

DOI:10.2478/jbcr-2023-0005

Original Article

LAPAROSCOPIC HERNIA REPAIR: TAPP VERSUS TEP. A SINGLE CENTRE EXPERIENCE

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Summary

Surgery for inguinal hernia is currently the most common surgical procedure worldwide, and every year over 20 million patients undergo open or laparoscopic hernia repair. Two generally accepted endoscopic approaches are transabdominal preperitoneal procedure (TAPP) and total extraperitoneal procedure (TEP). For nine years (2010 – 2018), 48 patients with inguinal hernia had laparoscopic hernia repair (TAPP or TEP) at Villarobledo General Hospital. Forty-three patients (89.6%) were male, and five (10.4%) were female. Of these, ten had right inguinal hernia (RIH), 18 - left inguinal hernia (LIH), 12 - bilateral inguinal hernia (BIH), 6 had recurrent unilateral inguinal hernia (RUIH), and 2 had recurrent bilateral inguinal hernia (RBIH). In 33 patients (68.7%), transabdominal preperitoneal laparoscopic hernia repair (TAPP) was performed. Total extraperitoneal laparoscopic hernia repair (TEP) was performed on 15 patients (12%). In 8 patients (16.6%), simultaneous surgical procedures were performed: umbilical hernioplasty in 4 (8.3%) patients and laparoscopic cholecystectomy in 4 (8.3%) patients. There were no conversions in any of the surgical procedures. The average operative time was 77 minutes. Twenty-six patients underwent one-day surgery, 18 were in the hospital for one day, and four patients were discharged on the second postoperative day following surgery. In 7 patients (14%), recurrences occurred: in the first postoperative year - 1 patient; in the second year after surgery - 3 patients; in the third after surgery - 2 patients; and in the sixth year - 1 patient. The recurrence rate was 2 in 33 patients after TAPP (6%) versus 5 in 15 patients after TEP (33%), Chi-squared=5.91 (p=0.015). In one patient, perforation of the bladder occurred after TEP and was managed conservatively using a urethral catheter and preperitoneal drainage. TAPP and TEP had a considerable discrepancy in recurrence rates. Such discrepancy in recurrences is probably due to the higher complexity of the TEP technique and the required supervising of experienced surgeons during the learning curve.

Keywords: inguinal hernia, TAPP, TEP, laparoscopic hernia repair, recurrence

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Received: January 17, 2023

Revision received: March 16, 2023

Accepted: June 15, 2023

Introduction

The first operation for inguinal hernia repair dates back to 330-250 BC [1] and freestanding ambulatory surgical facilities, exclusive of federal, military, and Veterans Affairs hospitals. Patients: Five-percent national sample. Main Outcome Measure: Ten most frequent surgical operations or classes of surgical procedures within neurosurgery, ophthalmology, otorhinolaryngology, cardiothoracic surgery, general surgery, urology, obstetrics and gynecology, and orthopedics. Results: In 1994, the 10 most frequently performed surgical operations in the United States totaled 7 929 000 cases. This contrasted with 5 731 000 top 10 procedures in 1983, or an increase of 38%. The most common surgical operation in 1994 was cataract extraction, totaling 2 049 000 cases. Groin herniorrhaphy (689 000 procedures]. Surgery for inguinal hernia is now the most common surgical procedure worldwide, and every year more than 20 million patients undergo open or laparoscopic hernia repair [2]. The use of polypropylene surgical mesh has dramatically changed the results, and postoperative recurrence rates decreased to less than 5%. Tension-free hernia repair with mesh (Lichtenstein Procedure) is the most popular surgical intervention with a significantly low recurrence rate, chronic inguinal pain, hematomas, seromas and other complications [3]. Moreover, the implementation of minimally invasive surgery, postoperative pain and recuperation period have significantly improved [4]. Thanks to new technology and innovative surgical equipment in the operating theatre, surgery advanced quickly to new horizons, and minimally invasive approaches have been applied worldwide [3].

