Original Research Article

DOI: http://dx.doi.org/10.18203/2349-2902.isj20172793

Feasibility of laparoscopic inguinal hernia repair (TEP) in rural centre in India

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Received: 10 May 2017 Revised: 21 May 2017 Accepted: 05 June 2017

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ABSTRACT

Background: Inguinal hernia repair is one of the most frequently performed operations in general surgery worldwide. Routinely used gold standard Lichtenstein technique gives a long scar and more post-operative pain. TEP has demonstrated favourable short-term results, with regards to reduced postoperative stay, pain and earlier return to physical activity in comparison with open mesh repairs.

Methods: This study was prospective observational study in which 75 patients were included for TEP repair and followed for the outcome measured as the time taken for operation, incidence of intra operative and post-operative complications, severity of pain at post-operative day 1, 1 week, 1 month and 6 months after operation, return to work and cost effectiveness of inguinal hernia repair.

Results: We have enrolled the 75 patients from 16 to 80 years out of which 34 (45.3%) patients were from age group 50 to 70 years. 47 (62.7%) patients operated on right side and 58 (77.4%) were operated for indirect hernia. Mean time taken for TEP was 81.5 minutes with minimum of 45 minutes and maximum of 135 minutes. There was single most complications of Pneumoperitoneum in 24 (32.0%) which was benign and managed conservatively. Other complications include bleeding in 4 (5.3%) and vas injury in one (1.3%), the mean duration of time taken for return to work was 11 days. The mean cost of TEP was Rs. 5932 with minimum of Rs. 4327 and maximum of Rs. 7742.

Conclusions: The laparoscopic (TEP) repair is well established surgery for primary hernia repair and the other open tension free Lichtenstein technique is still regarded as a gold standard for inguinal hernia repair. The laparoscopic hernia surgery attempting similar claims underwent controversies with conflicting results. Laparoscopic (TEP) inguinal hernia repair gives greater patient's satisfaction and better cosmetic results than open (Lichtenstein) repair.

Keywords: Feasibility, Inguinal hernia repair, Laparoscopic hernia repair, Rural centre, TEP

INTRODUCTION

The final word on hernia will probably never be written.¹ Inguinal hernia repair is one of the most frequently performed operation in general surgery worldwide

irrespective of the country, race or socioeconomic status and hence patient wants to know which procedure they should choose to undergo for hernia operation. Routinely used gold standard Lichtenstein technique gives a long scar and more post-operative pain. Upcoming

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laparoscopic repair promises less pain, improved cosmetic, and less or equivalent recurrence in hernia repair. TEP (totally extra peritoneal) Laparoscopic inguinal hernia repair which was first described by Mc Kernan and Laws in 1993 is a popular method in the present era. Over the past two decades, laparoscopic inguinal hernia repair has become more and more popular. TEP has demonstrated favourable short-term results, with regards to reduced postoperative stay, pain and earlier return to physical activity in comparison with open mesh repairs. The Lichtenstein hernia repair (open, tension free mesh technique) is simple and safe method for treatment of inguinal hernia. The recurrence rate is low both in the hands of expert and for the average surgeons.^{2,3} The early results from non-randomized studies of laparoscopic hernia repair technique showed a possible advantage of the totally extraperitoneal patch technique (TEP) over the trans abdominal Preperitoneal patch technique (TAPP), with lower recurrence rates and fewer operative complication because the abdominal cavity is not entered.4-6

The objective of this study was to evaluate the clinical outcome in totally extra peritoneal laparoscopic (TEP) inguinal hernia repair in terms of operating time, intra operative and post-operative complication, postoperative pain, recovery, recurrence, cost effectiveness and learning curve.

METHODS

This study was prospective observational study. After institutional ethics committee permission, 75 patients were included in laparoscopic totally extra peritoneal (TEP) inguinal hernia repair in the age group of 15 to 80 years. To be eligible for participation patients should be American society of anesthesiology (ASA grade) 1 or 2, male with only unilateral uncomplicated inguinal hernia. Patients were explained in detailed about the benefits and complications of laparoscopic totally extra peritoneal (TEP) repair. Written consent was taken from all the participants. The all laparoscopic inguinal hernia repair (TEP) were done under general anaesthesia. All patients were catheterized on the operation table and catheter removed on first or second post-operative day.

Exclusion criteria

Patient who cannot be followed up post operatively, Patient with previous midline or paramedian incision. If procedure converted from laparoscopic to open hernia for some surgical reason, patient with chronic groin pain disease other than hernia, patient taking opioids and tranquilizers.

