Original Research Article

Comparative study of complications following laparoscopic TEP versus TAPP versus open hernioplasty in inguinal hernia repair

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Abstract

Background: Hernia repairs, both inguinal and ventral/ incisional, are some of the most common surgeries performed in the world. Over the last 5 years, the field of hernia surgery has had a significant transformation thanks to many new and innovative surgical techniques as well as exponential growth in mesh and mesh technology.

The aim of the study: To compare the intraoperative complications of TEP vs TAPP vs open hernioplasty in terms of operative time, major visceral or vessel injury and conversion rates.

Materials and methods: This study was conducted in the Department of General Surgery, Government Stanley Medical College, and Chennai in 2018. 75 patients (25 cases of open hernioplasty, 25 cases of TAPP, 25 cases of TEP). Post-operative pain was recorded based on Visual Analog Scale and requirement of analgesics. Post-operative complications like urinary retention, wound seroma, wound hematoma, wound infection, port site infection, recurrence, mesh infection, bowel complication was collected with clinical examination and complications recorded.

Results: The study involved 75 male patients who satisfied the inclusion criteria. 25 patients were subjected to Lichtenstein tension-free open hernioplasty, 25 treated with TEP, and another 25 subjected to TAPP. Among the 75 cases studied 21 cases were found to have left sided inguinal hernia, whereas 54 cases were having right sided hernia. Intraoperative complications like major vessel injury or bladder injury were observed. No intraoperative complications were encountered

during the study period in any of the groups. Post-operative urinary retention was found only in two cases of Lichtenstein tension-free open hernioplasty and this required bladder catheterization. All cases of laparoscopic hernioplasty were catheterized intraoperatively and catheter retained till post-operative day 1, hence urinary retention could not be assessed. The post-operative pain was measured using the Visual Analog Scale (VAS) 6 hours after the surgery. The patient was given a dose of Injection Tramadol 100mg in after the surgery. The pain scores were analyzed with Chi-square and the difference found to be statistically significant. Lichtenstein tension-free open hernioplasty was found to have increased postoperative pain when compared to laparoscopic repair. Among the laparoscopic repair, TAPP was found to have increased postoperative compared to TEP. The post-operative hematoma was observed in a single case of Lichtenstein open hernioplasty. The hematoma was in the subcutaneous plain and required drainage.

Conclusion: Primary unilateral inguinal hernia without complications can be treated with Lichtenstein tension-free open hernioplasty or laparoscopic transabdominal preperitoneal hernioplasty or laparoscopic totally extraperitoneal hernioplasty. Lichtenstein open hernioplasty has an advantage over laparoscopic repair in terms of shorter duration of surgery and learning curve.

Key words

Preperitoneal hernioplasty, Lingual hernia, Post-operative complications, Visual analog score.

Introduction

Hernia repairs, both inguinal and ventral/incisional, are some of the most common surgeries performed in the world. Over the last 5 years, the field of hernia surgery has had a significant transformation thanks to many new and innovative surgical techniques as well as exponential growth in mesh and mesh technology [1]. Increased focus on hernia surgery has led to improved research and outcomes data and has provided strategies to treat both simple and complex hernias [2]. Secondary to the increased complexity of patients and new techniques and mesh products available, there has been a renewed interest in hernia surgery amongst the general and plastic surgery community. The inguinal hernia was repaired laparoscopically soon after the establishment of laparoscopic cholecystectomy as the gold standard for cholelithiasis [3]. However, unlike laparoscopic cholecystectomy, which was very quickly accepted by the surgical community, laparoscopic hernia repair has remained a contentious issue since its inception [4]. The early laparoscopic techniques of plugging the internal ring with mesh or simply closing the ring with staples were surgically unsound and were quickly abandoned when early trends showed a high recurrence rate. The laparoscopic method of tension-free mesh repair appeared to be gaining in popularity in the early 1990s among the enthusiasts [5]. Early uncontrolled studies claimed that laparoscopic repair was superior to the conventional open repairs regarding postoperative pain, resumption of normal activities, and return to work, Real controversy started in 1990, when laparoscopic Tension-Free repair came in to vogue and was routinely advocated and aggressively marketed by promising less pain and shorter recovery period, but the things in the small prints were completely ignored [6]. The most scientific way to come to conclusion over the superiority of one method over other is evidence-based medicine. Laparoscopic mesh repair cannot be compared with open tissue repair. So, the comparison should be between laparoscopic mesh repair and open mesh repairs [7].

