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A comparative study of composite versus prolene mesh in intraperitoneal onlay repair for ventral hernia

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Abstract

Introduction: There are many techniques to repair ventral hernia. Among these intraperitoneal onlay mesh repair has become popular. So a study on intraperitoneal onlay mesh repair is necessary to increase effectiveness of surgery, reduce the complications and reduce the cost of surgery.

Aim and Objectives: To compare the outcomes of composite mesh and prolene mesh usage in intraperitoneal onlay mesh repair for ventral hernia.

Methods and Materials: This prospective comparative study was conducted among the patients between 18-80 years with uncomplicated ventral hernia. 30 patients were included in the study after obtaining informed consent, with group A as 15 patients who underwent intraperitoneal onlay mesh repair for ventral hernia using composite mesh and group B as 15 patients who underwent intraperitoneal onlay mesh repair for ventral hernia using prolene mesh.

Results: The mean age of patients was 45.66 ± 11.28 yrs of age, with minimum age of 30yr and maximum of 67yrs. Among them female preponderance was seen in study, with 76.7% were females and 23.3% were male patients. Duration of surgery in group A was 130 ± 8.52 mins and group B was 121.6 ± 7.58 mins. ($p < 0.05$) The mean hospital stay among group A was 5.03 ± 0.62 days and group B was 6.0 ± 1.1 days. ($p < 0.05$) The mean post-operative pain was significantly lower in group-A (4.4 ± 0.51) compared to group B patients (5.53 ± 0.52). ($p < 0.05$) Overall 3 patients had seroma and 4 patients had the suture site infection out of 30 patients. Group B had significant higher complications compared to patients in group A. ($p < 0.05$)

Conclusion: In present study the onlay mesh repair for ventral hernia using the composite mesh was found to be superior to the prolene mesh. The mean duration of hospital stay, post operative pain and post operative complication were significantly lower among the patients underwent onlay mesh repair with composite mesh compared to the prolene mesh repair for ventral hernia.

Keywords: Onlay, Composite mesh, Prolene mesh, Seroma, surgical site infection.

Introduction

Hernia is the protrusion of a viscus via a normal or pathological weakening in the wall of the cavity that it is contained in. Ventral hernias are the second most common form of hernia encountered. A ventral hernia is a tissue protrusion caused by a weakening in your abdominal wall. It can happen anywhere in your abdomen. A Ventral Hernia is a protrusion of an abdominal viscus or a portion of an abdominal viscus through the front abdominal wall that occurs anywhere other than the groyne. Incisional hernias, paraumbilical hernias, umbilical hernias, epigastric hernias, and spigelian hernias are all examples of hernias [1].

Many of them are called incisional hernias because it form at the healed region of previous surgical incisions. Here abdominal wall have become weak which allows abdominal cavity contents to push out. In strangulated ventral hernia, intestinal tissue gets caught within an opening in abdominal wall. This part cannot be pushed back into abdominal cavity and its blood flow is stopped. This type of ventral hernia requires emergency intervention.

Ventral hernias require surgical repair. If it is not treated, they continue to increase in size until they can cause serious complications. Untreated hernias can increase in size which also will become more difficult to correct. Swelling can lead to trapping of hernia contents which is called incaecertion. This can lead to reduced blood supply to tissues which is called strangulation. There are many techniques to repair ventral hernia. Among these intraperitoneal onlay mesh repair has become popular. Repairing a ventral hernia without difficulties is always difficult for operating surgeons, and advances in fundamental surgical methods have been achieved to avoid complications in hernia surgery.

The onlay approach offers the benefit of separating the mesh from the abdominal contents; however, the principal downside is that the mesh can easily get contaminated in the presence of surgical site infections, and there is also a higher chance of seroma development [4]. So a study on intraperitoneal onlay mesh repair is necessary to increase effectiveness of surgery, reduce the complications and reduce the cost of surgery.

Since intraperitoneal onlay mesh repair is an emerging technique, not many studies as been done, especially comparing the usage of composite mesh and prolene mesh in intraperitoneal onlay mesh repair.

Materials & Methods

It was a prospective comparative study in a tertiary care Hospital. Study included all patients more than 18 years of both genders, with uncomplicated ventral hernia and undergoing surgery in department of general surgery. All patients aged more than 80 years, pregnant women, terminally ill patients, patients undergoing chemotherapy/ radiotherapy, immune compromised patients are excluded. A total of 30 patients are included in study. Among them 15 patients underwent intraperitoneal onlay mesh repair for ventral hernia using composite mesh and 15 patients underwent intraperitoneal onlay mesh repair for ventral hernia using prolene mesh.