All patients were given intravenous antibiotics single dose (ceftriaxone+sulbactum 1.5 gm preoperatively before induction). The analgesics (diclofenac sodium 50 mg) 12 hourly for 1 day and then if complaint of pain was persistent. After procedure, patients were given normal

diet and asked to return to work or their normal routine activity as soon as possible. The outcome measured as the time taken for operation, incidence of intra operative and post-operative complications, severity of pain at post-operative day 1, 1 week, 1 month and 6 months after operation, return to work and cost effectiveness of TEP inguinal hernia repair. Patients who did not visit OPD for follow up were asked to complete a questionnaire send by post and some were also contacted through phone.

RESULTS

We have enrolled the 75 patients from 16 to 80 years out of which 34 (45.3%) patients were from age group 50 to 70 years. 47 (62.7%) patients operated on right side and 58 (77.4%) were operated for indirect hernia. 67 (89%) patients were having hernia since 1 to 2 years and 39 (51.9%) patients were manual laborer. Total 42 (66%) patients were having one or the other predisposing factors like history of working for long hours in standing position, difficulty in micturition, chronic cough (COPD) and chronic constipation.

Mean time taken for TEP was 81.5 minutes with minimum of 45 minutes and maximum of 135 minutes. Figure 1 show the learning duration taken for laparoscopic hernia repair. Initially time taken for laparoscopic hernia repair was 135 minutes and gradually as the experience increased the duration for operation decreased. There was a gradual decline in the graph and no steep curve. Later in the study the duration was 45 minutes. After 43 laparoscopic operations, the time required for laparoscopic was reduced to 1 hour.

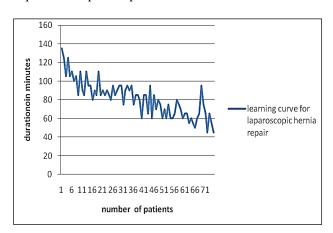


Figure 1: Duration in minutes taken for laparoscopic hernia repair (TEP).

There were single most intraoperative complications of pneumoperitoneum in 24 (32.0%) which was benign and managed conservatively with insertion of veress needle, other complications include bleeding in 4 (5.3%) and vas injury in one (1.3%). 65 (86.6%) patients had no postoperative complications, 4 (5.4%) patients had abdominal distension which reduced after one or two days after conservative management, one patient had

seroma formation which settled by itself, one patient had neuralgia on the thigh of operated inguinal hernia which took one month to disappear after giving tab neurobion forte for one month. 2 (2.6%) patients had scrotal pain for a week and then reduced after giving anti-inflammatory medications, 2 (2.6%) had urinary burning micturition probably due to catheterization which reduced after plenty of fluid. The minimum duration of time taken to return to work was 3 days the maximum duration of time taken to return to work was 30 days, the mean duration of time taken for return to work was 11 days. The mean cost of TEP was Rs. 5932 with minimum of Rs. 4327 and maximum of Rs. 7742.

Table 1 depicts the pain felt by patients preoperatively and post operatively. At post-operative day one most patients 47 (62.6%) had mild pain, 22 (29.4%) had moderate pain and only 6 (8%) had severe pain. Pain at post-operative one week 67 (89.3%) patient had mild pain, 7 (9.3%) patient had moderate pain and no patient had severe pain. Pain at post-operative one month 37 (49.3%) patients reported that they didn't have pain and 32 (42.6%) had mild pain in inguinal area. Pain at post-operative 6 months 59 (78.6%) patients in had no pain. Only 12 (16.0%) patients in had mild pain, no patient had moderate or severe pain.

Table 1: Pain felt by patients at different interval before and after operation (TEP).

Severity of pain	Preoperative pain	Pain at Post- operative, day 1	Pain at post- operative, 1 week	Pain at post- operative, 1 month	Pain after 6 months
Not reported*	0 (0%)	0 (0%)	0 (0%)	4 (5.3%)	4 (5.4%)
None	56 (74.6%)	0 (0%)	1 (1.3%)	37 (49.3%)	59 (78.6%)
Mild	18 (24.0%)	47 (62.6%)	67 (89.3%)	32 (42.6%)	12 (16.0%)
Moderate	1 (1.3%)	22 (29.4%)	7 (9.3%)	2 (2.6%)	0 (0%)
Severe	0	6 (8%)	0 (0%)	0 (0%)	0 (0%)

^{*}patient who do not reported in follow up

Table 2: The duration of surgery in laparoscopic inguinal hernia repair (TEP) in various studies.