Materials and methods

This study was conducted in the Department of General Surgery, Government Stanley Medical College, and Chennai in 2018. 75 patients (25 cases of open hernioplasty, 25 cases of TAPP, 25 cases of TEP) Post-operative pain was recorded based on Visual Analog Scale and requirement of

analgesics. Post-operative complications like urinary retention, wound seroma, wound hematoma, wound infection, port site infection, recurrence, mesh infection, bowel complication was collected with clinical examination and complications recorded.

Inclusion criteria: All cases of primary uncomplicated unilateral direct or indirect inguinal hernia operated in elective theatre at Stanley Medical College were included in the study.

Exclusion criteria: Patients who had an irreducible, obstructed or strangulated hernia, Patients with a bilateral hernia, sliding hernia, Patients with recurrent hernia.

Statistical analysis: The collected data were analyzed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis was used for categorical variables and the mean and S.D were used for continuous variables. The Shapiro Wilk's test for normality shows the data was skewed hence to find the significant difference in the multivariate analysis the Kruskal Walli's test was and followed by the Mann-Whitney U test was used. To find the significance in categorical data Chi-Square test was used. In all the above statistical tools the probability value .05 was considered as significant level.

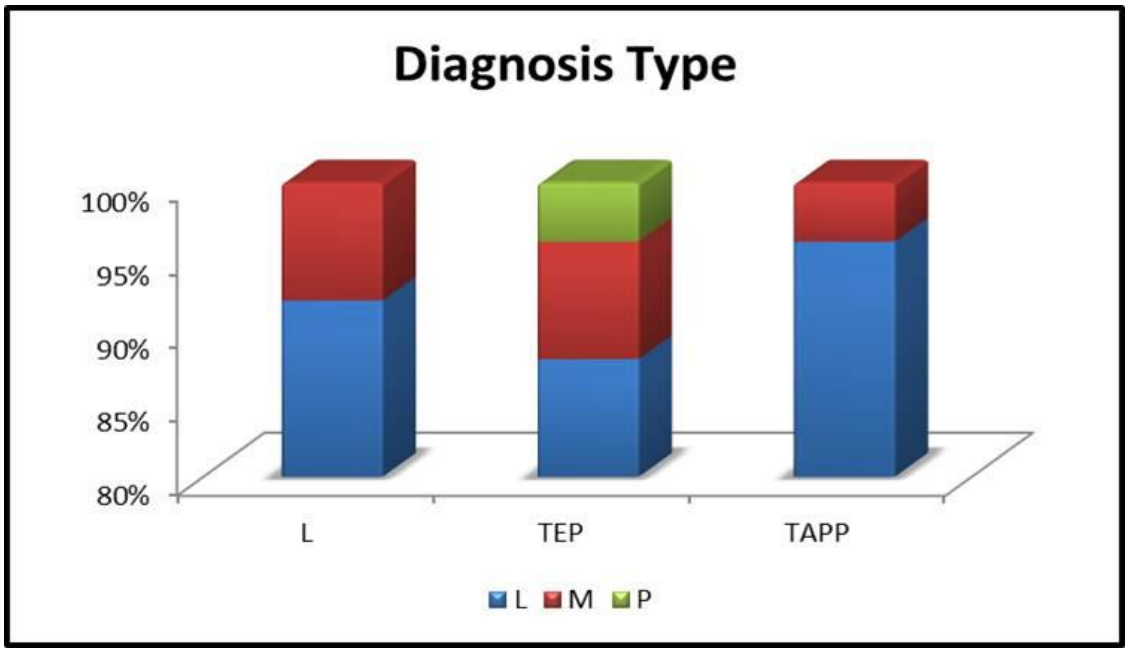
Results

The study involved 75 male patients who satisfied the inclusion criteria. 25 patients were subjected to Lichtenstein tension-free open hernioplasty, 25 treated with TEP, and another 25 subjected to TAPP.