Furthermore, laparoscopic transabdominal preperitoneal (TAPP) and extraperitoneal (TEP) approaches for groin hernia repair have gained

popularity and are currently more often used in daily surgical practice. Compared to the classic Lichtenstein procedure, TAPP and TEP worked better regarding wound infections, recurrences, time to return to work and physical activities [5]. Thus, TAPP and TEP are the two comprehensive laparoscopic approaches for inguinal hernia repair [5, 6]. However, concerns about the long learning curve and higher costs have risen, and determining the best surgical option for treating inguinal hernia remains not greed on. Choosing between a minimally invasive or open approach is a surgeon’s decision and should be based on his/her own experience. On the other hand, according to the literature, the Lichtenstein procedure is the worldwide most applied surgery, so the minimally invasive inguinal hernia repair should be compared to it [7].

Patients and Methods

Forty-eight patients diagnosed with groin hernia underwent minimally invasive surgery (transabdominal preperitoneal repair or total extraperitoneal) repair at the General Hospital of Villarobledo from 2010 to 2018. Of these, 43 (89.6%) were men, and 5 (10.4%) were women. Ten patients had a right-sided inguinal hernia (RIH); 18 had left-sided inguinal hernia (LIH); 12 patients had a bilateral inguinal hernia (BIH); six had a recurrent unilateral inguinal hernia (RUIH), and 2 had a recurrent bilateral inguinal hernia (RBIH). Transabdominal preperitoneal (TAPP) repair was applied In 33 patients (68.7%). In 15 patients (31.3%), total extraperitoneal (TEP) repair was performed. In 8 (16.6%) patients, additional surgical procedures were performed: in 4 (8.3%) patients – umbilical mesh hernioplasty, and in another 4 (8.3%) – laparoscopic cholecystectomy (Table1).

The polypropylene surgical mesh sized 15/12 cm was applied in all the patients. In

Table 1. Patients, methods and results

Surgical procedure	Patients	Female	Male	RIH	LIH	BIH	RUIH	RBIH	Recurrences	Simultaneous umbilical hernioplasty	Simultaneous laparoscopic cholecystectomy
TAPP	33-68.7%	5	28	7	13	5	6	2	2 (6%)	4	4
TEP	15-31.3%	0	15	3	5	7	0	0	5 (33%)	0	0

the TAPP repairs, the mesh was fixed to the anterior abdominal wall using a non-absorbable (titanium) tack. The peritoneum was restored over the mesh with running absorbable sutures (PDS) or by tack. After reducing the hernia using the TEP technique, the mesh was expanded but not fixed to the anterior abdominal layer.

Results

There were no cases of conversion from laparoscopic to open surgery. The mean operative time for the two groups was 79 minutes, varying from 39 to 131 min (77 min. mean operative time for TAPP versus 81 min. for TEP). Twenty-six patients were discharged from the hospital the same day after surgery, 18 had a one-day hospital stay, and four had a two-day hospital stay after surgery. No surgical site infections, wound seromas or hematomas were recorded. Recurrence of the hernia was recorded in 7 patients (14%). Chronologically, the recurrences were as follows: in the first year - in 1 patient; in the second year - in 3 patients; in the third year - in 2 patients; in 1 patient - in the sixth year after the procedure. Recurrences were recorded in 2 out of 32 patients who underwent TAPP (6%) and in 5 out of 15 patients who underwent TEP (33%); Chi-squared=5.92, $p=0.014$. (Table 1) No life-threatening hemorrhages from the retroperitoneum or a big vessel of the pelvis were recorded; no intestinal perforation or other serious intraoperative complication was seen, except in one case (2.1%), in which perforation of the bladder occurred after total extraperitoneal approach surgery. The disorder was managed conservatively with a urethral catheter and preperitoneal drainage. No nerve injury, chronic pain or postoperative paresthesia was recorded in any group. The average time to return to normal physical and/or work in each group was 22.3 days, varying from 7 to 45 days.

Discussion

The patients' predisposition for having an inguinal hernia includes family history, preceding groin hernia on the other side, male sex, advanced age, irregular collagen structure, prostatic surgery, weight loss, and low BMI. Recurrences after surgery may result from the

poor performance of the procedure, previous interventions, the surgeon's lack of experience, and local anaesthesia [2].

