

Comparison between self-gripping mesh and sutured mesh in open inguinal hernia repair

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Abstract

Background: Inguinal hernias are one of the most common problems encountered by the surgeon, accounting for about 10-12% of all operations. Operations for the inguinal hernia are one of the most common procedures. Currently herniorrhaphy is the most performed surgical procedure in the world.

Aim: The aim of this study is to compare tissue adhesives and how it can reduce postoperative complications, especially chronic pain as well as recurrence rate in self-gripping mesh compared with sutured mesh in open inguinal hernia repair.

Methods: This study conducted on 30 cases of fresh inguinal hernia submitted to inguinal hernioplasty "mesh repair" 15 of them submitted to sutureless mesh "Group I" while the other 15 cases submitted to sutured mesh "Group II".

Results: Our results revealed that there was no statistical difference between both groups regarding the age. Also, there was no significant difference between both groups regarding gender. Our study revealed that the operative time was longer and blood loss was more during operation in sutured group than in sutureless group. In spite of increase incidence of complications sutured group than in sutureless in our study but there was no difference between both groups regarding complications.

Conclusion: From our study we can conclude that the use of self-grip (sutureless) meshes and sutured meshes in the management of groin hernias have nearly the same results in experienced hands.

Keywords: Self-gripping mesh, Sutured mesh, Inguinal hernia

Introduction

Inguinal hernias are one of the most common problems encountered by the surgeon, accounting for about 10-12% of all operations. An inguinal hernia can be defined as protrusion of a part or whole abdominal viscous into the inguinal canal either through the deep ring or through Hasselbach's triangle. Approximately 75% of all hernias occur in the groin with a lifetime risk of 27% in men and 3% in women. About 2/3 of these hernias are indirect and one third is direct ⁽¹⁾.

Operation for the inguinal hernia is one of the most common procedure that a general surgeon undertakes and various surgeons have given their valuable contribution to different techniques of inguinal hernia repair for better outcome in relation to various complications like groin pain, infection, testicular atrophy and recurrence etc. related to older techniques ⁽²⁾.

Nowadays mesh hernia repair has become gold standard and increasing mesh procedure in hernia surgery led to substantial decrease in hernia recurrence rate ⁽¹⁾. The use of mesh has reduced recurrence rates to below 5%

in inguinal hernia repair and post-operative morbidity is now often attributed to other outcome measures, especially chronic pain and surgical site infection (SSI) ⁽³⁾.

The current surgical options for mesh fixation include, but are not limited to, sutures, tacks or staples, self-fixing meshes and fibrin or other glues. However, there is no consensus among doctors on the best surgical technique. The choice of options often depends on surgeons' personal preference ⁽⁴⁾.

Heavy weight polypropylene meshes have been found to elicit inflammatory reactions responsible for mesh shrinkage when scar tissue evolves. Thus, it has been recommended to use low-weight meshes and to limit the extent of fixation. More recently, self-gripping meshes have been developed, avoiding the need for additional fixation. The Parietex ProGrip self-fixating mesh is composed of monofilament polyester and polylactic acid (PLA) grips, and is indicated for use in inguinal and incisional hernia repairs ⁽⁵⁾.

Authors advocating sutureless mesh hernioplasty, have the opinion that they decrease tension in suture line and a better leveling leads to rapid embodiment of mesh without formation of dead space therefore chances of nerve entrapment and post operative complications are reduced, so that postoperative recovery and postoperative hospital stay will be decreased. On the other hand some studies claim that chances of displacement, migration and folding of mesh are more in sutureless mesh hernioplasty than traditional Lichtenstein technique, resulting in the failure of the whole procedure ⁽¹⁾.

The sutureless ProGrip mesh is a revolutionary mesh as it can be secured without a suture, avoiding any risk for nerve entrapment, and preserving anatomical structures. Moreover, the resorbable PLA micro-grips of the ProGrip mesh are substantially blunt to prevent damage to the surrounding tissues ⁽⁵⁾.

Aim of the work

The aim of this study is to compare tissue adhesives and how it can reduce postoperative complications, especially chronic pain as well as recurrence rate in self-gripping mesh compared with sutured mesh in open inguinal hernia repair.

Patients and Methods

This study was conducted at Al-Azhar Main University Hospitals and Kafr El-Dawar General Hospital on patients with inguinal hernias. **The study was approved by the Ethics Board of Al-Azhar University.**

This study was conducted in Surgical Departments on 30 patients with inguinal hernia classified into 2 groups:

Group I: 15 patients underwent hernia repair with self-gripping "Prolene" mesh.

Group II: 15 patients underwent hernia repair with sutured "Prolene" mesh.

Inclusion criteria:

Patients with fresh inguinal hernia were included in our study.