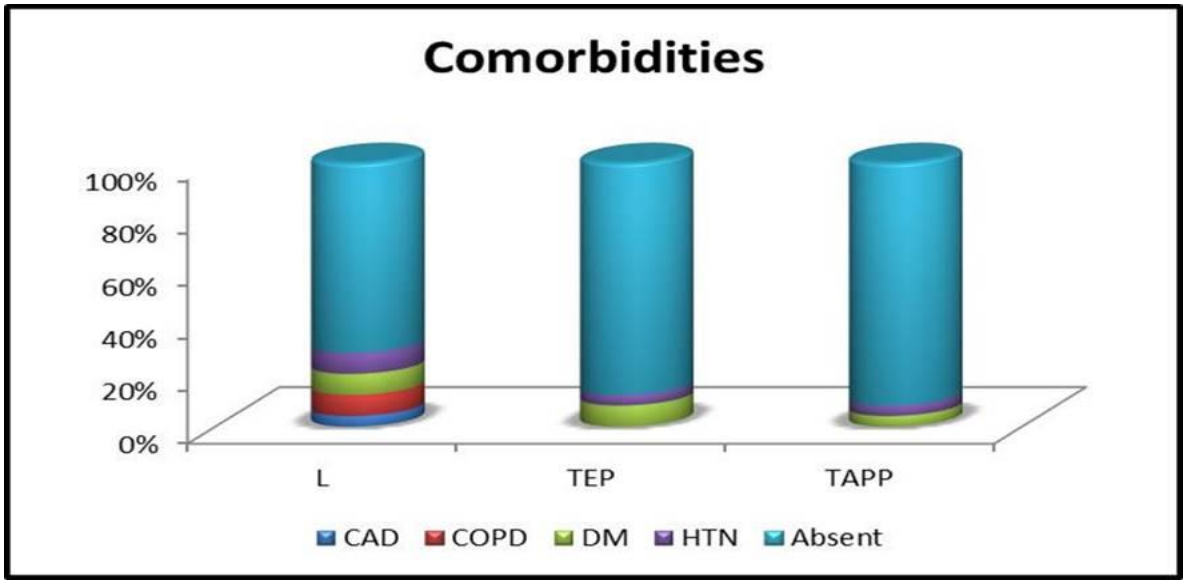
Among the 75 cases studied 92% were a lateral inguinal hernia, 6% was a medial inguinal hernia and 4% were pantaloon hernia. Although all hernias were preoperatively evaluated, most of the diagnosis on the type of the hernia was made intraoperatively (**Graph – 1**).

Diabetes was the most common comorbidity in the present study group. Other comorbidities included in the present study were systemic hypertension, Chronic Obstructive Pulmonary Disease, and Coronary Heart Disease. Patients with cardiopulmonary diseases were subjected to Lichtenstein tension-free open hernioplasty (**Graph – 2**).

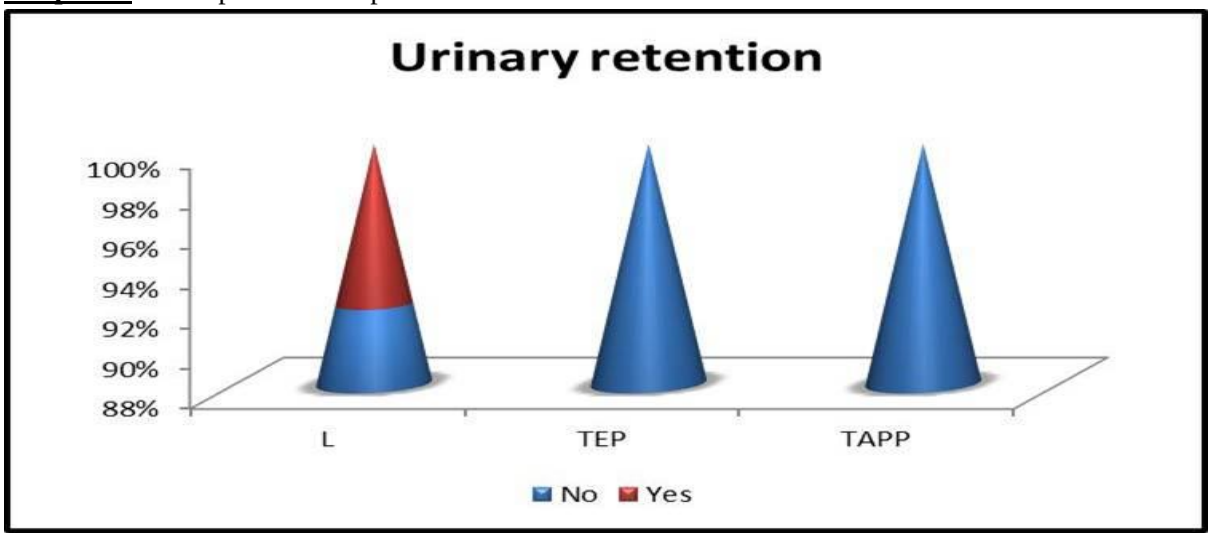
Graph – 1: Type of hernia.



