

ORIGINAL RESEARCH

Assessment of Efficacy of Sutureless Mesh Repair of Inguinal Hernia: A Clinical Study

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ABSTRACT

Background: In general, the term "hernia" refers to the protrusion of a viscus from the cavity in which it is typically enclosed, or, more specifically, the protrusion of a loop or knuckle of an organ or tissue through an aberrant orifice. In order to assess the effectiveness of the new sutureless mesh repair technology, our study was designed. **Materials & Methods:** 50 consecutive inguinal hernia patients who were admitted for elective surgery in Department of General Surgery, Rama Medical College Hospital & Research Centre, Kanpur, Uttar Pradesh (India) were included in the study. Mesh was positioned on the posterior inguinal wall to treat an inguinal hernia without the use of glue or fixation sutures. All patients were required to fast for eight hours, and the surgical site was cleaned and groomed the day before the procedure. Prolene mesh that is lightweight was employed. Spinal anaesthesia was used throughout all patient operations. The patients received postoperative care and were given IV fluids for the first 12 hours after surgery. The patients' pain level was assessed using a visual analogue scale (VAS) on the first postoperative day. On the seventh post-operative day, the sutures were removed, and every participant was inspected. **Results:** The present study included assessment of 50 patients within the age group of 20 to 50 years. Mean age of the subjects was 25.7 years. 52 percent of the patients belonged to the age group of 20 to 30 years. 30 percent of the patients belonged to the age group of 41 to 50 years. Right side involvement occurred in 70 percent of the cases, while left side involvement occurred in 30 percent of the cases. While classifying patients on the basis of content, it was observed that gut was present in 14 percent of the cases, while omentum was seen in 86 percent of the cases. **Conclusion:** Based on the aforementioned findings, the authors came to the conclusion that sutureless tension free mesh repair is a successful method for treating inguinal hernia cases.

Key words: Inguinal hernia, Sutureless.

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INTRODUCTION

Abdominal wall hernias are common, with a prevalence of 1.7% for all ages and 4% for those aged over 45 years. Inguinal hernias account for 75% of abdominal wall hernias, with a lifetime risk of 27% in men and 3% in women.¹ Repair of inguinal hernia is one of the most common operations in general surgery, with rates ranging from 10 per 100 000 of the population in the United Kingdom to 28 per 100 000 in the United States.² In 2001-2 about 70 000 inguinal hernia repairs (62 969 primary, 4939 recurrent) were done in England, requiring more than 100 000 hospital bed days. Ninety-five per cent of patients presenting to primary care are male, and in men the incidence rises from 11 per 10 000 person years aged 16-24 years to 200 per 10 000 person years aged 75 years or above.³ Inguinal hernias present with a lump in the groin that goes away with minimal pressure or

when the patient is lying down. Most cause mild to moderate discomfort that increases with activity. A third of patients scheduled for surgery have no pain, and severe pain is uncommon (1.5% at rest and 10.2% on movement).⁴

Sutureless repair is successful for all but the largest of indirect inguinal hernias. After reduction of the peritoneal sac, the presenting indirect component of the hernia is immediately resolved by placement of a polypropylene mesh through the internal ring. The posterior wall is reinforced with a second swatch of Prolene mesh to prevent herniation, which often results from future degenerative changes. Both swatches of mesh are held in place in separate tissue planes by the body's internal hydrostatic forces. Being sutureless, no tension is placed on any layer; there is no damage to tissues from an errant suturing technique. This procedure has been used in 412 of the

1,091 inguinal hernia repairs over the past 36 months.⁵

So, our study was planned to evaluate the efficacy of new technique of sutureless mesh repair.

MATERIALS & METHODS

The effectiveness of a new technique for sutureless mesh repair was evaluated as part of the current investigation, which was carried out in the Department of General Surgery, Rama Medical College Hospital & Research Centre, Kanpur, Uttar Pradesh, India. After thoroughly outlining the full research methodology, the institutional ethical committee granted ethical approval, and all subjects provided written consent. 50 participants in the study had inguinal hernias that had been recommended for elective surgery. The study comprised male participants, participants aged 20 to 50, participants with uncomplicated inguinal hernias, and those without a history of any other systemic illness. All patients' complete demographic information was gathered. Mesh was positioned on the posterior inguinal wall to treat an inguinal hernia without the use of glue or fixation sutures. All subjects were required to fast for eight hours, and the surgical site was cleaned as well as groomed the day before the procedure. Prolene mesh that is lightweight was employed. Spinal anaesthesia was used throughout all patient operations. The patients received postoperative care and were given IV fluids for the first 12 hours

after surgery. The patients' pain level was assessed using a visual analogue scale (VAS) on the first postoperative day. On the seventh post-operative day, the sutures were removed, and every participant was inspected. The SPSS software was used to assess all the results, which were recorded in a Microsoft Excel spreadsheet. Chi-square and the Mann Whitney U test were employed to determine the level of significance.

