

Original Research Article

A comparative study to evaluate the outcome between open posterior preperitoneal versus open anterior tension free hernioplasty in cases of recurrent inguinal hernia

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ABSTRACT

Background: The ideal method for repair of inguinal hernia would cause minimal discomfort to the patient, both during the surgical procedure and in the postoperative course. It would be technically simple to perform and easy to learn, would have a low rate of complications and recurrence, and would require only a short period of convalescence. However, the most effective method in any given patient is not clearly defined and consequently surgery for recurrent inguinal hernia after mesh repair is usually a difficult operation due to the disadvantage of re-operating through dense fibrotic scar tissue around the mesh with the risk of testicular damage and a large number of local hematoma. To avoid the disadvantage of re-operating through scar tissue and dense fibrotic scar tissue around the mesh, the open posterior pre peritoneal mesh repair was popularized by Nyhus as a good alternative for recurrent inguinal hernias. In previous study, Saber and co-workers reported that open pre peritoneal hernia repair offers many advantages over the trans inguinal repair for recurrent hernia. This approach gives results far superior to those of the commonly used anterior approach.

Methods: Patients in this study were divided consecutively in two main groups: A and B. Group A patients were subjected to open posterior preperitoneal approach, those of group B were subjected to transinguinal anterior tension-free repair. All of our patients were gentlemen with total number was 60 patients; 30 for each group, their ages ranged between 42 and 65 years. The study duration was from January 2009 to January 2011 in department of general surgery, B.J Medical college and civil hospital, Ahmedabad, India.

Results: There was no statistical difference between the two groups regarding patients' age and body mass index. Age ranged between 42 and 65 years with a mean age as 53.5 years. The mean operative time in group A was 71.3 min±25.2 (40-120). In group B, the mean value was 94.5 min±28.5 (60-150). The mean hospital stay was 1- 3 days (2.1 ± 0.8) in group A and 2-6 days (3.7 ± 1.5) in group B. In the other hand, the mean time to return work was 8.2±1.15 (7-10) days in group A while in group B was 11.2 ± 2.3 (7-15) . Therefore, the mean time off from work in group A was 10.3 ± 1.95 days and in group B was 14.9±3.8 (P < 0.05).Chronic postoperative pain was observed in 4 patients in group A (13.33%) , in 9 patients in group B (30%).

Conclusions: In recurrent inguinal hernia, the open posterior approaches are more effective in term of operative outcome. The open pre peritoneal hernia repair offers many advantages. It is inexpensive, has a low recurrence rate, and allows the surgeon to cover all potential defects with one piece of mesh. Postoperative recovery is short and postoperative pain is minimal. This approach gives results far superior to those of the commonly used anterior approach.

Keywords: Recurrent inguinal hernia, Open posterior pre peritoneal approach, Open anterior tension free approach, Hernioplasty

INTRODUCTION

The term 'hernia' derived from the Greek word meaning an offshoot or a bulge. In Latin the word 'Hernia' means to tear or to rupture.¹ A hernia is an abnormal protrusion of a peritoneal-lined sac through the musculoaponeurotic covering of the abdomen.² Abdominal hernias include groin hernia (70%), umbilical hernia (15%), epigastric hernia (7%) and incisional hernia (9%). Most abdominal hernia arises in the groin (from the Latin word inguen, so named inguinal) because it is the transition zone between the abdomen and thigh. Inguinal canal is a potential weak opening in the lower abdominal wall, which allows the passage of blood vessels, lymphatic, vas deference and nerves to enter the scrotum. Approximately 96% of all the groin hernias are inguinal and remaining 4% being femoral.³ Hernia surgeries are basically of three types; herniotomy-excision of hernia sac. Herniorrhaphy-repair of hernia defect with use of anatomical tissue. Hernioplasty- repair of the hernia defect with reinforcement of mesh. All these can be done either through open or laparoscopic surgery. National Library of Medicine term has defined recurrence as "the return of a sign, symptom, or disease after a remission".³

A review of literature published on the recurrence and re-recurrence of tissue repair

Bassini: recurrence, 2.9% to 25% and re-recurrence, 6.5% to 13.4%.

McVay: recurrence, 1.5 to 15.7% and re-recurrence, 2.4% to 5.5%.