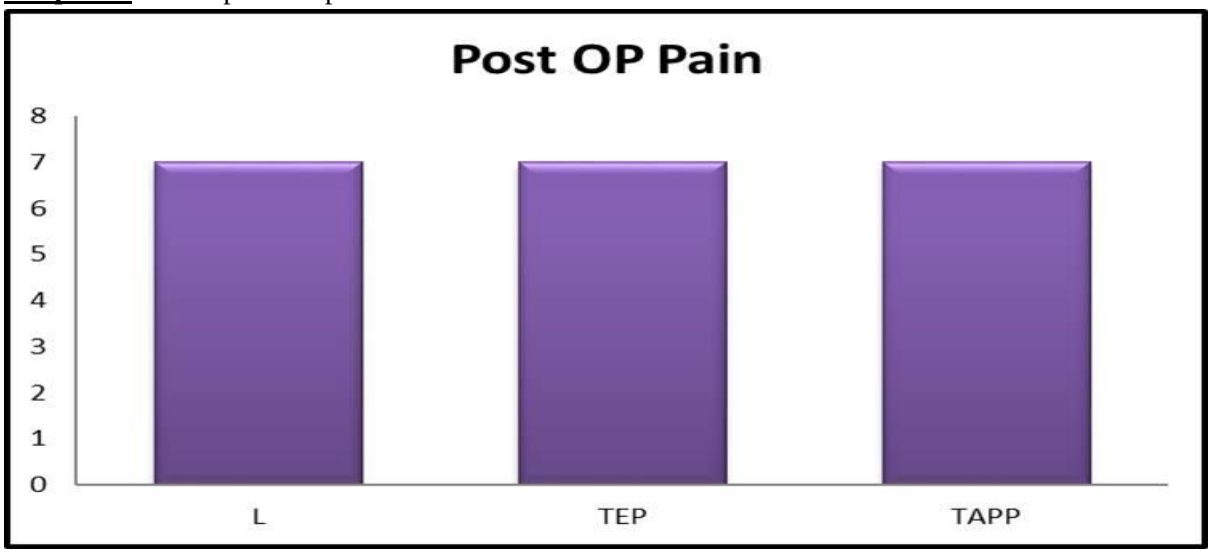
Graph – 2: Association of comorbid.