Complete history with physical examination of patient was done with emphasis on ventral hernia examination. A written consent form were obtained. All routine investigations were sent. All pre op orders were followed. Patients underwent intraperitoneal onlay mesh repair for ventral hernia using composite mesh were grouped as group A and patients underwent intraperitoneal onlay mesh repair for ventral hernia using prolene mesh were grouped as group B. Time taken for surgery was measured using stop watch. All post op orders was followed. Post op pain is assessed by visual analogue scale. Patients were watched for any post op complications like hematoma, seroma, bleeding, and suture site infection. Patients were discharged when patient was stable and followed for 1 week on outpatient basis to assess for complications and review if necessary after 1 week.

Statistical analysis

All the data was noted in proforma and entered in excel sheet. Continuous variables represented in mean, standard deviation and categorical variables were represented in frequencies and percentage using the tables, figures, bar chart and pie diagram. The mean difference between the groups for continuous variable was analysed using independent student t-test and for categorical variables chi-square test was used. All the statistical analysis was performed using SPSS v21 operating on windows 10. P-value of <0.05 was considered statistically significant.

Observation and Results

Total of 30 patients, fulfilling inclusion criteria. Patients were grouped as group-A who underwent intraperitoneal onlay mesh repair for ventral hernia using composite mesh and group B who underwent intraperitoneal onlay mesh repair for ventral hernia using prolene mesh.

The mean age of patients was 45.66±11.28yrs of age, with

minimum age of 30yr and maximum of 67yrs. Among them female preponderance was seen in study, with 76.7% were females and 23.3% were male patients, with female to male ratio was found to be 3.28:1. Duration of surgery in group A was 130±8.52mins and group B was 121.6±7.58mins. The mean hospital stay among group A was 5.03±0.62days and group B was 6.0±1.1days. Similarly the mean post-operative pain was significantly lower in group-A (4.4±0.51) compared to group B patients (5.53±0.52). Overall 3 patients had seroma and 4 patients had the suture site infection out of 30 patients.

Table 1: Comparison of mean age of patients between the groups using t-test

	Composite mesh		Prolene mesh		t-test (p-value)
	Mean	SD	Mean	SD	
Age	42.47	10.88	48.87	11.12	0.122

Table 2: Comparison of gender distribution between the groups of patients using chi-square test

		Composite mesh		Prolene mesh		Chi-square (p-value)
		Count	Column N %	Count	Column N %	
Gender	Female	11	73.3%	12	80.0%	0.186 (0.66)
	Male	4	26.7%	3	20.0%	

Table 3: Comparison of mean duration of surgery, hospital stay and post-operative pain between the groups using t-test

	Composite mesh		Prolene mesh		t-test (p-value)
	Mean	SD	Mean	SD	
Duration of surgery	130.00	8.52	121.60	7.58	0.001**
Hospital stay	5.03	0.62	6.00	1.13	0.05*
Post-operative pain	4.40	0.51	5.53	0.52	0.001**

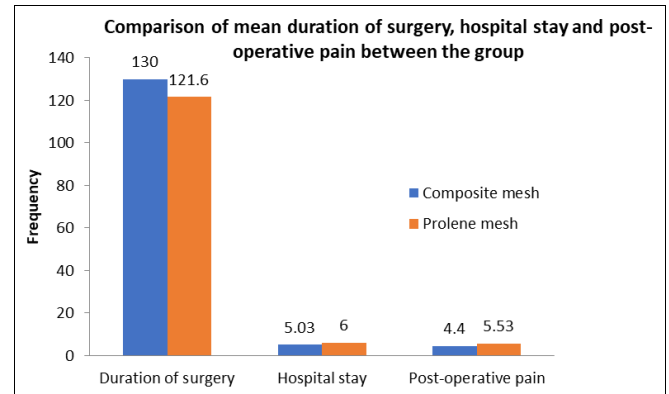


Fig 1: Comparison of mean duration of surgery, hospital stay and post-operative pain between the groups

Table 4: Showing the overall distribution of complications among the study participants

		Frequency	Percent
Complications	Nil	23	76.7
	Seroma	3	10.0
	Suture site infection	4	13.3
	Total	30	100.0

Table 5: Showing the comparison of complications between the groups using chi-square test

		Composite mesh		Prolene mesh		Chi-square (p-value)
		Count	Column N %	Count	Column N %	
Complications	Nil	14	93.3%	9	60.0%	6.08 (0.05)*
	Seroma	0	0.0%	3	20.0%	
	Suture infection site	1	6.7%	3	20.0%	

