



Prospective Randomised Controlled Trial of Laparoscopic Totally Extraperitoneal (TEP) Mesh Repair versus Lichtenstein Open Tension-Free Repair of Groin Hernias

Surgery

Dr Manoj Talreja Assistant Professor (Dept of Surgery) Department of General Surgery GCS Medical college hospital and research centre Ahmedabad, Gujarat

Dr Vidhyasagar M Sharma Associate Professor (Dept of Surgery) Department of General Surgery GCS Medical college hospital and research centre Ahmedabad, Gujarat - Corresponding Author

Dr C K Jakhmola Senior Advisor (Surgery and GI Surgery) Department of General Surgery GCS Medical college hospital and research centre Ahmedabad, Gujarat

ABSTRACT

Totally Extraperitoneal (TEP) Mesh Repair for groin hernias is now rapidly gaining popularity as it is a minimal access surgical technique which is reported to have comparatively better results to Lichtenstein open mesh repair if done by an experienced surgeon. The technique has a steep learning curve which can be overcome by strictly following surgical protocols. This is a study to compare both these techniques and find out which one of them is better in terms of surgical outcome and patient acceptability. We report our local experience and results of TEP procedures at our hospital.

KEYWORDS

Groin hernias, Mesh Repair, Minimal Access Surgery.

Introduction:

With the advent of laparoscopic or minimally invasive surgery, surgeons started working on it and in 1990s two major type of laparoscopic repairs named as totally extra peritoneal (TEP) repair^[1,2] and transabdominal preperitoneal (TAPP) repair^[3] were developed. Many guidelines like NICE (National Institute of Clinical Excellence) guidelines, EHS (European Hernia Society) guidelines^[4] etc have been published and several randomised controlled trials and systematic reviews have been done. All these showed that when compared to open repair, laparoscopy gave the benefits of less postoperative pain, less analgesic consumption, earlier return to normal activities and work in the post-operative period^[5]. There are less long term complications of groin pain and permanent paraesthesia and fewer recurrences than sutured herniorrhaphy, but with comparable efficacy to open mesh repairs^[6]. We aim to prefer the laparoscopic totally extra peritoneal (TEP) inguinal hernia repair versus TAPP repair as in this technique surgeon does not enter the peritoneal cavity, which reduces the risk of visceral injury, adhesion formation and the development of port site hernias^[7].

Aims and objectives:

Aim of the study was to compare the surgical morbidity, operative time, pain score, analgesic requirement, post operative complications related to the disease and time taken by the patient to return to his normal activity after surgery between Lichtenstein tension free open mesh repair and Laparoscopic totally extra peritoneal (TEP) mesh repair of inguinal hernia. Our main objectives were to work up the patients with inguinal hernia, randomise and operate them by either open or laparoscopic surgery. Patients were assessed for recovery after surgery in both the groups and compared in terms of post operative pain, analgesic use and return to normal and recreational activity. Patients were followed up for one year and assessment for long term complications and patient's satisfaction with the procedure was done.

Materials and Methods :

This is a randomised control study conducted at a single tertiary care centre from December 2011 to January 2014. We enrolled male patients with symptomatic inguinal hernia satisfying the inclusion criteria and randomised into two groups on the basis of computer generated numbers. Patients of group A underwent "Laparoscopic Totally Extra Peritoneal (TEP) Mesh Repair" and patients of group B underwent "Open Lichtenstein Tension Free Mesh Hernioplasty". Total 100 patients were enrolled with 50 patients in each group.

Pre operative antibiotic dose i.e. cefotaxime 1 gm intravenously was given to all the patients.

All the laparoscopic surgeries were done using general anaesthesia using standard drugs for laparoscopy. Standard three port method

described in the text was followed.

All open surgeries were performed under spinal anaesthesia. Lichtenstein technique of tension free meshplasty was followed.

Observations:

Patients of both the groups were analysed for various variables. The entire statistical analysis was done using SPSS version 60, software and mean SD and p-values were calculated. Data was presented in frequencies and their respective percentages for qualitative variables. There was no significant difference in mean age group of the patients. It was observed during the study that in patients operated by the laparoscopic totally extra peritoneal (TEP) mesh repair, there is significant reduction in operative time from a mean 49.22 minutes in group B patients to a mean of 38.38 minutes in group A patients. There is significant reduction in number of doses of analgesia from a mean of 3.3 doses in group B to 2.1 doses in group A. The pain scores was significantly reduced not only on the evening of surgery but also on the 1st and 2nd post op day as well, that is from a mean of 72.04, 39.20 and 24.12 in group B to 57.12, 30.60 and 13.60 in group A respectively. The overall duration of hospital stay was reduced from a mean of 2.96 days in group B to 1.44 days in group A patients. There was early return to normal and recreational activities in patients operated by TEP method. Return to normal activity was counted on the basis of number of days patient took to resume normal day to day activities like going to the toilet and attending to his basic needs without resorting to help from others. This was significantly reduced from a mean of 2.74 days in group B patients to 1.34 days in group A patients. Similarly the return to recreational activity was also counted and the basis of which was the patient being able to take part in the recreational activities like sitting in the common room or eating the common dining hall or taking a walk in the lawn. This was also significantly reduced from a mean of 4.7 days in group B patients to 3.22 days in group A patients. There was no significant difference in the complication rates of the two groups. One patient in each group developed seroma operated site which was managed conservatively while another patient in group B developed a surgical site infection which was managed by opening the skin sutures, intravenous antibiotics and secondary suturing after the infection resolved