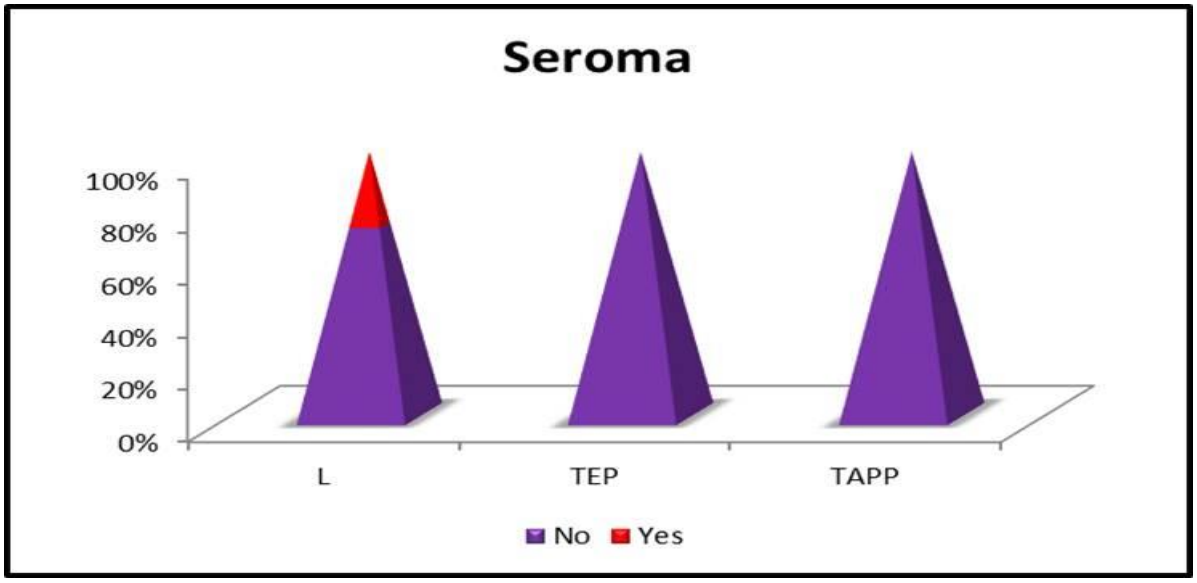
Graph – 3: Intraoperative complications.



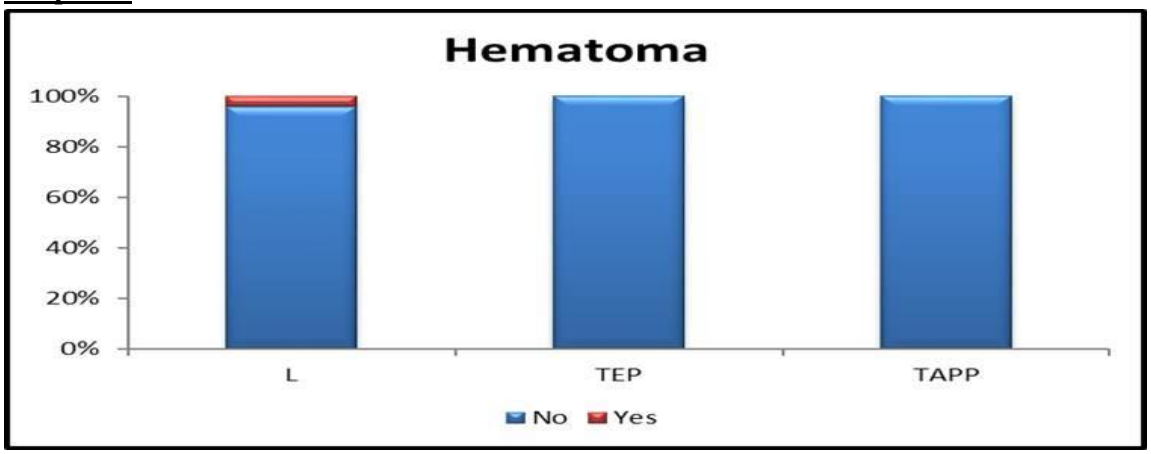
Graph – 4: Post-operative pain.



