Comparing Skin Staples to Sutures for Fixing Mesh in Tension Free Hernioplasty

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Abstract

Lichtenstein tension free repair is the most commonly used technique for inguinal hernia repair due to low recurrence rate, easy reproducibility outside specialized centers and better patient satisfaction. However consideration about long term pain and discomfort following hernia repair led to searching for alternative methods for mesh fixation other than sutures eg fibrin glue, absorbable tackers, tissue welding with lasers and other techniques have been tried. This study was done to compare the duration of surgery and postoperative outcome of securing mesh with skin staples versus polypropylene sutures in Lichtenstein hernia repair.

Patients and Methods: A total of 60 patients with inguinal hernia undergoing Lichtenstein mesh repair were randomly divided into two groups. The mesh was secured by using skin staples (group I) or polypropylene sutures (group II).

Results: The operation time was significantly reduced in group I (mean 20.7min) as compared to group II (mean 32.7min) and less complication rate in group I as compared to group II. Discomfort or pain at the site of repair was less in group I at peak follow-up of 1 year.

Conclusion: Mesh fixation with skin staples is effective with significant reduction in the operating time and complications or recurrence. Application of staples are much more quicker than sutures for fixing the mesh, thus saving the operating time.

Key Words: Skin staples – Fixing mesh – Tension free hernioplasty.

Introduction

INGUINAL hernias are the most common hernias in Humans and their incidence rate is estimated at 27% in men and 3% in women during lifetime. Considering such frequent occurrence, inguinal hernia repairs are the most common procedures performed globally (around 20 million a year) [1].

Lichtenstein and colleagues (1989) reported that excessive tension on the suture line resulted in the high recurrence rate after the primary repair. In 1989, Lichtenstein et al., concluded that with tension free mesh repair of hernia, recurrence can be nearly completely avoided [2]. Lichtenstein tension free repair is the most commonly used technique due to, low recurrence rate, easy reproducibility outside specialized centers and better patient satisfaction [3]. However consideration about long term pain and discomfort following hernia repair led to searching for alternative methods for mesh fixation other than sutures; fibrin glue, absorbable tackers, tissue welding with lasers and other techniques have been tried [4-7].

The latest trials in this aspect evaluated securing mesh with use of skin staples instead of the usual polypropylene sutures. Staples are applied from a Proximate® Skin Staplers. Staples are quick to use and reduce the operating time and minimize the risk of wound infection [8-11].

Patients and Methods

This study was carried out in the Department of Surgery, Sahel Educational Hospital Cairo, from April 2011 to April 2013. Sixty patients (>18 yrs) with inguinal hernias were include into the trial. Patients were randomized either to the group I (where the mesh was secured with staples) or the group II (where the mesh was sutured with polypropylene sutures 2/0).

A single dose of intravenous Ceftriaxone 1 gram was administered with induction of anesthesia. Following inguinal dissection and delivery of the cord, indirect sacs were dissected from the spermatic cord and then divided and transfixed and distal part was excised. In sliding hernias the sac was invaginated and a mesh plug tailored to the size of the internal ring was fixed above the sac. Direct hernia sacs were reduced unopened and plicated or a mesh plug fixed above Figs. (1,2).
A sheet of polypropylene mesh (1x6cm) was cut to shape and laid over the posterior wall of the inguinal canal so that it overlapped the pubic tubercle. Two ampoules of gentamycin 80mg were spread over the mesh. In group II this was fixed in position by interrupted sutures of 2/0 Polypropylene. In group I the positioning of the mesh was identical but a proximate® Fixed-Head Skin Stapler (Ethicon) containing 35 preloaded stainless steel staples was used to secure it. A staple was placed into the pubic tubercle with between three to four staples along the inguinal ligament placed 1-2cm apart (Fig. 3). Further two to three staples were placed in the internal oblique and transversalis muscle medially and superiorly and the overlapping free edges of the mesh were stapled together with two staples lateral to the cord. In both groups the external oblique aponeurosis was closed with a continuous suture of 2/0 Vicryl (Ethicon) and the subcutaneous tissue were then approximated with 3/0 vicryl. Skin closure was completed in group II using Subcuticular Suture of 3/0 Polypropylene.

In group I skin closure was completed using staples from the same stapler. The time taken from the beginning of the mesh insertion to completion of skin closure was recorded.

Postoperative complications like infection, hematoma, requiring drainage or in-patient admission, pain significant to cause alteration in lifestyle, and other miscellaneous complications were noted daily. Patients were discharged on 1st post-operative day unless eventual postoperative condition required further stay.

Patients were followed-up in out-patient clinic 1 week after discharge. 15 days thereafter, then, 1-2 months later, and then for further follow-up till 12-18 months. Check up for any complication and recurrence was carried out in detail and the observations were recorded.

**Results**

There were 30 patients in each group and results were compared in terms of operative time and complications.

The time utilized to fix the mesh and the total operative time were significantly reduced in group I compared to group II as shown in Table (1).

No serious intraoperative complications occurred in either groups. Scrotal edema occurred mainly in patients with larger and inguinoscrotal hernias (5 in sutured group and 2 in staples group). Wound ecchymosis (5 in sutured group and 2 in staples group) settled down within 2 weeks. All patients with Wound infection (3 in sutured group and 0 in staples group) had only minor infection, and required only drainage, repeated dressings and oral antibiotics. Wound seroma were aspirated in 2 patients in group II and 1 patient in group I. Wound hematoma occurred only in one patient with advanced liver disease in sutured group and was evacuated and a suction drain inserted for 3 days. Chronic pain limiting patient activity occurred in 2 patient in the staple group and in 4 patient in the sutured group. At 12 months follow-up only 1 patient in the sutured group was still complaining.

