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MINIREVIEWS

# Current trends in laparoscopic groin hernia repair: A review

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## Abstract

Hernia is a common problem of the modern world with its incidence more in developing countries. Inguinal hernia is the most common groin hernia repaired worldwide. With advancement in technology operative techniques of repair have also evolved. A PubMed and COCHRANE database search was accomplished in this regard to establish the current status of laparoscopic inguinal hernia repair in view of recent published literature. Published literature support that laparoscopic hernia repair is best suited for recurrent and bilateral inguinal hernia although it may be offered for primary inguinal hernia if expertise is available.

**Key words:** Laparoscopic hernia repair; Lichtenstein repair; Day care surgery; Open hernia repair; Inguinal groin hernia



**Core tip:** This review compares the laparoscopic hernia repair to conventional open hernia repair techniques in terms of cost, recurrence, procedure related morbidity and quality of life of the patient. Recent published literature has been included in this regard to focus on if any supremacy exists between the two approaches.

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## INTRODUCTION

Hernia is a common problem of the modern world with an incidence ranging from 5%-7%. The prevalence of hernia is far greater in developing countries like India amounting to a major health care burden. Of all groin hernias, around 75% are inguinal hernias[1,2]. The repair of the groin hernia is therefore a commonly performed surgery worldwide.

Operative techniques have evolved continuously over the past decades establishing tension free mesh repair as standard of care for inguinal hernia management. A PubMed and COCHRANE database search was accomplished in this regard to establish the current status of laparoscopic inguinal hernia repair in view of recent published literature.

The groin is a naturally occuring defect in the ante-

rior abdominal wall. This weak muscular area in the inguinal region has been named after surgeon and anatomist Henri Fruchaud. The anatominal extents of this myopectineal orifice are as follows: cranially and medially this is bordered by the conjoined tendon and the rectus abdominis muscle, laterally by the iliopsoas muscle and caudally by the superior ramus of the os-pubis. This area is covered by the fascia transversalis, split in two by the inguinal ligament, and penetrated by the spermatic cord (in men)/round ligament (in women) and femoral vessels. The integrity of the area is hence primarily depends on fascia transversalis, whose failure to sustain the preperitoneal fat and varying intraabdominal pressure is therefore the fundamental cause for formation of congenital or acquired inguinal hernia. Inguinal hernias are treated by repairing the fascial defect in the myopectineal orifice of Fruchaud or by strengthening the weakened fascia transversalis by placement of a prosthesis (mesh).

## CONSERVATIVE TRIAL *VS* SURGERY

Inguinal hernia is a disease of benign nature and follows a fixed course but their complications are dramatic and frequent. Surgical repair done under emergency conditions has higher recurrence and is associated with increased morbidity and mortality[3,4]. Hence, a repair in elective setting is always preferred. Open repairs applying principles of Pascal's law include tension free like Lichtenstein repair, which can be done under regional anaesthesia in a safe and economic way[5,6]. Recently with advancement in laparoscopy, endoscopic repairs seems to offer better quality of life, decreasing hospital stay and early return to work. Henceforth every possible attempt should be made for early repair of inguinal hernia if no addded comorbidity is present[7,8]. A few of asymptomatic elderly individual, not fit for surgery can be advised conservative management.

## ANAESTHESIA

Till date all anaesthetic techniques have been used to undertake the operative repair safely. General anaesthesia was the most common method used in early days but in recent past it has been replaced by regional anaesthesia[9]. Few benefits of regional anaesthesia include: (1) A conscious patient at the operating table. Patient can cough to increase the intra-abdominal pressure thereby checking the effectiveness or repair; and (2) Lesser time spent in the operating room, lower incidence of nausea, fewer requirements of post operative analgesia and early discharge on a day care basis[10].

However general anaesthesia is still the method of choice for undertaking endoscopic/laparoscopic inguinal hernia repairs.

## TYPES OF REPAIR

Herniorrhaphy techniques include: Bassini repair; Shouldice repair; McVay repair.

Hernioplasty techniques include: Anterior (Lichtenstein repair; Plug and patch repairs; Double layer hernia repair); Posterior (pre-peritoneal) repairs {Rieves repair; Stoppa repair; Laparoscopic/endoscopic repair [Total extra peritoneal repair (TEP); Trans abdominal pre peritoneal repair (TAPP)]}.

Among these various methods prosthetic repairs have established their supremacy over repairs withour using prosthesis. A recent metaanalysis published in cochrane has revealed that Shouldice herniorrhaphy is the favoured non prosthetic technique comparing recurrence but it lacks favour on terms of operational time and hosptial stay[11,12]. Concluding, lower recuurence rates have been established for mesh repair techniques compared to tissue repair techniques alone.

Recent European hernia society guidelines state that none of the alternative mesh techniques except for Lichtenstein and endoscopic techniques have received sufficient scientific evaluation to be recommended[13]. American college of surgeons and National Institute of Clinical Excellence consider Lichtenstein repair as gold standard open repair[4,14,15]. However tissue repairs are a viable alternative in females because of the more durable transversalis fascia[16] and in emergency repairs where use of mesh is associated with increased surgical site infections[17,18].

