, paralytic ileus and port site infection found in 4 (13.3%) and 3(10%) patients respectively.



**Figure 6:** Peroperative complications (n=30)

[Figure 6] shows the distribution of Peroperative complications. Among them 85% patients revealed peroperative hemorrhage, 15% revealed conversion.

[Table 8] shows the distribution of patients according to average costs of treatment. The cases of which outcome were uneventful, out of 30 patients total 17(77.3%) patients costs BDT whereas 6 (22.7%) patients cost 10000-20000 BDT as different expenditure in total treatment period.

**Table 1:** Age and sex distribution of study population

Age in Years	Male (n=13)	%	Female (n=17)	%	P-Value
20 - 30	00	00	01	3.3	0.914367 <sup>NS</sup>
31 - 40	02	6.7	03	10	
41 - 50	06	20	08	26.7	
51 - 60	04	13.3	04	13.3	
>60	01	3.3	01	3.3	
Total	13	43.3	17	56.6	

**Table 2:** Predisposing factors of the study population(n=30)

Co-Morbidities	Male No.	%	Female No.	%	P-Value
Diabetes mellitus	10	33.33	06	20	>0.05NS
Chronic cough	04	13.33	02	6	
Chronic constipation	02	6	04	13.33	
Chronic retention of urine	01	6	01	3	
Immunocompromisedpt	06	20	02	20	

P-value is calculated by chi-square test

NS: Not significant

**Table 3:** Distribution of Pre hernia (Index) operations among incisional hernia patients (n=30).

Procedure	Type	n=30	%	Indications
Emergency	Caesarean Section	11	37	Complicated labour
	Exploratory Laparotomy	10	33	Acute abdomen
Elective	Laparotomy	7	23	Cholelithiasis Colorectal cancer. Total Abdominal Hyterectomy Ureterolithotomy
	Lap.surgery	2	7	Cholecystectomy Appendicectomy
	-	30	100	-

**Table 4:** Surgical site infections among the study population (n=30)

Patients			
SSIs	No	%	P value
Superficial	02	6.6	>0.05NS
Deep	00	00	
Organ/Space	01	3.3	
Total	03	10	

value is calculated by chi-square test, NS: Not significant

**Table 5:** Categorization of SSIs on the basis of Southampton wound grading system

Grade	N=30	%	P value
0	27	90	> 0.05NS
Ia	00	00	
Ib	02	6.6	
Ic	00	00	
IIa	00	00	
IIb	00	00	
IIc	00	00	
IId	00	00	
IIIa	00	00	



IIIb	00	00	
IIIc	00	00	
III d	00	00	
IVa	00	00	
IVb	00	00	
V	01	3.3	

P-value is calculated by chi-square test, NS: Not significant

**Table 6:** Scoring of pain, tenderness and vas in course of postoperative management (n=30)

Pain Scoring (0-4)	Postoperative Day					
	D1	D2	D3	D4	D5	P value
Average Pain Score	3 to	2 to	< 1	< 1	< 1 to	>0.05
Tenderness Scoring (0-4)	Postoperative day					
	D1	D2	D3	D4	D5	P value
Average Tenderness Score	3 to	3 to	2 to	<1	<1	>0.05
Avg. Visual Analogue Scale (0-10)	Postoperative day					
	D1	D2	D3	D4	D5	P value
Average Visual Analogue Score	<3	<2	<1	<1	<1	>0.05

**Table 7:** Preoperative & early postoperative complications (n=30)

Complication	No of patients	%	P value
Operative complications			<0.05s
Bleeding			
Port site	02	6.6	
Omental	01	3.3	
Visceral	01	3.3	
Bowel injury	01	3.3	
Conversion	01	3.3	
Postoperative complications			
Paralytic ileus	04	13.3	
Port site infection	03	10	
Fistula	00	00	
Mortality	00	00	

P-value is calculated by student's t test

S: Significant

**Table 8:** Average costs of treatment(n=30)

Non-complicated patients				
Taka	No. of patients	%	Mean±SD (TK)	P value
<10,000	17	77.3	8,500±1,200	>0.05
10,000-20,000	06	22.7		



>20,000	00	00		
Total	23			
<b>Complicated patients</b>				
<b>Taka</b>	<b>No. of patients</b>	<b>%</b>	<b>Mean±SD (TK)</b>	<b>P value</b>
<10,000	02	25	15,500±950	0.003642 <sup>s</sup>
10,000-20,000	04	50		
>20,000	01	25		
Total	07			

P-value is calculated by student's t test, S: Significant

## DISCUSSION

Khulna Medical College Hospital Surgery Department recently started to repair incisional hernia through the laparoscopic intraperitoneal mesh hernioplasty approach. Though this approach of incisional hernia repair is a beiltolder in Dhaka but by this time only few research paper was published on the short-term outcome of this approach. This observational study was designed to achieve through the clinical variables such as surgical site infection rate and grading, pain, and tenderness score, VAS, length of hospital staying and operative, postoperative complications and estimation of average cost. The main aim is to know the overall outcome of this approach in our settings.