Shouldice: recurrence, 0.2 to 2.7% and re-recurrence, 2.9% to 6.36%.

Nyhus: recurrence, 3.2% to 21% and re-recurrence, 9.5% to 27.0%.

An unacceptable recurrence rate and prolonged postoperative pain after tissue repair along with better understanding of the metabolic origin of inguinal hernias led to the concept and acceptance of tension-free hernioplasty with mesh.^{4,20} Francis Usher focused on development of prosthesis and finally introduced a new polymer 'polypropylene'.⁴ In 1989, Lichtenstein introduced the current concept of the "tension free" polypropylene mesh repair and because of that only hernia surgery with mesh is known as "Lichtenstein's tension free hernioplasty".^{5,20} Open pre peritoneal approach originally described by Nyhus and then modified by mesh placement was introduced by Fruchaud H et al in 1956 using a nylon mesh which was fixed to transverses abdominis/internal oblique and Cooper's ligament, which was then popularized by Rives, with slit to cover the cord. To prevent recurrence, five principles of modern hernia repair should be maintained for hernia repair.^{5,20}

- Antiseptic/aseptic operation
- High ligation of the sac
- Tightening of the internal ring
- Reconstruction of the posterior inguinal floor
- Tension free repair.

Objectives

- Study recurrence of inguinal hernia in relation to age of patients, duration of hernia, type of hernia, etc.
- To analyse the time profile for inguinal hernia recurrence and identify risk factors for early and late recurrences.
- Find out various complications of hernia surgery.
- Evaluate surgical modalities to be done i.e open mesh repair or open suture repair, open preperitoneal repair, laposcopic repair after recurrence on the basis of previous surgery.

Recurrent groin hernia

Most recurrences appear within 2 to 3 years of the primary repair and they are called early recurrences due to technical failure and infection. Any recurrences after 2 to 3 years is called late onset and blamed on "tissue failure".

Aetiology for recurrence of hernia are:

Types of hernia

Sliding hernia, very large and long standing direct hernia.

Patients

Chronic bronchitis, chronic dysuria, chronic constipation, long malgaigne's bulging.

Operative failure

Failure to ligate the sac at neck, Tension in sutures and missed hernias, absorbable suture material, infection.

Postoperative care

Infection, lifting heavy weights, persistent cause of increase intra abdominal pressure.

Recurrence after open mesh repair can be grouped in two categories: 1) material-related causes and 2) technique-related causes.

Material-related causes

Mesh shrinkage

According to our clinical and laboratory studies reported in 1995, after implantation in vivo, mesh shrinks by

approximately 20%. Shrinkage of mesh can lead to recurrence of hernia. Recurrence, however, can be prevented by extending the mesh well beyond the boundary of the inguinal floor.

Mesh deformity related to the textile engineering of the mesh

Certain structural designs of meshes leads to narrowing of the mesh in the perpendicular direction of stretching the mesh. As a result the narrowed centre of the mesh can pull away from its attachment to the host tissue and lead to recurrence.

Technique-related causes

- Failure to extend the mesh for approximately 1.5-2.0 cm medial to the pubic tubercle, 4-5 cm above the inguinal floor and 5-6 cm lateral to the internal ring.
- Failure to keep the mesh slightly relaxed or buckled up to account for forward protrusion of abdominal wall in response to increased intra-abdominal pressure when the patient stands up from the surgical supine position and begins routine daily activities.
- Inadequate mesh fixation that can lead to wrinkling of the mesh and recurrence of hernia.

METHODS

Patients in this study were divided consecutively in two main groups: A and B. Group A patients were subjected to open posterior preperitoneal approach, those of group B were subjected to transinguinal anterior tension-free repair. All of our patients were gentlemen with total number was 60 patients; 30 for each group, their ages ranged between 42 and 65 years. The study started from January 2009 to January 2011 in department of general surgery, B.J. Medical College and Civil hospital, Ahmedabad, India. The study included all patients having unilateral recurrent inguinal scrotal and irreducible hernias. Patients with primary inguinal hernia, patients with marked obesity (BMI >35) and ASA grade 3 and beyond were excluded.

