

A Walk along the Learning Curve of Totally Extra-Peritoneal (TEP) Repair of Inguinal Hernia

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Abstract

Objectives/Background: Laparoscopic repair of inguinal hernia is a recent advancement gaining global popularity. It supposedly has a very steep learning curve due to various reasons. This study highlights an initial experience with totally extra-peritoneal repair of inguinal hernias with respect to difficulties, the learning curve, and outcome of this experience.

Methods: It's a prospective descriptive analysis of first 78 consecutive TEP repairs of inguinal hernias performed in 67 patients in a teaching hospital as well as private hospitals during one and a half year. Patients less than 15 years, morbidly obese, old unfit patients and patients with previous history of lower abdominal surgery, recurrent hernias, complicated and complete scrotal hernias were excluded. All the patients were explained the new technique and were informed of the likely complications and all the known benefits. Those who gave consent were registered as study subjects. Variables studied included demographics, difficulties/complications during surgery, early post-operative complications, chronic pain and recurrence of hernia. A detailed pro forma was duly filled in by one of the authors and attached with history chart of every patient. The patients were reviewed after 15 days and then every three months for a period of one year. The data collected was then statistically analyzed on SPSS version 16.

Results: This study took one and a half years to complete from Jan 2009 to Jun 2010 during which we operated 67 patients with 78 primary inguinal hernias with a mean age of 40.27, Std 9.724 and a range of 38(20-58) years. All the patients were males with 56 (83.58%) unilateral and 11 (16.41%) bilateral inguinal hernia. The mean operative time of the initial 30 cases was reduced by 50% in the last cases. A number of early post-operative complications occurred during the same hospitalization. Results of three years of follow up are quite promising and encouraging.

Conclusion: TEP is a safe and reliable method of inguinal hernia repair. Initial problems and fear due to a totally different anatomy soon overcome by repeated attempts at repair by this technique and sticking to the rules laid down by experts in this field.

Keywords: Inguinal hernia; Laparoscopic repair; TEP; Learning curve; Complications

Introduction

Laparoscopic inguinal hernia repair is a recent advancement in the treatment of this common surgical problem. A number of studies claim its superiority over open repair of hernia in terms of post-operative pain, earlier return to normal activity, work and recurrence of hernia [1,2,3]. The Totally Extra Peritoneal (TEP) repair, although technically difficult, is a type of laparoscopic hernia repair which is gaining popularity and acceptance globally [4-6]. It has an advantage that it does not breach the peritoneal cavity, has a shorter recovery period and return to work [7,8]. There are, however, reported complications of this procedure which are comparatively more dangerous, longer surgery time and a steep learning curve [9-12]. Despite reported limitations and risks, the TEP is getting a worldwide acceptance and popularity as more and more surgeons are learning this technique. It is, however, mandatory to learn this technique and acquire adequate experience and anatomical knowledge before performing this technically demanding technique of inguinal hernia repair. We started hernia repair by this technique keeping in view a substantial body of literature confirming its safety, reliability, keeping peritoneum untouched, as well as long term security for patient against recurrence.

Materials and Methods

It's a retrospective study conducted at a teaching hospital and private hospitals of our town over one and a half year during which 67 patients of primary inguinal hernia were operated by TEP laparoscopic repair technique. The study subjects included patients over 15 years of age regardless of their gender. Initially thin patients with small,

direct and uncomplicated hernias were included in the study and after gaining initial exposure and experience of 30 patients; incomplete indirect hernias were also recruited and operated. Morbidly obese, elderly patients with co-morbidities complete and complicated hernias were excluded from the study. The patients were explained the advantages and disadvantages of both the open and TEP repair techniques. Given consent on their own choice, they were inducted in the study. The variables studied included demographics, hernia characteristics, operative aspects, early post-operative recovery and complications, operative time, in hospital complications, total hospital stay and late complications up to three years. The data was collected on a pro forma by one of the authors as soon as the patients arrived in the hospital. A set of pre-requisite investigations depending upon the age of the patients was carried out and fitness for anesthesia sort where ever indicated. The data summarized as means, percentages and analyzed on SPSS version 16.

Surgical technique

We adopted the commonly used technique with a 10 mm infra-

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umbilical port. Through this port we introduced a handmade balloon for insufflating and dissecting the extra peritoneal space as suggested by Chowbey PK et al. [6], after cutting the anterior rectus sheath and creating a space between rectus muscle and posterior rectus sheath. This is achieved by injecting 100 cc saline or by insufflating air through the suction drain which has balloon tightly tied to its tip. This created a good space and then the balloon was deflated and withdrawn. A 10 mm cannula was introduced through this port and the space was insufflated by using in sufflator fixed to the trocar. A 10mm telescope was then introduced and under vision a 5mm trocar was introduced 2cm above pubic symphysis and the third 5mm trocar introduced between this and the infra-umbilical port. Further dissection continued to visualize the hernia defects and the sac along with the cord structures. Lateral space created by way of traction and counter traction. The cord structures were very gently separated from the sac after reduction of the sac. If the sac did not reduce completely, we passed a suture around it and left the cut distal sac as such. A polypropylene mesh (8cm by 12cm) was then rolled onto a grasper and introduced through 10 mm port after ensuring that sufficient space is already created to lay the mesh. Once in the extra peritoneal space, mesh is unrolled with the help of graspers and then spreading it horizontally from midline to lateral side of the deep inguinal ring covered the hernia defect optimally and then it was fixed at various points by means of the tracker to keep it safe from displacing.

