Original Research Article

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A comparative study of totally extraperitoneal versus transabdominal preperitoneal repair of inguinal hernias

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ABSTRACT

Background: The two common procedures which are nowadays commonly performed for laparoscopic repair of inguinal hernia are transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) mesh repair. This retrospective study was aimed to compare these two, TAPP and TEP laparoscopic approaches for inguinal hernia repair in terms of various outcomes.

Methods: In this retrospective study, we included 50 cases of inguinal hernia who underwent laparoscopic approach of inguinal hernia repair at Saveetha medical college and hospital between 2014 and 2016 for a duration of 3 years. Various parameters including the age, sex of patient, type of hernia, preoperative and post-operative complications, duration of hospital stay was analysed.

Results: Of the 50 patients who underwent laparoscopic repair, 26 patients underwent TEP and 24 patients under went TAPP procedure. 31 cases were indirect inguinal hernias and 30 cases were direct inguinal hernias, totalling 61 hernia repairs, as 11 patients had bilateral hernia. One female inguinal hernia and 4 cases of recurrent hernia were operated by TAPP method. Postoperative complications like seroma formation; subcutaneous emphysema was seen in TEP group. Two cases of TEP were converted to TAPP and open lichenstein procedure. Postoperative pain was less in both the group. Patients who underwent TEP procedure spent less time in the hospital compared to those who underwent TAPP procedure.

Conclusions: There is no major difference in the outcome after TEP and TAPP surgeries except for some minor complications and the results are comparable in both techniques TAPP and TEP. Both the procedures can be practiced according to surgeon's familiarity of the procedure.

Keywords: Hernioplasty, Inguinal hernia repair, Laparoscopic hernia repair, TAPP, TEP

INTRODUCTION

In general, surgical practice, Inguinal hernia repair is one of the commonly performed procedure. Over a hundred years the methods for inguinal hernia repair had very few changes till synthetic mesh was introduced. Francis Usher introduced polypropylene.¹

The aims of successful hernia repair include, achieving an effective repair with lowest possible recurrence rate, minimal per and postoperative complications, rapid return to normal work, and performing a cost-effective procedure. To achieve these goals, various methods of repair have been employed which have progressed from open repair to various laparoscopic approaches.²

Laparoscopy brought a new change in approach towards treating inguinal hernias. So there is always a controversy in the literature regarding the approach for treatment of inguinal hernias.³⁻⁵ The first cases of minimally invasive inguinal hernia repair were reported in 1992.⁶ Arregui described the transabdominal preperitoneal prosthetic

(TAPP) procedure as a method for repair for inguinal hernias.^{6,7} TAPP procedure includes creation of pneumoperitoneum, inspection of inguinal orifice on both the sides, incising the peritoneum and gaining access to preperitoneal layer. Myopectineal orifice of fruchard is defined and hernia sac tackled. Finally mesh placed covering all the three orifices. Fixation of mesh defers from surgeon to surgeon.

In 1993, the totally extraperitoneal prosthetic (TEP) repair was introduced by McKernan and Laws.⁸ This procedure involves dissection of preperitoneal space without entering the peritoneal cavity. Exploration of myopectenial orifice is done along with dissection, reduction of sac and mesh placement with fixation.

The quality of life indicators assessed by the postoperative pain, hospital stay and return to work strongly favours tension free repair and laparoscopic repair. Between these two approaches, laparoscopic inguinal hernia repair has advantages over open inguinal hernia repair in terms of early return to work, less postoperative pain, low incidence of wound infection. But between these two types of laparoscopic hernia repairs – TEP (totally extra peritoneal) and TAPP (trans abdominal pre-peritoneal) repair, there has been always a debate as to which laparoscopic procedure is more effective than the other. The purpose of this study is to compare the results of these two procedures.

METHODS

This is a retrospective study of 50 cases of Inguinal hernia patients, above the age of 18 years, who underwent Laparoscopic hernia repair of 59 inguinal hernia (11 patients had bilateral hernia) at Saveetha Medical college and hospital, a tertiary care teaching hospital at Chennai, India, during the past 3 years, 2014 to 2016.

Patients with complicated inguinal hernia and patients who had undergone any other surgical procedure along with Laparoscopic hernia repair at the same sitting, were excluded. Uncomplicated hernias were only included in this study. The age and sex of the patient, co morbidities, type of hernia, unilateral or bilateral, primary or recurrent hernia, ASA status, surgical complications, duration of stay, time to return to work were analyzed.