Operative techniques

The open pre peritoneal approach to the inguinal region was performed under general or regional anaesthesia, as originally described by Nyhus.⁷ Through a lower abdominal transverse incision, the anterior rectus sheath was incised and the rectus muscle reflected medially. The pre peritoneal space was cleaved with blunt dissection, exposing the myopectineal orifice. The cord was explored and the hernias were reduced. A 15 ×15 cm² polypropylene mesh with a slit was inserted in the pre peritoneal space and fixed with non-absorbable sutures to pubic tubercle and Cooper's ligament. The mesh was passed behind the cord and manipulated to lay flat against

the posterior inguinal floor overlapping the entire myopectineal orifice.

The anterior tension-free repair, as defined by Lichtenstein et al, was performed using 6×11 cm² polypropylene mesh.⁶ Large pore-sized (1.6 mm), monofilament heavy-weight polypropylene meshes were used.

End points

The primary end point of the study was the recurrence of the hernia, defined as a clinically detectable characteristic swelling in the groin and diagnosed by two authors. The secondary end points were time off from work, defined as the number of days between the day of surgery and the first day a patient returned to work, postoperative pain, scrotal swelling, and wound infections. Regarding the postoperative pain, we considered the visual analog scale pain score, prosthesis awareness and return to normal physical activity. Chronic pain was defined as pain lasting more than 3 months and was studied in relation to age, body mass index and operative procedure.⁶

Here we used the already adopted simplified scoring system by Saber et al for the method of pain assessment. This system is a 3-scale system; with maximum score as 7 points and minimum as 2 points.⁶

- Analog scale pain score (1-10): mild (1-4) = 1 point, moderate (5-7) = 2 points, severe (8-10) = 3 points.
- Prosthesis awareness: Yes = 1 point, no = 0 point.
- Physical activity: Pain only on exertion = 1 pain limits some daily activity = 2, disabling pain.

The statistical analysis were done by using the Statistical Package for Social Scientists (SPSS) for windows and chi-square test, paired student t-test. P < 0.05 was considered significant.

RESULTS

There was no statistical difference between the two groups regarding patients' age and body mass index. Age ranged between 42 and 65 years with a mean age as 53.5 years. Follow-up assessment was at the 1st week after discharge then at 1st month and through regular visit of 6 months duration or by a telephone call thereafter. Follow up included patients' complaint, if any, clinical examination and ultrasonography if needed. The maximum follow-up period was 60 months and the minimum was 22 months with a mean value as 41±26.87 months. A complete follow-up was obtained in 28/30 (93.3%) of patients in group A, 27/30 (90%) of patients in group B.

The mean operative time in group A was 71.3 min±25.2 (40-120). In group B, the mean value was 94.5 min±28.5 (60-150). The mean hospital stay was 1- 3 days (2.1±0.8) in group A and 2-6 days (3.7±1.5) in group B. In the

other hand, the mean time to return work was 8.2 ± 1.15 (7-10) days in group A while in group B was 11.2 ± 2.3 (7-15). Therefore, the mean time off from work in group A was 10.3 ± 1.95 days and in group B was 14.9 ± 3.8 ($P < 0.05$). Chronic postoperative pain was observed in 4 patients in group A (13.33%), in 9 patients in group B (30%) (Table 1).

Table 1: Detailed descriptions of results in the two groups with corresponding p-values.

Points	Group A	Group B	P-value
Operative time	40-120 min (71.3 ± 25.2)	60-150 min ($94.5 - 28.5$)	NS
Hospital stay	1-3 days	2-6 days	$P < 0.05$
Time off from work	10.3 ± 1.95	14.9 ± 3.8	-
Pain score	2.1	3	$P < 0.003$
Early complications	5	8	NS
Late complications	-	1	NS
a-Testicular atrophy	-	1	-
b-Hernia recurrence	-	-	-

DISCUSSION

The ideal method for repair of inguinal hernia would cause minimal discomfort to the patient, both during the surgical procedure and in the postoperative course. It would be technically simple to perform and easy to learn, would have a low rate of complications and recurrence, and would require only a short period of convalescence.⁸ However, the most effective method in any given patient is not clearly defined and consequently surgery for recurrent inguinal hernia after mesh repair is usually a difficult operation due to the disadvantage of re-operating through dense fibrotic scar tissue around the mesh with the risk of testicular damage and a large number of local hematoma.^{6,9}

To avoid the disadvantage of re-operating through scar tissue and dense fibrotic scar tissue around the mesh, the open posterior pre peritoneal mesh repair was popularized by Nyhus as a good alternative for recurrent inguinal hernias.⁷ In previous study, Saber and co-workers reported that open pre peritoneal hernia repair offers many advantages over the trans inguinal repair for recurrent hernia.¹ This approach gives results far superior to those of the commonly used anterior approach.

