

Research Article**A Run on the Path of Learning Curve of Laparoscopic Hernia Repair (TEP)****Dr. Ashwani Gupta¹, Dr. Ashish², Dr. Vimal Bhandari³, Dr. Lokender Kumar⁴, Dr. Praveen Garg⁵,
Dr. Gaind. S. Kumar⁶**¹Associate Professor & HOD, ²Senior Resident, ³Consultant & Associate Professor, ⁶Post Graduate Student, Department of General Surgery, VMMC and Safdarjung Hospital, New Delhi – 110029, India⁴Consultant General and Laparoscopic surgeon, Department of General Surgery, Park Super-Specialty Hospital, Faridabad, Haryana-121006, India)⁵Consultant General and Laparoscopic surgeon, Department of General Surgery, New Rohini Hospital, Rohini, New Delhi – 110085, India***Corresponding author**

Dr. Ashish

Email: ashishvmmc@gmail.com

Abstract: Hernia repair is one of the most common surgeries performed all over the world. The Totally Extra Peritoneal (TEP) repair, although technically difficult, is a type of laparoscopic hernia repair which is gaining popularity and acceptance globally. 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 but a steep learning curve 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. The proposed study was conducted in the Department of Surgery VMMC & Safdarjung hospital, New Delhi includes total 45 patients over one and half year of Duration, using a standard TEP technique with regular follow up of the patient for 3 year and done at the time period of 1 week, 1 month, and 3 months, 6 months and 1 year till 3 years. Our study concludes that better understanding of the laparoscopic anatomy is extremely important before one can attempt this technique. Results with this technique are comparable with other techniques of hernia repair with decrease in the complications and recurrence rate with more understanding of laparoscopic anatomy and gaining confident.**Keywords:** Laparoscopic Hernia repair, TEP, Learning curve

INTRODUCTION

Hernia repair is one of the most common surgeries performed all over the world[1]. In 1979 P.Fletcher performed the first laparoscopic repair of groin hernia by closing the neck of hernia sac[2]. After that repair of groin hernia repair evolved and standardized into two main approaches: Trans abdominal preperitoneal (TAPP) or totally extra peritoneal (TEP).

According to number of studies TEP is superior over open hernia repair in view of post-operative pain, earlier return to work and recurrence[3-5]. The Totally Extra Peritoneal Hernia repair despite difficult technique gaining popularity and acceptance globally[6-8]. Early return to work, shorter recovery period and not entering into peritoneal cavity are advantages of this technique[9,10]. Like any other surgical technique this also have some complications like longer surgery time and steep learning curve[11-14].

Approximately 70,000 hernia repairs are carried out annually in the United Kingdom of which only 4.1% are performed by laparoscopic surgery[15]. About 15-20% of hernia repairs in the United States are performed laparoscopically[16]. Laparoscopic surgery is recommended as one of the treatment options for the repair of inguinal hernia in the recently revised NICE (National Institute of Clinical Excellence, UK) guidelines[15]. Despite reported limitations and risks[11-13], 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[17-20]. Before starting hernia repair by this technique we have go thoroughly through literature, searched for every possible articles and work published, keeping in view patients safety, reliability, keeping peritoneum untouched and after informing about all the perspectives of the procedure to patients and taking consent from patients.

MATERIAL AND METHODS

The proposed study was conducted in the Department of Surgery VMMC & Safdarjung hospital, New Delhi. Numbers of patients included were total 45. The study done over one and half year of Duration from Jan 2011 to July 2012. Eligibility: All adults (>18yrs) irrespective of gender with inguinal hernia.

Inclusion Criteria: All reducible inguinal hernias was included in the study.

Exclusion Criteria: Irreducible hernia, Obstructed and strangulated hernias, Inguino-scrotal hernia, Patient unfit for general anaesthesia. Patients were admitted in the hospital an evening prior to surgery. Informed verbal and written consent for laparoscopic hernia repair was taken. All fit patients who underwent laparoscopic hernia repair received the three doses of cephazoline antibiotic, first dose at the time of induction of anaesthesia and two doses 12 hourly post operatively

All Patients were asked to void urine before coming to OT and procedure was done under general anesthesia by the same surgical team. Monitors, patients, surgeons' alignment were maintained. Monitor was at the foot end of the patient on the side of hernia and surgeon was at head end on opposite side of hernia. The foot end of the OT table was raised with an upward tilt on the side of the hernia.

A short subumbilical incision (2cm) was made and deepened to expose the anterior rectus sheath. A short longitudinal incision was made in the anterior rectus sheath to expose the underlying rectus muscle which was retracted laterally to expose the posterior rectus sheath. The plane between the rectus muscle and the posterior rectus sheath led inferiorly to the extra-peritoneal space with a blunt tipped trocar or a dissecting balloon. A gloved balloon dissector was inserted through the opening in the midline up to pubic symphysis superior to posterior rectus sheath and extra peritoneal space was created with 150 ml of saline infusion and kept for 5 minutes for hemostasis. Hassan port 10mm then inserted and secured with thread and further used as a camera port. Another 5mm port was made 1 finger above the pubic symphysis in the midline. Third 5mm port was inserted in middle of two above mentioned ports in midline.

Dissection of retro pubic space of retzius in medial inguinal fossa and lateral inguinal fossa were done using blunt and sharp dissection. All potential sites of hernias were inspected i.e., direct, indirect, obturator & femoral. Hernia sac was reduced. Adequate parietalisation was done. 15 × 15 cm polypropylene mesh tailored to 15x13 cm was inserted, unrolled over myopectineal orifices as per standard guidelines. Mesh

was rolled outside and delivered inside via camera port. After right alignment of mesh inside, it was unrolled on the floor.