Exclusion criteria:

- Patients with recurrent hernia
- Patients with severe liver affection
- Patients with permanent causes of increased intra-abdominal pressure

Methods

All studied patients were submitted to the following:

- History taking
- Presence of comorbidity that persist after repair as BPH
- Clinical examination and laboratory investigations
- Operative assessment:
 - Duration of surgery (operative time)
 - Intraoperative difficulties
 - Duration of postoperative stay and results
 - Postoperative complications as infection, rejection of mesh, postoperative pain, etc.,
 - Recurrence rate
- Follow-up of patients monthly for 6 months

Statistical analysis

Data were be collected and entered to the computer using **SPSS** (Statistical Package for Social Science) program for statistical analysis.

Two types of statistics were done:

A. Descriptive statistics:

- * Quantitative data were shown as mean, SD, and range.
- * Qualitative data were expressed as frequency and percent.

B. Analytical statistics:

- * Chi-square test was used to measure association between qualitative variables.
- * Student t-test was used to compare means of 2 sets of quantitative normally distributed data, while Mann Whitney test was used when these data were not normally distributed.
- * P-value is considered statistically significant when it is ≤ 0.05 .

Results

This study conducted on 30 cases of fresh inguinal hernia submitted to inguinal

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hernioplasty "mesh repair" 15 of them submitted to sutureless mesh "Group I" while the other 15 cases submitted to sutured mesh "Group II".

The age of group I ranged between 25-70 years with a mean age of 55.9 ± 14.4 years while in group II the age of patients ranged between 30-68 years with a mean of 57 ± 10.7 years. The statistical analysis revealed that

there was no statistical significant difference between both groups regarding the age ($P = 0.811$).

All patients of group I (15/15, 100%) without any female (0/15, 0.0%) while in group II 93.3% (14/15) of patients were males and 6.7% (1/15) was female and the statistical analysis revealed that there was no significant difference between both groups regarding gender ($P = 0.845$).

Table 1: Age and sex distribution in groups of the study.

Variable	Group I		Group II		P
Age (Years):					0.811 (NS)
Range	25-70		30-68		
Mean±S.D	55.9±14.4		57±10.7		
Sex	No	%	No	%	0.845 (NS)
Male	15	100	14	93.3	
Female	0	0	1	6.7	
Total	15	100	15	100	

In group I seven patients (7/15, 46.7%) had right indirect inguinal hernia (I.I.H), five patients (5/15, 33.3%) had left indirect inguinal hernia and three patients (3/15, 20%) had bilateral indirect inguinal hernia. While in group II eight patients (8/15, 53.3%) had right indirect inguinal hernia and seven patients (7/15, 46.7%) had left I.I.H. and the statistical analysis revealed that there was no significant difference between both groups regarding type of hernia ($P = 0.631$) (Table 2).

Table 2: Age and sex distribution in groups of the study.

Type of hernia	Group I		Group II		P
	No	%	No	%	
Right I. I. H	7	46.7%	8	53.3%	0.631 (NS)
Left I. I. H	5	33.3%	7	46.7%	
Bilateral I. I. H	3	20%	0	0.0%	
Total	15	100	15	100	

All patients (15/15, 100%) of both groups underwent hernioplasty of anterior approach using mesh "synthetic polypropylene", without any intraoperative complications. In fifteen of the patients "Group I" the mesh put without sutures while the other 15 "Group II" the mesh was sutured.

The operative time in group I ranged between 40-58 min with a mean operative time of 50.3 ± 4.7 min while in group II the operative time ranged between 49-70 min with a mean operative time of 65.5 ± 5.5 min and the statistical analysis revealed that there was significant statistical increase in the operative time of group II "sutured group" than in group I "sutureless group" ($P = 0.032$), (Table 3).

During operation in group I blood loss ranged between 20-50 ml with a mean amount of blood loss of 33.53 ± 9.1 ml while in group II the blood loss ranged between 30-55 ml min with a mean of 40.7 ± 7.1 ml of blood loss and the statistical analysis revealed that there was significant statistical increase in the operative time of group II "sutured group" than in group I "sutureless group" ($P = 0.022$), (Table 3).

Table 3: Operative time and blood loss during operative procedures in groups of the study.

Variable	Group I	Group II	P
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Operative time (Min):			
Range	40-58	49-70	0.032
Mean±S.D	50.3±4.7	65.5±5.5	(S)
Blood loss (ml):			
Range	20-50	30-55	0.022
Mean±S.D	33.5±9.1	40.7±7.1	(S)

Twelve patients (12/15, 80%) of group I passed without complications while in group II ten patients (10/15, 66.7%) passed without complications and the statistical analysis revealed that group I "sutureless group" has better outcome than group II "sutured group", (P = 0.021), (Table 4).

Complications encountered in three patients (3/15, 20%), one of them (1/15, 6.7%) was due to superficial wound infections and treated by the use of antibiotic orally; another one (1/15, 6.7%) was due to seroma collection and treated by drainage and antibiotic, and the third one (1/15, 6.7%) occurred late and was due to mesh rejection as a result of infection "deep seated", (Table 4).