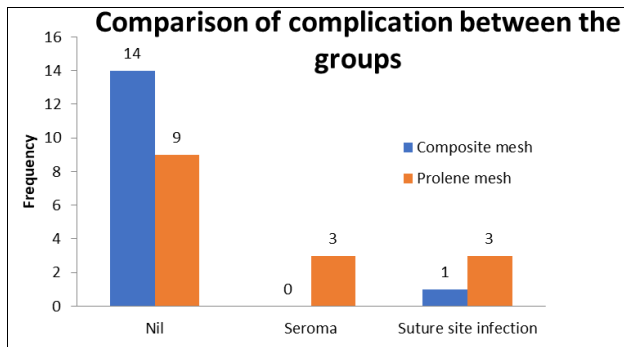


Fig 2: Comparison of complication between the groups

Discussion

This prospective comparative study was conducted among the patients more than 18 years of both genders, uncomplicated ventral hernia undergoing the surgical treatment. Study aimed to compare the outcomes of composite mesh and prolene mesh usage in intraperitoneal onlay mesh repair for ventral hernia

Total of 30 patients, fulfilling inclusion criteria, patients were grouped as group-A patients undergoing intraperitoneal onlay mesh repair for ventral hernia using composite mesh and group B as patients undergoing intraperitoneal onlay mesh repair for ventral hernia using prolene mesh.

The mean age of patients was 45.66 ± 11.28 yrs of age, with minimum age of 30yr and maximum of 67yrs. Among them female preponderance was seen in study, with 76.7% were females and 23.3% were male patients, with female to male ratio was found to be 3.28:1. There was no significant difference between the age distribution, and similar distribution among the gender. In similar to present study, Naz A *et al.*, documented mean age of patients in group A was 40.30 ± 4.52 years while in group B, it was 39.12 ± 4.58 years. The mean drain removal time in group A was 4.40 ± 1.53 days and in group B it was 3.06 ± 0.23 days ($p=0.01$).⁵

On comparison of the parameters between the two groups, to assess the duration of surgery, hospital stay and post-operative pain among the patients. on comparison, group A patients had significant longer duration of surgery compared to group B. duration of surgery in group A was 130 ± 8.52 mins and group B was 121.6 ± 7.58 mins. ($p < 0.05$) On comparison of the duration of hospital stay and post-operative pain, the group A had significant lower mean compared to group B patients. the mean hospital stay among group A was 5.03 ± 0.62 days and group B was 6.0 ± 1.1 days. ($p < 0.05$) Similarly the mean post-operative pain was significantly lower in group A (4.4 ± 0.51) compared to group B patients (5.53 ± 0.52). ($p < 0.05$) In study by Shekhar H *et al.*, the average duration of surgery for the onlay group was 44.48 ± 3.84 minutes and for the sublay group was 55.28 ± 9.63 minutes; immediate post-operative pain with usual doses of analgesics was higher in the onlay group for the first 48 hours; two patients in the onlay group had wound infection and none in the sublay group; hospital stay was longer in the onlay group than in the sublay group; and one patient in the onlay group had early recurrence. Sublay mesh repair is a better option for ventral hernia repair than onlay mesh repair since the mesh is mainly buried and attached beneath the rectus muscle, there are less problems, and there is a low recurrence rate.⁶

On comparison of the complications, overall 3 patients had seroma and 4 patients had the suture site infection out of 30 patients. Between the groups, Group B had significant higher complications compared to patients in group A. ($p < 0.05$) The study by Naz A *et al.*, The difference in terms of wound infection was also significant ($p=0.04$). Sublay hernia repair was found to be a good alternative to onlay repair for treatment of ventral hernia.⁵ In study by Emile SH *et al.*, there was no

statistically significant difference in the incidence of SSI between the two groups (7.5 percent for mesh group vs 5.3 percent for suture group). Seven patients experienced recurrence. The average follow-up time was 24 months. The suture repair group experienced much more recurrence than the mesh group. Diabetes, recurrence, and intestinal resection were all significant predictors of SSI.⁷ Alkhoury *et al.*, have conducted study including 141 patients who have undergone laparoscopic ventral hernia repair with prolene mesh. Partial small bowel obstruction happened in 2.4% patients, which settled with conservative management and did not require surgery for these patients. Port site hernia occurred in 1.6%, seroma formation in 0.7% wound infection occurred in 3.2% and recurrence in 4.8%. On the other hand, even a composite mesh can have complications. In a retrospective study of 95 cases who underwent intraperitoneal composite mesh repair, one patient has fistulation, 8 patients had infection and all the eight needed mesh removal. Patient who had fistulation needed bowel resection.

Limitation of the study

This study was conducted at a single centric hospital based study, with small sample size. The study has the potential to be conducted among larger population and at multiple setting of hospitals to assess the utility of the method and benefit to the patients.

Conclusion

In present study the onlay mesh repair for ventral hernia using the composite mesh was found to be superior to the prolene mesh. The mean duration of hospital stay, post operative pain and post operative complication were significantly lower among the patients underwent onlay mesh repair with composite mesh compared to the prolene mesh repair for ventral hernia. However the time taken for surgery in onlay mesh repair with composite mesh was higher compared to prolene mesh, the complications and morbidity was significantly lower among them. Hence the composite mesh still remains to be better option for the treatment for ventral hernias.

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