Authors (year)	Laparoscopy (mean)	
Wright et al ⁸	58 minutes	
Mrc trial group ⁹	58.4 minutes	
Bringman et al ¹⁰	50 minutes	
Deepraj et al ¹¹	65.7 minutes	
Present study	81.5 minutes	

DISCUSSION

Now the laparoscopic (TEP) repair is well established surgery for primary inguinal hernia repair and the other open tension free Lichtenstein technique is still regarded as a gold standard for inguinal hernia repair. The laparoscopic hernia surgery attempting similar claims underwent controversies with conflicting results.

The mean duration for TEP in current study was 81.3 minutes, with minimum time taken was 45 minutes and maximum was 135 minutes. To achieve an average operation time of less than 1 hour for TEP of unilateral hernia, involved surgeons must have surmounted the steep learning curve for TEP. Despite the fact that TEP was a new procedure for the surgeon and the study was conducted during the learning phase, the results were comparable to the established open Lichtenstein hernia technique as also reported by other studies worldwide. Lichtenstein hernia was 135 minutes whereas time taken for laparoscopic hernia was 135 minutes of unilateral hernia. This because in the later

part of study surgeon, assistant and duty nurse became familiar with the procedure done and this is also because the laparoscopic procedure performed by the same surgeon throughout the study. Table 2 compares the results in various other studies in terms of time taken for TEP. 13-16

Total 29 patients (38.7%) had intraoperative complications. The high rate of intraoperative complications in TEP was because of single most complication of pneumoperitoneum occurred. Out of total 29 patients (38.7%), 24 patients (32%) had pneumoperitoneum and was comparable with other study of 39.4% patients, 12 and 40% to 47% 17,18 and all are managed by insertion of veress needle and removal of gas. The tendency of pneumoperitoneum was decreased with the increased surgical experience. Otherwise there was low rate of complications of minimal bleeding intra operatively 5.3%. In one patient of transaction of vas happened, the patient was old and vas strongly adhering to hernia sac and cut while separating cord structures from the sac.

Total 10 (13.4%) patients had post-operative complication, while other trials show more complications in laparoscopic hernia repair. ¹⁹ The most common complication was post-operative abdominal distension felt by 4 patients (5.4%), but no other compliant of pain in abdomen or difficulty in eating or passing stool present and all relieved within 2 days without medications, 1 patient (1.3%) developed seroma in at 7 days after operation and came with complaint of swelling in operated hernia site without pain and the seroma

disappear after 1 month duration without further morbidity, 1 (1.3%) patient had neuralgia and started day second day after operation and remained for 1 month and decreased with multivitamin tablet, 2 patients (2.6%) developed scrotal swelling, during post-operative stay, 2 patient (2.6%) developed urinary complications in the form of retention of urine after removal of catheter on 2nd post-operative days and for which re catheterization was done. Table 3 shows post-operative complication rates in laparoscopic repairs in other studies. ^{14,15,20-22}

Table 3: Post-operative complication rates in laparoscopic repairs in other studies.

Authors	Laparoscopic
MRC trial group ⁹	56%
Bringman et al ¹⁰	9.8%
Lal et al ¹⁵	12%
Neumayer et al ¹⁶	39%
Cochrane review ¹⁷	0.3% Visceral, 0.28% Vascular
Present study	13.4%

Mean admission day for patients were 4 days. This is like as other study done in India. ²³ In present study longer duration of stay noted, this is because most of the patients were from rural area and they don't want to go home early. Patients want to go home after suture removal and also some were from distant area and they found it difficult to go and come back for suture removal and hence there was a longer duration of stay. In other studies patient were discharged at the same day of operations ¹⁰, ¹¹, and hospital stay more than 7 days was associated with some type of complications.