RESULTS

The present study included assessment of 50 patients within the age group of 20 to 50 years. Mean age of the subjects was 25.7 years. 52 percent of the patients belonged to the age group of 20 to 30 years. 30 percent of the patients belonged to the age group of 41 to 50 years.

Right side involvement occurred in 70 percent of the cases, while left side involvement occurred in 30 percent of the cases.

While classifying patients on the basis of content, it was observed that gut was present in 14 percent of the cases, while omentum was seen in 86 percent of the cases.

Punched out defect in transversalis fascia was seen in 22 percent of the cases.

Mean duration of operative procedure was found to be 37.9 minutes.

Mean postoperative pain at 1 hour postoperatively, 6 hour postoperatively and 12 postoperatively was found to be 5.16, 4.87 and 3.63 respectively.

Table 1: Distribution of subjects according to age group

Age-group (years)	Number of subjects	Percentage
20- 30	26	52%
31- 40	09	18%
41- 50	15	30%
Total	100	100%
Mean age (years) = 25.7		
±SD = ±12.45		

Table 2: Distribution of patients according to the site of inguinal hernia

Type of hernia	Frequency	Percentage
Right	35	70%
Left	15	30%

Table 3: Distribution of patients according to content

Content	Frequency	Percentage
Gut	07	14%
Omentum	43	86%

Table 4: Distribution of patients according to state of posterior wall

State of posterior wall	Frequency	Percentage
Punched out defect in transversalis fascia	11	22%
Normal	39	78%

Table 5: Duration of operative procedure

Duration of operative procedure (minutes)	Value
Mean	37.9
SD	4.33

Table 6: Postoperative pain score at different time intervals

Time interval	Mean Postoperative pain score	SD
1 hour	5.16	2.69
6 hour	4.87	2.41
12 hour	3.63	2.17

DISCUSSION

Inguinal hernia repair is one of the most frequently performed surgical procedures worldwide in general surgery. There are approximately 700,000 procedures of hernia repair performed in the world every year, which results in costs of approximately USD 500,000,000 in the USA plus the costs for medication, sick leave and lost work performance. According to the German Diagnosis-Related Groups (DRG) system, the cost of surgical therapy for inguinal hernia is around 322,000,000 Euro. This means that in terms of costs, effective and reliable therapy of inguinal hernia is a significant factor that influences the efficiency of national systems of public health insurance.^{6,7} The transabdominal laparoscopic (TAPP) approach in the therapy of inguinal hernia seems to be a suitable alternative to classical open inguinal hernia repair, mainly in the hands of an experienced surgeon.⁸ According to several studies comparing open and endoscopic/laparoscopic hernia repair, laparoscopic inguinal hernia repair is a suitable alternative primarily in case of recurrent hernias and bilateral hernias.^{9,10} The operative technique developed by Lichtenstein that utilises the open approach and anterior positioning of the implanted mesh was considered a gold standard in inguinal hernia repairs for a long time.¹¹

Hence; the present study was planned to evaluate the efficacy of new technique of sutureless mesh repair.

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While classifying patients on the basis of content, it was observed that gut was present in 14 percent of the cases, while omentum was seen in 86 percent of the cases. Punched out defect in transversalis fascia was seen in 22 percent of the cases. Mean duration of operative procedure was found to be 37.9 minutes. Mean postoperative pain at 1 hour postoperatively, 6 hour postoperatively and 12 postoperatively was found to be 5.16, 4.87 and 3.63 respectively.

M Tabbara et al¹² evaluated the outcomes after inguinal hernia repair using the lightweight self-adhering sutureless mesh "Adhesix™" and demonstrated the safety and efficacy of this mesh. This was a 3-year retrospective study that included 143 consecutive patients who underwent 149 inguinal hernia repairs at our department of surgery. All hernias were repaired using a modified Lichtenstein

technique. Preoperative, perioperative, and postoperative data were prospectively collected. Incidence of chronic pain, postoperative complications, recurrence, and patient satisfaction were assessed three years postoperatively by conducting a telephone survey. They had 143 patients with a mean age of 58 years (17-84), who underwent 149 hernia repairs using the Adhesix™ mesh. Ninety-two per cent (131 patients) were males. Only 10 patients (7%) had a postoperative pain for more than three years. In our series, neither age nor gender was predictive of postoperative pain. Only one patient had a hematoma lasting for more than one month and only four patients (2.8%) had a recurrence of their hernia within three years of their initial surgery. Ninety per cent of the patient expressed their satisfaction when surveyed three years after their surgery. In conclusion, the use of the self-adhering sutureless mesh for inguinal hernia repair has been proving itself as effective as the traditional mesh. Adhesix™ is associated with low chronic pain rate, recurrence rate, and postoperative complications rate, and can be safely adopted as the sole technique for inguinal hernia repair.