Results

67 patients underwent 78 TEP repairs of inguinal hernias of small size, mostly unilateral and in thin patients without any previous history of lower abdominal surgery. The patients were selected from a huge number of hernia patients presenting in our unit as well as in private hospitals keeping in view our limited experience as an observer and as assistant only in this technique. We did not include complete and complicate hernias especially in obese subjects. All the operations were supervised by a senior expert.

The mean age of our study subjects was 40.27 years with a Std of 9.724 and a range of 38 (20-58). All the study subjects were males and of the total patients, 56(83.58%) had unilateral and 11(16.41%) had bilateral inguinal hernias. Majority of the hernias were small, reaching to the mid inguinal point while a few were descending up to the root of penis. General anesthesia was given to all the patients. The initial 30 patients took longer time(Average 95 minutes) compared to the last series (average 60 minutes) and different complications like breaching the peritoneum while inserting the trocar occurred as shown in Table 1. The operative time taken during initial 35 patients was significantly longer but then it gradually decreased in the later cases. The time taken during repair of direct hernias was substantially less compared to the indirect hernias (P <0.001), as shown in Table 2. Similarly, the overall time taken in unilateral hernias was significantly less compared to bilateral hernias (P<0.001). Overall 6(8.95%) operations were converted to open and most of them due to bleeding, difficulty in dissection due to adhesions obscuring anatomy. All the conversions occurred during first 12 operations. The commonest post-operative complication was the formation of a seroma (n=13, 19.40%) which resolved spontaneously. The other complications included acute retention in 5(7.46%), groin pain in 8 (11.94%) and cutaneous parasthesia of mild nature in 6(8.95%) patients. The mean hospital stay was comparatively longer in the initial 25-30 cases (mean 4.2 days). However, the mean in hospital stay of the last 37(55.22%) patients was substantially reduced to a mean of 1.4 days. Overall there were 9(13.43%) recurrences within a span of 8-10 months. All recurrences occurred in the patients who were operated during the initial phase of our study among the first 20 operations. Six (8.9%) recurrences occurred in unilateral indirect

Complication	Frequency	Percentage
Peritoneal breach during port insertion	07	10.44
Bleeding during dissection in extra-peritoneal space.	04	5.97
Difficulty in identifying the anatomy	07	10.44
Inability to reduce the sac completely	08	11.94
Bleeding during separation of sac from cord structures	05	7.46
Sub-cutaneous insufflation	02	2.98
No Complications	44	57.69

Table 1: Operative Complications.

Type of hernia	Total operative time from induction				Total
	Up to150 Minutes	Up to75 Minutes	Up to60 Minutes	Up to 40 Minutes	
Direct	0	7	19	20	46
Indirect	8	10	12	2	32
Total	8	17	31	22	78

Table 2: Comparison of time taken in direct and indirect hernias.

hernias while 3(4.4%) in bilateral direct hernias. All of the recurrences were then managed by open surgery. Four (6%) patients complained of groin pain for up to three months for which they needed analgesics. All patients recovered, though some had problems of varying severity, with no mortality.

Discussion

Hernia repair remains controversial despite number of techniques in practice. The optimum repair technique is yet to be decided [11]. Laparoscopic repair of inguinal hernia is a recent advancement, although less conventional, but gaining worldwide popularity based on such facts as low recurrence rate, less post-operative pain, early recovery and return to work , low rate of early and late complications [12-16]. A steep learning curve in laparoscopic hernia repair is making its uptake low despite known benefits over open hernia repair. This is attributed to the technical difficulties of the laparoscopic hernia repair, a general reluctance to learn a technically demanding method with a learning curve [17-19]. A number of studies have proposed different ways to reduce the learning curve and to develop this skill by way of especially designed skill labs for training on simulators [20-21]. This study presents our initial period of the learning curve with totally extra peritoneal repair of inguinal hernias during last one and a half year. We selected TEP over TAPP after a thorough study of literature and recommendations made by the experts in this field [6,22-23]. Our results match with many other similar studies in many respects. Taking care of our initial, though mentored, experience, we tried to perform these operations in accordance with the guide lines of the experts [6,24-25]. Difficulty in identifying the anatomy and breaching the peritoneum during port insertion as well as during sac reduction and separation was frequent during our initial operations. Similarly, bleeding during dissection and sac separation was also troublesome in our initial series. These difficulties are reported by many other authors during their initial experience with TEP [26-27]. The operative complications occurred more frequently during the early phase of our study. During the later part of our series, the number of operative complications decreased as we gained orientation of the laparoscopic anatomy. The overall time taken during direct hernia repair was much shorter compared to the indirect hernia repairs in our results. This is consistent with the results of other similar reports [28]. The complications during operation of our initial series are the same reported by many other authors with varying proportions [28-29]. Our total time duration of initial cases was much improved in the later part of our study due to increasing familiarity with the laparoscopic anatomy and growing confidence.

This is also verified by other studies claiming improvement in total time duration with growing exposure [30-31]. The total hospital stay also was significantly shortened in the later part of the series (4.2 to 1.4 days). Overall recurrence rate was 13.43% (n=9) seen in patients during initial phase of the study. This also is in line with other similar studies considering our study population [3,15-16]. This study demonstrates our very initial endeavor to perform the laparoscopic hernia repair with a reasonable success in the patients we operated in the later phase of our study.

Conclusion

Laparoscopic totally extra-peritoneal inguinal hernia repair seems to be difficult to perform but is and easily achievable target if the patient selection is appropriate and basic guidelines are followed. A better understanding of the laparoscopic anatomy is extremely important before one can attempt this technique. We believe that it's a long way to go before any concrete and final verdict can be established between different techniques of inguinal hernia repair.

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