The mean cost of surgery was Rs. 6508. This is in conclusions of other studies. 10,23,24 This is because all laparoscopic procedures were done in general anaesthesia and use of large size of mesh (6"x6") which is costlier than use of small size mesh (3"x3") mesh which used in open hernia repair. We noted very low rate of recurrence, only one patient (1.3%) had recurrence till 6 months post operatively. Others study noted varying rates of the recurrence. The recurrence in laparoscopic group was within the hospital stay and was noted in 2nd postoperative days as bulge at operated side and this was very early in the study and represent technical failure. In this study patient went to work on an average of 11 days. This is comparable to other studies.^{9,15,25-27} This translates into a significant economic savings to the society because of fewer working days lost. Liem et al proved that the patient who underwent laparoscopic repair regain their physical performance fast than those who underwent open (Lichtenstein) hernia repair. Laparoscopic group join their work fast owing to less post-operative pain and may be because they did not find any scar on operated area and was cosmetically better.²⁸

It is often stated that duration of sick leave depends on tradition and social insurance system, rather than real need to be off work after surgery²⁹ but present data shows clearly that the degree of occupational exertion influence the length of sick leave. This was clearly seen in the manual working labourer undergoing laparoscopic operations (TEP). When we compared return to work with working conditions we found out that those who work as a heavy manual labourers they return to work late due to sole fear of recurrence as compared to those who engaged in light manual or desk work in spite they were told by us to return to work when they feel comfortable as early as possible. This fact that the TEP group in general had a shorter period of sick leaves indicates that convalescence period directly related to degree of surgical trauma. Table 4 shows the comparison of time taken to return to work after laparoscopic repair of hernia in various studies. 16, 20, 30

Table 4: Comparison of time taken to return to work after laparoscopic inguinal hernia repair (TEP) in various studies.

Authors	Laparoscopic
Deepraj S et al ¹¹	14.8 days
Lal P et al ¹⁵	12.8 days
Fleming et al ²⁵	21 days
Present study	11 days (mean)

The current study demonstrated that postoperative pain after laparoscopic (TEP) was significantly less. Similar findings were also demonstrated by most randomized clinical trials when comparing the outcome of open and laparoscopic hernioplasty. 15,20,26,31,32 Although TEP involves a wide dissection of the preperitoneal space, the ilioinguinal and iliofemoral nerves, which are invariably encountered during anterior open repair lie external to the preperitoneal plane and injury to these sensory nerves during anterior open repair probably accounts for the increased severity of post-operative pain. The postoperative quality of life was definitely better for patient operated laparoscopically. This is calculated as a postoperative pain felt by patients in different intervals. The severity of pain determined by a scale (NRS) consisting of 4 grades as determined in other studies³³ (none, mild, moderate, severe). The current study demonstrated that post-operative pain at rest after laparoscopic hernia repair (TEP) was less. Similar findings were demonstrated in most randomized trials. 7, 15, 20, 31, 32

As shown in Table 1, at 1st post-operative day 8.0% patients had severe pain which reduced over a period of time, also other studies confers that follow up till 7 days post operatively the laparoscopic hernia repair causes less pain than open repair, as assessed by analgesic use and pain score. ^{19,24,34,35} Severity of pain at 1 week post operatively was less. Only 9.3% patient had moderate pain and no patient had severe pain. At 1 month after surgery 49.3% patients reported that they didn't have pain, 42.6% had mid pain and only 2.6% had moderate pain. Six months after surgery no patients had pain. This

finding well correlated with old study done by Courtney et al.³⁶

In laparoscopic hernia, no incision is made in the groin and small wounds which are made heal rapidly and hence there is less pain postoperatively. Even though TEP was a new procedure for the surgeon and the study was Conducted during the learning phase, the results were comparable to the established open Lichtenstein hernia technique as also reported by other studies worldwide. The greatest hindrance to laparoscopic surgery in our setup was added cost which is significantly more, the most of the patients cannot afford to pay more money for this kind of surgery especially in rural India, moreover unlike other western countries very less patients have their health insurance policies however the laparoscopic operations causes significantly less pain in the early postoperative period, leading to early mobilization and earlier return to work than the open mesh repair.

CONCLUSION

Laparoscopic hernia may be more expensive than open repair in terms of direct hospital costs. Societal costs due to quicker recovery and return work shows clear advantage for reduction in costs also reduction of post-operative chronic groin pain is likely to lead to savings in both direct hospital cost and societal cost. Laparoscopic (TEP) operations give greater patient's satisfaction and better cosmetic results than open (Lichtenstein) repair and also more acceptances to surgery even in rural area

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the

institutional ethics committee

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Cite this article as: Sawarkar P, Zade R, Dhamanaskar S, Gathe B, Sawardekar P, Khade A. Feasibility of Laparoscopic Inguinal Hernia Repair (TEP) in Rural Centre in India. Int Surg J 2017;4:2336-41.