Since 1989, the authors have been using the Trabucco tension-free and sutureless technique for the repair of primary groin hernia with a pre-shaped mesh in more than 8,000 surgical procedures for complex and "simple" abdominal and inguinal hernias; over 4,000 cases have been considered in this study. The great majority of these procedures were performed under local anaesthesia and with a complete and careful nerve sparing. Compared to the Lichtenstein's technique, which is currently the golden standard treatment worldwide, there are no significant differences in the observed recurrence rate (below 2%). For the Law of Pascal, the pre-shaped prosthesis developed by Trabucco remains stretched uniformly in the inguinal canal, without the need to be secured with sutures and without forming dead space, which is a cause of infections, pain, and recurrence. The main advantage of a tension-free and sutureless repair is given by the relevant reduction in postoperative chronic neuralgia, which is not an uncommon complication and, depending on its intensity, can also potentially jeopardize a patient's work and social activities. The identification and the sparing of the three nerves of the inguinal region is of crucial importance to reduce the rate of neuralgia in the short and long term. Furthermore, the use of a local anaesthesia imposes the surgeon to properly recognize those nerves and to respect them during the repair. It goes without saying that the complete exposition of the right anatomy of inguinal canal is mandatory. The

intentional section of one or more nerves, when it is not technically possible to achieve a satisfactory nerve sparing, or special tricks to create proper fenestrations (small window) on the edge of the prosthesis to prevent the scar tissue to involve the spared nerves, ensures a further reduction of the rate of neuralgia and excellent patient outcomes. (G Campanelli et al)¹³

P Tarchi et al¹⁴ assessed the early and long-term results after Lichtenstein tension-free repair using a self-adhesive mesh (ParietexProGrip™ - Covidien, Germany) in a single center. The study enrolled 211 patients, 199 males (94.3%) and 12 females (5.7%), mean age 62 years (28-90 years), between January 2008 and December 2011. Of these, 206 had primary inguinal hernias while 5 were recurrences following previous tension repair. Ten different general surgeons, including residents, performed Lichtenstein hernia repair using a 12 x 8-cm ParietexProGrip™ mesh. In 88.1% of patients no additional fixation was used, while in 11.9% a single 2-0 polypropylene stitch was placed on the pubic bone. A 1-10 visual analog scale (VAS) was used to assess postoperative pain, evaluating it at 1 week, 1 month and 12, 24 and 36 months. Local paresthesia was assessed at same intervals. Any pain sensation lasting longer than 3 months postoperatively or requiring injection of analgesics was defined as chronic pain. Mean operating time was 64.1 minutes (SD ± 21.14). 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%). The main follow-up period was 3 years, although patients operated between 2009 and 2011 underwent a shorter follow-up. At one-year follow-up, 17 patients reported groin discomfort, but did not require analgesics. Three patients reported moderate pain, requiring occasional use of oral analgesics, and 2 of these described a discontinuous pain mainly during movement. One patient reported severe pain requiring local injection of analgesics. At 2-year follow-up, 3 patients reported groin discomfort. Five of the 17 patients who reported discomfort at 1 year were lost to the 2-year follow-up. One patient kept reporting a high VAS score (6), though slightly reduced from the previously reported at 1-year follow-up. Recurrence was observed in 0.5% at 1 year and in 2.4% at 2 years. At 3 years only half of the patients (102) were still on follow-up. Of these, 1 reported mild discomfort and 3 developed hernia recurrence. Globally a decrease in pain and local discomfort was observed. No cases of seroma, testicular complications or mesh infection were reported at 1-, 2- and 3-year follow-up. Self-gripping mesh for inguinal hernia repair is a good and safe option, easy to handle and with a low incidence of chronic pain (<3%). A sutureless fixation seems to prevent the development of postoperative chronic pain, without increasing recurrence rates.

CONCLUSION

Based on the aforementioned findings, the authors came to the conclusion that sutureless tension free mesh repair is a successful method for treating inguinal hernia cases. However, additional research is advised.

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