In group II, complications encountered in five patients (5/15, 33.3%), one of them (1/15, 6.7%) was due to superficial wound infections and treated by the use of antibiotic orally; two (2/15, 13.3%) was due to seroma collection and treated by drainage and antibiotic, and two (2/15, 13.3%) was due to chronic pain persists post-operatively and treated by postoperative non-steroidal anti-inflammatory drugs (NSAIDs), (Table 4).

Statistical analysis revealed that in spite of increase incidence of complications in group II but there was no significant difference between both groups regarding the complications (P = 0.210).

Table 4: Post-operative outcome in patients of the studied groups.

Outcome	Group I		Group II		P
	No	%	No	%	
Pass free	12	80%	10	66.7%	0.021*
Complicated:	3	20%	5	33.3%	0.210 (NS)
<i>Superficial wound infection</i>	<i>1</i>	<i>6.7%</i>	<i>1</i>	<i>6.7%</i>	
<i>Serom</i>	<i>1</i>	<i>6.7%</i>	<i>2</i>	<i>13.3%</i>	
<i>Mesh rejection</i>	<i>1</i>	<i>6.7%</i>	<i>0</i>	<i>0.0%</i>	
<i>Chronic pain</i>	<i>0</i>	<i>0.0%</i>	<i>2</i>	<i>13.3%</i>	

Discussion

This study was conducted on 30 cases of fresh inguinal hernia submitted to inguinal hernioplasty "mesh repair" 15 of them were submitted to sutureless mesh "Group I" while the other 15 cases were submitted to sutured mesh "Group II".

Our results revealed that there was no statistical difference between both groups regarding the age. Also, there was no significant difference between both groups regarding gender.

Tarchi and his colleagues, found in their study that the mean age was 62 years and males were more affected (94.3%) than females (5.7%) which run in line with our results ⁽⁶⁾.

Wang and Zhang in their study found that the age of the affected patients was 48.7±16.8 years which was in agreement with our results; while they found that 27% of their patients were females and 73% were males which disagrees with our results ⁽⁵⁾.

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In our study, the type (direct or indirect) and/or the site (right, left or bilateral) of hernia in the groin didn't affect the procedure.

Wang and Zhang in their study found that the right sided inguinal hernia were more common (67%) than left sided hernia (33%), which disagree with our results as we found no predominant type of inguinal hernia ⁽⁵⁾.

All patients in our study underwent operation by anterior approach using mesh without any intraoperative complications.

Tarchi and his colleagues found in their study that there were no intraoperative complications. Early postoperative complications included hematoma, seroma (5.7% cases), superficial wound infection (1%), urinary retention (0.5%), and scrotal swelling (1%) which was in agreement with our study in both groups ⁽⁶⁾.

Molegraaf and his colleagues in their study use the self-grip mesh repair in Leichtenstein repair in all of their patients which was in agreement with the results of our study ⁽⁷⁾.

In spite of increase incidence of complications in sutured group than in sutureless in our study, there was no difference between both groups regarding complications.

Lin and his coworkers in their study found that the incidence of hematomas was significantly higher in the suture fixation group than sutureless group. There was no significant difference between the 2 groups in terms of early recurrence, late chronic pain, late recurrence, wound infection, and mesh infection. The main disadvantage of suture fixation was the duration of operation as the mean operating time was significantly longer than glue fixation and this run in line with our obtained results ⁽⁸⁾.

Molegraaf and his colleagues concluded in their study that the self-gripping mesh has comparable results with a sutured mesh regarding the incidence of chronic postoperative inguinal pain, recurrence and foreign body sensation. However, long-term results still are based on relatively small patient numbers and outcomes measures are

heterogenic. The main advantage of the self-gripping mesh is the consistently significantly reduced operation time which coincides with our results ⁽⁷⁾.

In addition, Sun and his colleagues, found in their study that self-grip meshes were superior to sutured meshes regarding duration of the operation, hematoma, and recovery time to daily activities. There were no significant differences between the two groups for superficial wound infection, mesh/deep infection, seroma, persisting numbness, postoperative length of stay which was in agreement with the results of our results ⁽³⁾.

Rönkä and his coworkers in their study concluded that the type and size of inguinal hernias were similar in sutureless and sutured groups which were in agreement with our results. They also found that the duration of operation was 32 ± 9 , and 38 ± 9 minutes in the self-gripping, and suture groups, respectively which disagrees with our results. There were no significant differences postoperatively in pain response or need for analgesics, superficial infections, wound seromas between the study groups and this was in agreement with our results ⁽⁹⁾.

Tarchi and his colleagues found in their study that early postoperative pain was mild and may need non-steroidal anti-inflammatory drug to be given for its relief while chronic postoperative pain with long-term follow up improved even without use of NSAIDs which was in agreement with our study in both groups ⁽⁶⁾.

Conclusion

From our study we can conclude that the use of self-grip (sutureless) meshes and sutured meshes in the management of groin hernias have nearly the same results in experienced hands.

Recommendations

From this study we recommended that: There is still a place for using sutureless technique in management of groin hernia during hernioplasty. Training of our junior staff to do this technique of hernioplasty to have best results and fewer complications that already

occurred with sutured meshes as chronic pain and infections.

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