Comparison of various complications in two groups.
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Postoperative complications: 

A patient in study group I developed wound infection. They suggested that it could possibly be attributed to the inert coating covering the stainless steel staples. Thus, it may be inferred that rate of wound infection is significantly less with the use of staples but further studies and patients are needed to confirm it. The use of gentamycin locally may have a beneficial effect without increasing serum levels [15].

**Discussion**

The Lichtenstein technique is currently considered the “gold standard” of open, inguinal hernia repair [1,3]. Egger and colleagues first described using staples for mesh in this technique [12]. Recent studies comparing staples to suture fixation emphasized the advantage of shorter operating time with application of staples for securing the mesh in Lichtenstein repair [8,9].

The main advantage with application of staples for securing the mesh in Lichtenstein repair is reduction in the operative time. A Difference of 15 minutes was found between the groups I and II which was significant (p <0.001). Thus, staples can be applied much more quickly than sutures hence saving the operating time, reducing tissue handling, reducing the risk of wound infection, and also reducing the risk associated with prolonged anaesthesia. Similar results were also shown by Garg and colleagues [8,9].

**Complications:**

**Intraoperative Complications:** There was no intraoperative in the present study. Gould suggested it is safe to staple the mesh a little higher up on the inguinal ligament than one might with suture to avoid injury of underlying vessels [13].

**Postoperative complications:**

**Wound Infection:** Wound infection is a major cause of hernia recurrence [14]. In the present study, 3 (10%) patients in control group II and non (0%) patient in study group I developed wound infection. All settled down without the need for mesh removal. The infection rate was significantly higher in the control group II. Van der Zwaal [8] and colleagues reported that there was no postoperative wound infection. They suggested that it could possibly be attributed to the inert coating covering the stainless steel staples. Thus, it may be inferred that rate of wound infection is significantly less with the use of staples but further studies and patients are needed to confirm it. The use of gentamycin locally may have a beneficial effect without increasing serum levels [15].

**Scrotal Edema:** In the present study, 5 (4%) patients in group II presented with scrotal swelling compared to 2 patients in group I. Swelling was managed conservatively. Odema was mainly observed in larger long standing hernias and might reflect the amount of dissection carried out rather than the method of fixation used [14].

**Postoperative Pain:** In the present study, no significant difference was seen in the postoperative pain in both groups. Mills et al., have reported that there was no difference in pain score between the two groups. Garg and colleagues also stated that there was no difference in the pain duration in both groups of their study [9]. Van der Zwaal and colleagues [8]. Also reported that pain scores were similar in both the groups. Chronic pain limiting patient activity occurred in 2 patient in the staple group and in 4 patient in the sutured group. At 12 months follow-up only 1 patient in the sutured group was still complaining. Shaikh and colleagues study confirmed that staples do not cause any additive risk of recurrence or chronic pain [16].

**Recurrence Rate:** No early recurrence was seen in either groups. Other authors have reported recurrence rate of 0.5-3.7% in the traditional Lichtenstein repair procedure. It is known that recurrent inguinal hernia occur in the medial side. Therefore, it is important to position the mesh 1cm medial to the pubic bone [8]. Thus, there is some evidence that securing the mesh with staples instead of sutures might reduce the recurrence rate. But a detailed study with prolonged follow-up is required to comment accurately on the recurrence rate of inguinal hernia in both groups.

No difference in hospital stay was observed between the 2 groups. The median duration of hospital stay was 3 (1-3) days for both groups. Longest period of stay in suture group was 3 days and in staple group was 2 days.

**Conclusion:**

Staples are a far superior for fixation of mesh as compared to conventional sutures. This method is technically easier. The use of staples is not asso-

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**Table (1): Comparison of operative time in the two groups.**

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<thead>
<tr>
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<th>Stapler</th>
<th>Sutures</th>
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<tbody>
<tr>
<td>Time from mesh insertion to skin closure</td>
<td>Total operative time</td>
<td>Time from mesh insertion to skin closure</td>
</tr>
<tr>
<td>Mean</td>
<td>15.7</td>
<td>50</td>
</tr>
<tr>
<td>SD</td>
<td>6.9</td>
<td>14.4</td>
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</table>

**Table (2): Comparison of various complications in two groups.**

<table>
<thead>
<tr>
<th></th>
<th>Suture group II</th>
<th>Stapler group I</th>
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</thead>
<tbody>
<tr>
<td>Urinary retention</td>
<td>4 (8%)</td>
<td>6 (12%)</td>
</tr>
<tr>
<td>Wound ecchymosis</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Wound infection</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Wound hematoma</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Wound seroma</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Scrotal oedema</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>
Comparing Skin Staples to Sutures for Fixing Mesh

associated with any increase in postoperative pain and is not associated with any increase in complications as compared to the use of sutures. The use of staples is cost effective in comparison to the suture.

References


الملخص العربي

أصبح استخدام الشبكة في أصلاح الأربى هو الأساليب الأكثر استخداماً لمميزاتها المتعددة. مع هذا فالآليات المتغيرة في مكان أصلاح الفقد نتيجة استخدام جسم غريب أدى إلى البحث في استخدام طرق أخرى لثبت الشبكة وقد أجريت دراسة لمقارنة ثبوت الشبكة بالدبابيس مقارنة باستخدام الغرائز. تضمنت الدراسة 60 مريض بالفتق الأربى تم تقسيمهم عشوائياً لمجموعتين: استخدمت مجموعة الأولى لثبت الشبكة واستخدمت الغرائز في المجموعة الثانية. أوضحت النتائج أن الدبابيس طويلة جيدة لثبت الشبكة ومن مميزاتها تقليل زمن الجراحة وحدوث مضاعفات أقل.