The benefits of laparoscopic surgery compared to the classic Lichtenstein free tension technique include less postoperative pain, shorter recuperation period, lower rates of mesh and surgical site infection and hematomas, lower probability of neural lesions and avoiding chronic inguinal pain. The benefits of the classic free tension technique include shorter operative time and lower seroma and recurrence rates. In both surgical approaches, no differences were recorded regarding intestinal and bladder injury, large vessel lesions, and acute urinary retention [8].

Neumayer L. et al. reported 1983 patients who underwent open free tension mesh hernioplasty versus laparoscopic hernioplasty with two years follow-up of 85.5% of the patients. The hernia relapse rate was higher in the minimally invasive surgery cohort - 10.1% (87 of 862 patients), whereas in the classic free tension group, the relapse rate was 4.9% (41 of 834 patients) [9].

A recent systematic review and network meta-analysis by Aiolfi et al., including 7777 patients, concluded that minimally invasive TAPP and TEP inguinal hernioplasty were associated with significantly reduced early postoperative pain, a shorter recovery period, less chronic pain, fewer hematomas and surgical wound infections, as compared to open Lichtenstein free tension technique. The postoperative recurrence rates, seromas, and length of hospital were similar in TAPP and TEP [10].

Laparoscopic TEP is associated with higher rates of seroma related to the prosthesis. Even though a bulge may disturb the patients in the immediate postoperative period, they should be told that it subsides with time. Usually, drainage of the seroma is not necessary [11]. Some authors recommend low-weight surgical prostheses to prevent seromas [12]. In our series, no seromas occurred, probably because of the small number of operated patients.

There is evidence that iatrogenic neural gripping or lesion, the type of mesh, the weight of the prosthesis, and employing metal tacks to fix the mesh are often the main reasons for postoperative pain. Reduced pain in the immediate postoperative period after TAPP

and TEP is probably due to better recognition and visibility of pelvic anatomy. Furthermore, these techniques permit sparing manipulation of adjacent structures and diminishing parietal dissection of the abdominal wall [13, 14].

The time needed to return to daily activities depends on different factors. Nevertheless, extensive clinical trials have demonstrated that the recovery period after TEP and TAPP is much shorter than conventional methods. The shorter period for recuperation could be attributed to reduced postoperative pain [15].

Perhaps the most controversial detail about groin hernia surgery is the difference in the relapse rates between open and minimally invasive surgery. Usually, hernia recurrence is strongly related to poor performance of the surgical procedure, surgical site infection and the surgeon's lack of experience [2, 16].

Many surgeons assume that relapses after TEP and TAPP are due to inadequate abdominal wall dissection and malposition of the prosthesis, especially when small-mesh size is used, poor mesh fixation, slippage, and fold, or rotation of the mesh, etc. [17, 18]. In minimally invasive procedures, a relapse manifests promptly if the surgery is poorly performed. About 60% of the recurrences after TEP occurred during the first year, whereas less than 50% of the recurrences manifested in the first year in cases of open surgery without prostheses [19]. When experienced surgeons performed the operations, the recurrence rate dropped to 1% [20]. Regarding recurrent inguinal hernia, minimally invasive surgery appears to have clear advantages compared to the open surgery approach [9].

In our group of patients, the recurrence rate after surgery was 14%. Three patients had recurrences in the 2nd year. In two patients, the recurrences appeared in the third postoperative year. The results make us assume that the relapses are probably due to technical errors. There was a significant discrepancy in recurrences between TAPP and TEP: the recurrence rate was 6% after TAPP (2 relapses of 33 patients) versus 33% after TEP (5 of 15 patients). Such a discrepancy in the recurrence rate between the two techniques is probably due to the complexity of the TEP technique, which requires supervision by a surgeon with experience in the area during the learning curve.

Conclusions

TAPP and TEP inguinal hernioplasty techniques are associated with significantly reduced early postoperative pain, short time to return to work and normal daily activities, less chronic pain, and fewer hematomas and surgical wound infections to open Lichtenstein tension-free technique. Postoperative complication rate, seromas, and length of hospital stay appear similar for both methods. There was a considerable difference in recurrence rates between TAPP and TEP. Such discrepancy is probably due to the TEP technique's higher complexity, which requires supervision by experienced surgeons during the learning curve.

Acknowledgements

The author declares no financial support or other sponsorship.

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