26 patients had undergone TEP procedure and 24 patients had undergone TAPP procedure. Both TAPP and TEP were done by standard procedural guidelines. Three trocar technique was used. In TEP all 3 trocars were introduced in midline and initial space creation was done with 0-degree Telescope and later changed to 30-degree telescope. In TAPP, supraumbilical optical port and two 5mm working ports were introduced, at the level of optical port on side of hernia and slightly lower on the contralatral side. Non-absorbable prolene mesh of size 15 X 10 cm was used in all cases and fixation done with non-absorbable tackers. One to two tackers were used in

TEP and 3 to 4 Tackers in TAPP method. Mesh was secured in place by fixing it to pubic tubercle and anterior abdomen wall muscles. In TAPP the peritoneum was closed by suturing technique. The procedure was performed by two senior surgeons in the level of associate Professor trained in laparoscopy.

Parameters assessed were the complication rate, postoperative pain, post-operative hospital stay and time to return to work post-surgery. The pain was measured qualitatively by using a visual analog scale. The Anaesthetic, intra operative and post-operative complications was noted in a profroma during the hospital stay and as well as in follow up visit. Duration of hospital and time to return to work were also recorded.

RESULTS

Out of the 50 cases, 26 patients underwent TEP procedure and 24 patients had undergone TAPP procedure.

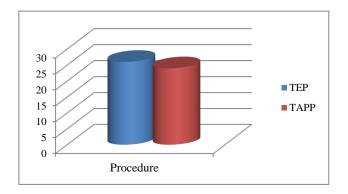


Figure 1: Types of procedure.

The patients who underwent TEP procedure were in the age group of 20--70 years, and that in TAPP group were of 20-60 yrs. In elderly patients TEP procedure was preferred more than TAPP procedure. Avoiding pnemoperitoneum might help in reducing the morbidity created due to pnemoperitoneum in old age group patients. Among the 50 patients in the study group, there was only one female inguinal hernia patient, rest all were male patients. Defect was repaired by TAPP procedure.

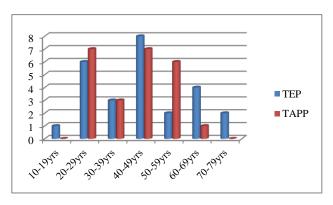


Figure 2: Age distribution.

Type of hernia

Out of the 50 patients, 39 patients (78%) had unilateral inguinal hernia and 11 patients (22%) had bilateral inguinal hernia. All patients with bilateral hernia have undergone TEP procedure. In TAPP procedure Opening and closing of the peritoneum has to be done on both the sides can be avoided in TEP procedure. 4 patients had recurrent inguinal hernia. Recurrent hernias were on one side only. All of them had been operated by TAPP technique.

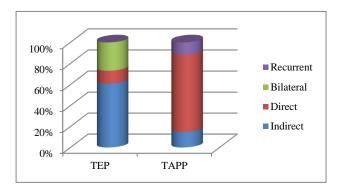


Figure 3: Type of Hernia.

ASA

All patients operated laparoscopic for inguinal hernia were ASA (American Society of Anesthesiology risk class) I and II. Comorbidities were represented by blood high pressure, obesity, diabetes mellitus type 2, benign prostate hypertrophy and different articular disease.

Table 1: Preoperative data of the patients in TEP and TAPP (n=number of patients).

Category	TEP (n=26)	TAPP(n=24)
Age (yrs)	45 (20-70)	41(20-60)
Sex (male: female)	26:0	24:1
ASA I:II	16:10	15:11
Unilateral: Bilateral	15:11	24:0
Recurrent Hernia	Nil	4
Direct: indirect	23:15	7:16

Intra operative data

Sac management: All complete indirect sacs were dissected and transected just deep to the deep ring. Incomplete sacs were fully reduced. Direct sac was reduced and inverted and fixed to the pubic tubercle with a tacker. This avoids the formation of seroma in a direct hernia site postoperatively. Accidental pnemoperitoneum was encountered in 5 cases of TEP. Of this in 3 cases pneumoperitoneum was managed by inserting a vareesee needle at the palmer's point. In the remaining 2 cases a 3mm trocar was inserted at palmer's point as vareese was not adequately decompressing the pnemoperitoneum. Conversion of TEP into TAPP was done in one case due

to multiple rents in the peritoneum. One case of TEP was converted to open lichensteins procedure due to anesthesia complication. No case of TAPP was converted. No peroperative complication were encountered during TAPP procedure including visceral injury (bowel, bladder), vascular injury.

Table 2: Intra-operative data.

Complication	TEP	TAPP
Visceral injury	Nil	nil
vascular injury	Nil	Nil
conversion	1 (to TAPP)	Nil
	1 (to open)	
Accidental	5	Not
pnemoperitonem		applicable

Postoperative data

Seroma of the inguinal region happened in 3 cases of direct hernia (11% incidence). TEP procedure was performed in all these cases. Seroma of the scrotum happened in 3 cases of complete indirect hernias (9.6% incidence). TAPP procedure was performed in all these 3 cases. Subcutaneous emphysema was seen in 5 cases of TEP. Especially in patients more than 60yrs of age. This incidence reduced by pluging the gap around the 10mm port site with saline socked gauss.