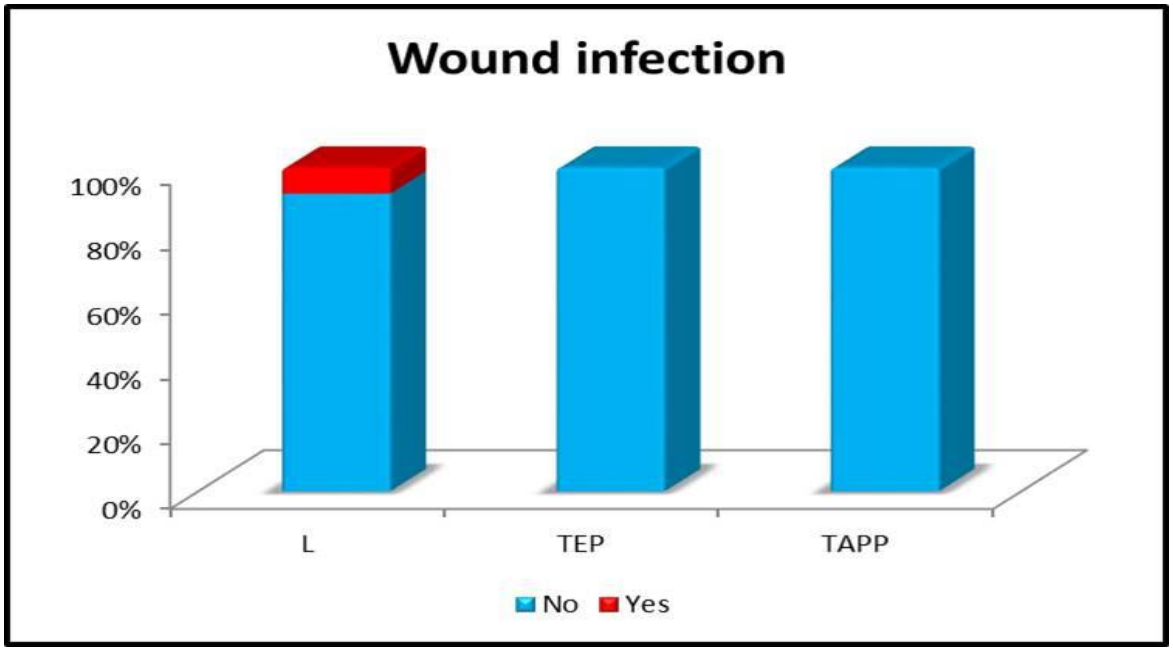
Graph – 5: Seroma.



Graph – 6: Hematoma.



Graph – 7: Wound infection.



Post-operative urinary retentions was found only in two cases of Lichtenstein tension-free open hernioplasty and this required bladder catheterization. All cases of laparoscopic hernioplasty were catheterized intraoperatively and catheter retained till post-operative day 1, hence urinary retention could not be assessed (**Graph – 3**).

The post-operative pain was measured using Visual Analog Scale (VAS) 6 hours after the surgery. The patient was given a dose of Injection Tramadol 100mg in after the surgery. The next dose of analgesic was given based on the VAS score. The pain scores were analyzed with Chi-square and the difference found to be statistically significant. Lichtenstein tension-free open hernioplasty was found to have increased postoperative pain when compared to laparoscopic repair. Among the laparoscopic repair, TAPP was found to have increased postoperative compared to TEP (**Graph – 4**).

Post-operative seromata was observed only in Lichtenstein tension-free open hernioplasty. 28% of cases developed seroma which required drainage. This caused prolonged hospital stay and wound infections (**Graph – 5**).

Post-operative hematomas were observed in a single case of Lichtenstein open hernioplasty. The hematoma was in the subcutaneous plain and required drainage (**Graph – 6**).

Wound infection was also observed only in cases of the open hernioplasty procedure. Wound culture and sensitivity shoved Staph. aureus, managed with antibiotics and drainage (**Graph – 7**).

Discussion

The cumulative prevalence of inguinal hernia in males aged 25–34 years is 5 %, rising to 10 % for age 35–44 years, 18% for age 45–54 years, 24% for age 55– 64 years, 31% for age 65–74 years, and finally 45% for males of age 75 years or more Inguinal hernias occur eight times as often in men as in women, and consequently approximately 90% of all inguinal hernia repairs are performed in male patients .Our study the mean age was 49 and 95% of cases were between the age group of 39-59. All cases selected were males several comorbidities, some of which are associated with altered collagen metabolism, have been proposed to be associated with inguinal hernia formation. It has been suggested that patients diagnosed with an aortic abdominal aneurysm or thoracic aortic disease are predisposed to inguinal hernia formation, but the evidence on this is inadequate [8]. In our study diabetes, hypertension and COPD was evaluated. It was found that preoperative diabetes was associated with increased post-operative complications. Also in presence of cardiopulmonary comorbid patients were preferably subjected to open hernioplasty. Cases of hernia with prostatic hyperplasia were referred to the Urology department and were excluded from the study. In our study, the mean duration for a Lichtenstein tension-free open hernioplasty was 55 minutes. Whereas mean operating time for TEP was 101 minutes and TAPP was 106 minutes. This is due to the prolonged learning curve required for laparoscopic repair compared to open repair. Some degree of postoperative pain is common and expected following surgery. However, persistent pain becomes a problem [9]. Chronic pain has been defined as surgical site pain persisting beyond 3 months. The incidence of chronic pain following open inguinal hernia repair has been reported at 18 %.Meanwhile, the incidence following laparoscopic repair is 6% [10]. Rosch R, et al. notes that the etiology of chronic pain is unclear, but is thought to include inguinal nerve irritation by suture or mesh, an inflammatory reaction to mesh and foreign material, scaring incorporating inguinal nerves, and abdominal wall compliance reduction [11]. In a 2014 update to the European Hernia Society (EHS) guidelines based on meta-analysis data there was no difference in chronic pain after Lichtenstein when compared to TEP hernia repair. However, a review of prospectively collected data with 17,388 patients demonstrated worse pain on exertion in the Lichtenstein group