One of the most important aims of this clinical study was to determine the severity of surgical wounds associated with laparoscopic intraperitoneal hernioplasty. Southampton wound grading system is an established effective surveillance tool in clinical practice to assess the grade as well as the severity of surgical site infections. In this study, this clinical tool was used to assess the severity. Surgical site infection is one of the most important causes of treatment failure, postoperative morbidity and mortality in case of mesh repair of hernia in our

day-to-day common surgical practice in our setup.

Approximately 56% of study populations are female and 26.7% are in 41 to 50 years age group followed by 16.7% in 51 to 60 years age group whereas these were 23.3% and 13% respectively among the male population. The mean age ± standard deviation of male patients was 47±2.1 years and it was 46±1.9 years in female patients.

The results of this study suggests that approximately only 2 patients out of total 30 patients (6.6%) found to develop superficial surgical site infections followed by 3.3% developed organ space infection. Here surgical site infection rate was about 10% and p value was quite insignificant (> 0.01). Among the 3 patients of surgical site infection, 6.6% had Grade 1b infection followed by 3.3% had Grade V infection using the Southampton wound grading system.

There is a rapid reduction of pain from postoperative day 1 to 5 and from 3rd day onwards, it is less than 1. The average pain score in day 1 is 2.3 and there is a rapid reduction to 0.3 at day 5. So, laparoscopic procedure in this research study has found to be as a very effective technique with rapid recovery of pain in postoperative period. But the p values are



less significant ( $>0.1$ ) here. Tenderness also trended to fall rapidly following surgery and was recorded less than 1 (using the tenderness score) from 4<sup>th</sup> postoperative day. But the p values are also less significant ( $>0.1$ ) here. In this study, patient's satisfaction in early postoperative period was calculated through Visual Analogue Scale and found that patient's satisfaction was very high from the 1<sup>st</sup> postoperative day. VAS 0.7 in 5<sup>th</sup> postoperative day indicates patient's satisfaction is about 95% at the 5<sup>th</sup> day.

In this observational study, peroperative bleeding is found to be the commonest operative hazard which is recorded approximately 13.3% of total study population. Port site bleeding occurred in 6.6% patients. Bowel injury and open conversion was happened in 3.3% patients. The results also suggest that 13.3% patients developed paralytic ileus following surgery followed by port site infection in 10% patients. Fistula formation and mortality rate were recorded as 00% in this study.

In addition to these advantages, decreased hospital costs has been noted by Holzman et al.<sup>[5,6]</sup> The results of this study depicts that the majority of the patients (73.3%) recovers and go home from 5 to 7 days following surgery. Only 20% discharged after 10<sup>th</sup> postoperative day. Another most important finding of this study is that in case of non-complicated patients, about 77.3% had an average cost less than taka 10,000 followed by 22.7% had an average cost in between taka 10,000 to 20,000 and mean cost is taka 8,500. In contrast, in case of complicated patients these are 25% & 50% respectively & mean cost is taka 15,500. But here the P value is  $>0.001$  (less significant result).

The study done in Faridpur, Bangladesh to review initial experience of laparoscopic hernioplasty for incisional hernia in 2010, the results of which suggests that 77.27% patients were discharged with 2 to 4 days following surgery, 18.18% discharged within 5 to 7 days and only 4.56% discharged after 7 days.<sup>[7]</sup> In another particular study, among 49 patients, out of 52 patients planned, laparoscopic repair was performed. There found no intraoperative complications. Postoperative complications were seen in 9 patients (18.4%). Mean hospital stay was 5.9 days.<sup>[8]</sup> In the previous study at Faridpur, no mortality or major complications were recorded and minor complications were observed in 22.74% patients. Approximately 4.55% patients developed port site bleeding and 4.55% patients developed bleeding due to injury to the inferior epigastric artery during suture passer. Conversion rate was recorded 00% and 9.09% patients developed seroma which was treated conservatively in postoperative period.<sup>[9,10]</sup>

Last year several large series on laparoscopic ventral hernia have been reported. This technique has proven to be a safe and feasible alternative to open mesh repair.<sup>[11]</sup> Although many retrospective series are available, only one randomized trial on 60 patients comparing open versus laparoscopic mesh repair has been published by Carbajo et al,<sup>[12]</sup> They found that laparoscopic repair had a lower complication rate, shorter operating time and shorter hospital stay.

So, in a nutshell, from the result of this study, it can be clearly observed that Laparoscopic hernioplasty is safe and convenient repair in short-term regarding the outcome of surgical site infections, peroperative and postoperative

complications, hospital staying, mean cost and average postoperative pain, tenderness and patients' satisfaction.

## CONCLUSIONS

In conclusion of this study, it can be said that laparoscopic hernioplasty is safe and convenient repair with significantly less trauma, shorter length of operation, quicker recovery, much less hospital stay as well as significantly reduced risk of surgical site infections and operative complications in short term. However, this study was done in a very limited study population and a narrow time scale, more research studies in this relation should be done with sufficient number study

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population to depict the original scenario in our clinical setup.

## Recommendation

Laparoscopic incisional hernia repair is a recent development that has been shown to be an effective way of treating incisional hernias. It is a safe alternative to open mesh repair. The procedure has the advantages of minimal access surgery and lower recurrence rate. There are many different techniques currently in use for ventral and incisional hernia repair. Laparoscopic techniques have become more common in recent years and it has been shown to be an effective way of treating incisional hernias.

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