Minimal access surgical repairs also provide very promising results if surgeon has technical expertise. It results in minimum postoperative pain, reduced wound infection and early return to work[19]. A Cochrane review between TEP and TAPP repair found the above said approaches are equal in terms of considering duration of operation, hematoma, length of hospital stay and rate of recurrence[20]. European hernia society guidelines promote TEP as a preferred method of repair to TAPP in the case of minimal access (endoscopic) surgery[13].

## LAPAROSCOPIC REPAIR *VS* OPEN SURGERY

In recent times a rousing debate is brewing between open and endoscopic prosthesis repairs for the preferred approach status. Open and minimal access surgcal (laparoscopic/endoscopic) techniques have been compared in a number of studies in published literature. To begin with, cost factor remains a burning issue in pulling down the laparoscopic repairs as thery involve high cost compares to open repair. Hynes *et al*[21] has stated that laparoscopic repair amounts to an average of $638 more compared to open surigcal techniques in North America. Similarly, McCormack *et al*[22] showed that laparoscopic repair is exorbitant to the health service compared to open surgical repair by approximately 300-350 pounds per patient. A Swedish study has demonstrated that the total hospital cost was 710.6 Euro higher for TEP repair which would increase to 795.1 Euro when the added bills due to recurrences and complications within 5 years were acknowledged[23].

Similarly Khajanchee *et al*[24] reported a cost difference of $128.58 for a TEP repair. The cost-minimization analysis, including complications, reoperations and community costs during follow-up of 5 years, in a randomized trial showed that laparoscopic inguinal hernia repair had a small but significant increase in overall costs compared with open repair[23]. Above all financial burden on the patient and high infrastructal cost has been a limiting factor specially in developing countries.

A systematic review by McCormack *et al*[22] comparing laparoscopic and open repairs has revealed no apparent difference in recurrence. Laparoscopy seems to cause less persisting pain and numbness. Return to normal day to day activities is also faster[25]. However, operation time using laparoscopy technique is longer and there appears to be a higher risk of serious complication rate in respect of visceral (especially bladder) and vascular injuries[26].

In the similar systematic review, on further comparing complications of laparoscopic repair to open repair, it was evident that laparoscopic repairs are associated with overall more incidence of seroma formation. On the other hand there are less frequent chances of hematoma formation (more in TEP patients) and wound/superficial infections but there has been a heterogenity in data to deduce a final statement[26]. Other complications related to laparoscopic hernia repair, although in lower frequency, include trocar site hemorrhage and/or herniation, and injury to the epigastric or gonadal vessels[25]. Complications related to use of laparoscopy and less to surgeon technique are hypotension secondary to elevated intra-abdominal pressure, hypercapnia, subcutaneous emphysema, pneumothorax, and increased peak airway pressures[25].

A large number of hernia repairs are still done with open technique as endoscopic repairs have a steep learning curve and requires costlier infrastructure[27]. Despite a few hurdles, endoscopic repair is becoming a preferred approach specially for bilateral and recurrent hernias.

## TYPES OF MESH

Types of mesh includes synthetic: Heavy weight (density > 100 g/m$^2$) [Polypropylene; Polyester; Light weight (density 35-50 g/m$^2$); Non absorbable (Plain polypropylene; Coated polypropylene; Partially absorbable: Polypropylene + polygalactin; Polypropylene + polyglycaprone)] and Biological.

Use of meshes has decreased the rate of recurrence to a significant extent but complications related to these prostheses have been reported in published literature.

Since mesh is a foreign antigen, theoritical reasoning supports the notion of increased chances of infection but practically this complication is well taken care of. Standard polypropylene mesh is most frequently used because of low cost, easily availability and reasonable strength to avoid recurrence[28].

Foreign body sensation and chronic postoperative pain have discouraged the regular use of established polypropylene mesh. Newer light meshes have been developed to overcome these problems but they are fairly expensive and only reduce the foreign body sensation without significant difference in recurrence rate compared to heavyweight mesh[29-31]. Biologic meshes, on the other hand may gain importance in future as they have been proposed to be advantageous in contaminated areas but they are extremely expensive, not widely available and studies supporting use of biologic meshes is limited which needs further in depth analysis[32,33].

Hence conentional polypropylene mesh is a trustworthy option for inguinal hernioplasty. On the other hand, lightweight meshes may be considered based on patient's affordability and surgeon's discretion.

## CONCLUSION

Patients with no atendent comorbidities with asympatomatic inguinal hernia at presentation should be offered hernia repair. Laparoscopic hernia repair is best suited for recurrent and bilateral inguinal hernia although it may be offered for primary inguinal hernia.

Mesh Repair is associated with the lowest recurrence rates with pain being the most common complication of hernia surgery.

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