(OR 1.420; CI 1.264–1.596) at 1 year postoperatively with a rate of 9.23% compared to 7.90% in the TEP group, and the overall prevalence of 8.7%. Hence, laparoscopy seems to reduce chronic postoperative pain compared to open repair. Surgical complications lead to undesired morbidity and potential mortality [12]. Köckerling, et al. demonstrated a higher postoperative complication rate following Lichtenstein repair in comparison to TEP repair in their review of prospectively collected data on 17,388 patients (OR 2.152; CI 1.734–2.672) and a prevalence rate of 3.2%. When comparing TEP versus Lichtenstein repair, the data demonstrated a postoperative bleeding rate of 1.16 % versus 2.46%, a seroma rate of 0.51% versus 1.48%, wound infection rate of 0.06% versus 0.26%, and wound healing disorders of 0.07% versus 0.35%, respectively [13]. The above study failed to demonstrate a difference in intraoperative complication rates when assessing for vascular injury, bowel injury, and bladder injury, with overall rates <0.28%. However, intraoperative bleeding was higher in the TEP repair group (0.76%) compared to 0.41% in the Lichtenstein repair group. When comparing TEP to TAPP complications, data has largely been of limited quality and suggests overall similarities in outcomes [14]. A recent small prospective randomized trial of 60 patients failed to show a difference in 30-day postoperative outcomes (urinary retention, hematoma, seroma, wound infection, pain, return to normal activity, and recurrence) between the two techniques, However, in a large prospective review of 17,587 patients, Stoppa R, et al. demonstrated that the overall surgical complication rates were higher for TAPP (3.97%) when compared to TEP (1.70 %) [14]. The noted difference was largely secondary to a higher seroma rate in the TAPP group (3.06%) versus 0.51% in the TEP group. In their discussion, the difference could be explained by the higher number of large defects and scrotal hernias in the TAPP group [15]. The study also suggested a higher postoperative bleeding rate in the TEP group (1.18%) compared to the TAPP group (0.82%).Overall, it appears laparoscopic techniques have lower postoperative complications relative to open techniques, while TEP and TAPP outcomes are largely comparable [16]. In our study the surgical site complications like a seroma, hematoma, and wound infection were unique to Lichtenstein tension-free open hernioplasty due to the larger incision. The incidence rates were compared using the Chi-square test and found to be statistically significant [17]. There was a single case of recurrence following TAPP which was detected in the immediate post-operative period. In our study, although the mean pain score in the post-operative period was 7, open hernioplasty patients had a statistically significant pain increased postoperative pain [18, 19].

Conclusion

Although no major intraoperative complications were noticed in the present study, the literature shows evidence of major vessel and organ damage, even mortality following laparoscopic procedures. But laparoscopic hernia repair outscores Lichtenstein repair in terms of post-operative complications and early discharge of the patient. Among the laparoscopic hernia repair, between TEP and TAPP, TEP has statistically significant lesser complication rates and time of discharge. But these are surgeon dependent factors and vary between studies. Hence, according to the present study, TEP is the best method of hernioplasty for a primary inguinal hernia. However, large scale studies and long-term follow-up studies are required to evaluate for the chronic pain, recurrence rates and learning curve in laparoscopic hernia repair.

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