In the present study, we found that the time of hospital stay and sick leaves and accordingly the time off from work all were reduced in patients with open posterior pre peritoneal approach compared with the anterior approach and the difference was statistically significant. Many

studies of same interest reported less hospital stay and rapid return to physical activity.^{6,9}

Chronic postoperative pain is strongly related to two main patient-related factors; age and body mass index or three surgery related factors such as surgery for recurrence with anterior approach, operations performed in specialist hernia centers, and finally the experience of the surgeon.¹ The Open pre peritoneal approach in the present study significantly reduced the final chronic pain score per patient in comparison with the anterior trans inguinal approach and our data came in concordance with studies of same interest.⁸

There are many studies traced patient age in relation to occurrence chronic pain and found that the risk of chronic pain decreased with increasing age.^{6,10,11} Our data regarding this point came in concordance with these reports. The BMI is another studied factor for chronic pain occurrence where many investigators found good correlation between less BMI values and chronic pain.^{6,11,12} And our data in the present study supported these finding.

The postoperative complications of hernia repair were estimated regarding the rate and traced regarding the type in similar previous studies as early and delayed forms.¹ Early complication, defined as that occurring within 1 month of surgery, are wound seroma, sepsis, scrotal edema and hematoma formation while the long-term complications, assessed at 3 months are testicular atrophy and recurrence.^{6,16} In published literatures, the overall postoperative complication rates were 18-38% and may reach as high as 49.7% in some series and in our study, the overall complication rate was 16.6% in group A and 26.6% in group B due to more tissue dissection and manipulation.¹³

Wound hematoma and superficial wound infections are the most common problems in previous series and serious complications, such as major hemorrhage, pubic osteitis and testicular atrophy, occur in less than one percent of patients undergoing herniorrhaphy.¹³ Minor complications such as seroma formation, wound sepsis, and scrotal hematoma were seen in both groups in the present study but with more incidence in group B. This observation met with data reported by other investigators.⁶⁻¹¹ Long term complications such as testicular atrophy and recurrence were traced by many researchers who reported 0% incidence for testicular atrophy and 0% or very low incidence (1.5%) for recurrence in their studies.^{6,11,14} While others found 4.38% hernia recurrence after posterior pre peritoneal repair 10% in the open anterior approach.^{15,16,20} While other data ranged between 2% and 14%.^{8,13,14} Accordingly, we found that recurrence rate was statistically insignificant in both groups and this finding met with other data in published literatures.^{8,21} Testicular dysfunction, atrophy and necrosis as a result of ischemic orchitis is a well-known complication after anterior

inguinal hernia repair with 1% occurrence following primary herniorrhaphy and 5% in recurrent cases.^{17,18} But in open pre peritoneal repair, the procedure is safe as it effectively eliminates testicular complications.¹ A significant decrease in testicular volume and less improvement in blood flow is seen after open repair where there is significant reduction in serum testosterone, follicle stimulating (FSH), and leutinizing (LH) hormones level.¹⁹

Testicular ischemia and necrosis are thought to be due to acute thrombosis of the pampiniform venous plexus rather than arterial injury, as there is collateral arterial flow to the testis from the inferior epigastric, vesical, prostatic, and scrotal arteries. Testicular atrophy is thought to be more common after open procedures particularly recurrent inguinal hernias due to greater manipulation of the spermatic cord beyond the pubic tubercle and during dissection of the distal hernia sac.¹⁷ According to these finding, we found that no testicular atrophy was seen in patients of group A but seen in one patient of group B (3.3%) due to operating within the fibrotic field with tissue reaction around the mesh.

CONCLUSION

In recurrent inguinal hernia, the open posterior approaches are more effective in term of operative outcome. The open pre peritoneal hernia repair offers many advantages. It is inexpensive, has a low recurrence rate, and allows the surgeon to cover all potential defects with one piece of mesh. Postoperative recovery is short and postoperative pain is minimal. This approach gives results far superior to those of the commonly used anterior approach.

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