Mesh was fixed at 3 points:-

1. At pectineal ligament.
 2. About 1 cm above pubic symphysis in anterior abdominal wall.
 3. Laterally 1 cm above the anterior superior iliac spine
- Tackers (5 mm) made of titanium were used as fixing device.

Intra operatively Inj. Marcaine was used at port site and Inj. Morphine (opioids) 0.1mg/kg/wt. was used as an analgesic by anesthetists Post operatively patient was allowed to take liquids 6 hrs. After the recovery from general anesthesia. On the evening of operation Diclofenac transdermal patches of 100 mg pasted on patient's upper arm. Subsequent analgesia was given as per patient's requirement. Patient was allowed to take normal diet on the post op day 1 and advised to carry on their normal routine work as per their level of comfort. Regular follow up of the patient for 3 year and done at the time period of 1 week, 1 month, and 3 months, 6 months and 1 year till 3 years.

RESULT AND OBSERVATION

In our study we have considered two phases of learning curve and tried to include 30 cases in each but due to loss of follow up from patient side we manage to have 25 in initial and 20 later phase.

Most of the patient in first phase were direct type hernia, one was recurrent and rest were indirect. After passing first phase and gaining confident we have included more of indirect and recurrent hernia patients. Entry into right space is the key in laparoscopic hernia surgery. We have difficulty in entering into right space in first 25 cases (28%) which decreased to only (10%) in later cases. One of the reason being difficulty in identifying the correct anatomy which was 30 % early case left to only 2.7%. Time taken for repair reduced from 116 min (median) in the initial cases to 86Min (median). Complication like peritoneal breach resulting in pneumoperitoneum and loss of space or needed varies needle insertion or conversion of procedure, bleeding requiring suctioning or conversion, difficulty in deployment of mesh occur more in early phase as compared to later phase. Any collection like seroma is differentiated from recurrence with the aid of ultrasound, managed conservatively and followed till 3 month for complete resolution which occur in 6 patients in early and 2 in later. None of the patient required any kind surgical intervention for seroma. There is only 2 recurrence occur in our early phase which reduced to 1 in late phase. Post-operative complications like port site infections occur more in early phase.

Table-1: Shows the briefing of our study observation

	EARLY PHASE N(25)	LATE PHASE N(20)	p-VALUE
Direct Hernia	18	10	0.13
Indirect Hernia	6	8	
Recurrent Hernia	1	2	
Entry in wrong plane	7	2	0.26
Difficulty in identifying correct anatomy	9	2	1
Bleeding	6	2	0.27
Peritoneal Breech	15	8	0.30
Difficulty in Mesh Placement	10	3	0.60
Seroma	6	2	0.26
recurrence	2	1	1
Conversion	2	1	1
Operative time (median)	116 min	86 min	SIGNIFICANT

DISCUSSION

Hernia repair is commonest surgery performed all over the world[1] but still remains controversial despite number of techniques in practice. The optimum repair technique is yet to be decided [13]. It has come a long way from stapling to on-lay mesh to the current approach of TAPP & TEP. 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[14, 21-24].

All surgeries have a learning curve, which consists of three phases[25]. First phase is the starting point (first 25 cases). The surgeon learns how to identify the anatomical landmarks. As the surgeons are not familiar with the inguinal anatomy from this angle, anatomical structure identification is learnt in this stage. The creation and maintaining of the preperitoneal space in TEP repair is also learnt in this phase. Second phase is rate of learning (25 to 40 cases). In this phase the surgeon learns how to dissect the sac, how to unroll the mesh and fix it. Third phase is stabilization and increase in the performance (after 45 cases). The surgeons overcome the difficulty faced in the earlier two phases and his speed increases.

Technical difficulties and steep learning curve of laparoscopic hernia repair resulting in low acceptance despite known advantages[26-28]. Training on simulator in specially designed lab are the different ways to reduce the learning curve[29-10]. After considering the result of many studies, searching thoroughly through literature and after taking recommendation from experts we choose TEP over TAPP[31,32] and our research work matches with other similar studies in many respect. Our all work has been done under the guide lines of the expert[33,34]. As shown in Table 1 complications like difficulty in identifying the anatomy and breach in peritoneum,

bleeding during sac dissection and separation were more in early phase. Overall operative complication were more in early phase of our study but after gaining confidence and get oriented to laparoscopic anatomy operative complication decreased in number which has been also reported in many studies during learning curve[35-38] also time taken to complete a surgery improved in later part. Recurrence rate following this technique can be as low as 2% in some series[39-40] and through conventional open approach can be as high as 35%[39-40].

42% of complication and 61% of recurrence occurs in first 100 cases according to a prospective study of 1227 hernia repair using the TEP technique over a period of 7 years[41]. Edwards et al study concludes that at least 30 to 50 cases has to be done to achieve expertise in this technique and only after which operative time, conversion to open and other operative complications significantly decreases[42]. 60 cases for a beginner surgeon for learning curve estimated by Choi YY et al without the help of any experienced surgeon[43]. Surgeon can be trained to perform the TEP repair more safely according to a retrospective review by Zendeja Bet al from the Mayo Clinic[44]. This study and its outcome shows the importance and advantages of this technique and time to move from open to laparoscopic approach in most basic surgery of world.

CONCLUSION

Laparoscopic totally extra-peritoneal inguinal hernia repair seems to be difficult to perform but is an 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. Results with this technique are comparable with other techniques of hernia repair with decrease in the complications and recurrence rate with more understanding of laparoscopic anatomy and gaining confident.

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