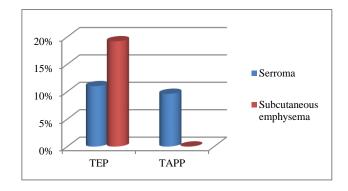


Figure 4: Post-operative complication.

Postoperative pain and hospital stay

Pain score was recorded on the 1st and 3rd postoperative days using the Visual analog scale for pain assessment. On 1st POD the average pain score in both the groups were 4.5. and on the 3rd POD the average pain score was 3 in both the groups. There was no significant difference in pain score between the two groups. Patients who underwent TEP were discharged on an average of 3.5 days. Whereas patients in TAPP group were discharged on an average of 4.5days postoperatively.

DISCUSSION

Most of the cases in our study were male patients. Only one patient was female and she has undergone TAPP

procedure. The European Hernia Society has recommended that laparoscopic approach is the preferred one for female hernia. Because the chances of finding a femoral hernia is better and repair of the defect with the preperitoneal mesh placement is better.¹⁰

The incidence of bilateral inguinal hernia has been variably reported in literature. Reports from cross-sectional studies and cohort of adult patients report an incidence of bilateral hernia up to 6% when clinical examination alone was used for diagnosis. In paediatric population, the incidence of bilateral hernia is higher with routine contra lateral exploration. Before the advent of laparoscopic surgery routine contra lateral exploration for bilateral hernias was not practiced in adults and no further discussion was needed. TAPP has led to an increase in the detection of incipient contra lateral hernias. A 20% increase in detection rates has been reported with use of laparoscopy over and above routine clinical examination.

Besides detecting contra lateral inguinal hernias, laparoscopic hernia repair was reported to aid in the detection of other hernias like incisional, Spigelian, obturator and femoral hernias, especially in cases of TAPP. The discovery of contralateral hernias is a certain advantage; another additional benefit is the exclusion of hernias in those patients with an equivocal clinical examination, particularly with the use of TAPP procedure. The service of the service of

In present study, we had a 22% incidence of bilateral inguinal hernia and all were diagnosed preoperatively. Routeine contralateral exploration of inguinal hernia site was done only in TAPP procedure. In TEP, contralateral side was not explored. No case of occult contralateral hernia was dignosed per operatively during the surgery for unilateral inguinal hernias. In present study of the 61 inguinal hernias, 31 were indirect hernias (50.81%) and 30 (49.1%) were direct hernias. Depending on the relationship to inferior epigastric vessels, an inguinal hernia can be direct or indirect. It has been well established that indirect inguinal hernia is most common abdominal hernia. ¹⁶

We had a 10% incidence of seroma in cases of direct. TEP procedure had been performed in these cases. After the sacs were inverted and tacked to the pubic tubercle, this problem didn't happen. The incidence of seroma in indirect hernias was 9.6%. All these cases were complete hernias, and underwent TAPP procedure. Indirect sac was transected just beyond the deep ring and distal sac was left behind. Seroma was managed conservatively. No significant difference between TAPP and TEP procedure was present regarding seroma formation. Lau et all found that significant clinical factors associated with seroma formation included old age, large hernia defects, an extension of the hernia into the scrotum, and the presence of a residual distal indirect sac.¹⁷ One case TEP was converted to TAPP procedure due to multiple rents in the

peritoneum. Even after insertion of vareese needle for decompression at palmer's point adequate preperitoneal space could not be attained for repair. One case of TEP procedure was converted to open Lichtenstein procedure due to anaesthesia complication and incomplete muscle relaxation; there was an inability to create a proper working space. Anesthesiology team should work along with surgeons for completing the procedure successfully.

There was no significant difference in the postoperative pan scoring between TEP and TAPP group. One of the major advantages of laparoscopic repair of inguinal hernia is a substantial reduction in postoperative pain. Most of the previous studies are in favour of similar pain scores in the immediate postoperative period in both the TEP and TAPP procedures. ^{18,19}

Present study demonstrated that TEP repair had shorter hospital stay as compared to TAPP. In the Meta-analysis by Bracale et al, there was a significantly longer postoperative hospital stay in the TAPP group, similarly Gass et al. also found a significantly longer hospital stay in the TAPP group.^{20,21}

CONCLUSION

Laparoscopic surgery for hernia is a strong option for repairing inguinal hernias, despite the long learning curve needed; it is feasible, safe, and provides good satisfaction to the patients. Differences between TEP and TAPP in our study were related to minor complications, no major complications occurred. Both the procedures can be practiced per surgeon's familiarity of the procedure.

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institutional ethics committee

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