Discussion:

Laparoscopic repair of inguinal hernias has not only given a big challenge to much in use conventional Lichtenstein open mesh repair but has proved to be superior or even recommended in cases of bilateral and recurrent inguinal hernias. The technique is being used now exclusively at most of the hospitals of the country. There are certain contra-indications for laparoscopic mesh repair like patients with massive hernias, extremely obese patients, pregnancy, unfit for GA, with significant chest diseases, having multiple co-morbidities and patients on anticoagulants. All these patients should not undergo

this repair and better done open repair by spinal or local anaesthesia. General anaesthesia used in laparoscopic repair does not affect the period of discomfort against the spinal anaesthesia used in open repair. It is debated that laparoscopic hernia repair is more expensive than open repair of inguinal hernia in terms of consumables but faster recovery and early return to the activity proves economically more beneficial to the patients operated with TEP repair and in addition a significant reduction in chronic groin pain further help to save the valuable time and money.

There is a steep learning curve for the surgeons interested in learning this technique which can be overcome by strictly adhering to the principles of surgery. This includes following correct tissue planes, recognizing each and every structure and doing precise dissection to achieve the desirable result. Initially a learning surgeon may operate under supervision of an experienced surgeon and take his time for understanding and performing the technique but later he should improve to bring it to a comparable level against open repair. There should be minimal or no complications and high standards may be achieved even in learning phase.

In open hernia an incision is given in the inguinal region and the aponeurosis of external oblique muscle is divided to reach the inguinal region and these structures are to be repaired to restore the normal anatomy, this leads to scar formation and a potential site of weakness in the anterior abdominal wall while in TEP repair there are very small incisions which heals rapidly with minimal scars and no residual weakness. In open repair the mesh is placed within the layers of groin muscles much outside the defect but in TEP repair the mesh is placed in pre peritoneal layer which is better anatomical and physiological correction of defect without giving any major incision to skin and muscles of groin. This also avoids the division of nerves which takes place in open groin surgery leading to sensory dysfunction and features of chronic groin pain. The significantly less pain in the postoperative period, leads to early mobilization and return to work than open mesh repair.

McCormack and Scott in 2003 published a report citing that after a laparoscopic repair return to usual activity is faster and persisting pain is reduced, however there is longer operative time with more complications^[8]. Vidovic D, Kirac I, Glavan E in 2007 published that operating time almost equal in both groups with complications slightly more in the TEP group^[9]. It is agreed that there are more chances of intraoperative and postoperative complications and short-term recurrence against the open Lichtenstein hernia repair but with extra care, as in our study, all possible complications can be nearly avoided. Scott et al [10] in 2004 over a 3 month follow up and Grant et al [11] in the same year over a 5 year follow up, found that laparoscopic patients were doing better

Laparoscopic repair of inguinal hernias should be recommended in all patients with bilateral and recurrent hernias^[12]. In a bilateral hernia both the sides are repaired through same incisions, taking less time and better results than open repair while in recurrent hernias of previous open repair, the defect is repaired posteriorly avoiding the adhesions and scar tissue formation of anterior open repair.

On the basis of these experiences, laparoscopic totally extra peritoneal hernia repair seems to be superior to, the existing open Lichtenstein repair in terms of duration of surgery, postoperative pain, hospital stay, return to work, cosmesis and patient satisfaction.

Conclusion:

With this we conclude that in this study of 100 patients of inguinal hernia comparing the post operative morbidity amongst the patient operated by "Laparoscopic Totally Extra Peritoneal (TEP) Mesh Repair" and "Open Lichtenstein Mesh Repair" we found that:

1. The operative time is significantly lower in the TEP group.
2. Patients who were operated by TEP took significantly lesser number of doses of intra muscular analgesia.
3. Pain scores were significantly lower in the TEP group on the post operative evening as well as first and second post operative days.
4. Duration of hospital stay was significantly less in patients who underwent TEP as compared to the patients who underwent Lichtenstein open mesh repair.
5. Time taken to return to normal activity was found to be significantly shorter in the patients belonging to the TEP group.

6. There was no significant difference noted in the post operative complications in both the groups.

Recommendations:

Our study recommends totally extra peritoneal (TEP) laparoscopic mesh repair is much better than lichtenstein mesh repair and should be done in all cases unless due to some contra-indications. Surgeons in this modern world need to overcome the steep learning curve of this surgical procedure and give benefits of laparoscopic surgery to the patients. There are following advantages of this surgery over the open repair:

- (i) Minimal scars
- (ii) Less wound complications
- (iii) Less postoperative pain
- (iv) Reduced analgesic requirement
- (v) Faster resumption of normal activities
- (vi) Very helpful and recommended in bilateral and recurrent inguinal hernias
- (vii) Lowered overall cost
- (viii) Patient satisfaction
- (ix) Cosmetic advantage

Conflicts of Interest – Nil

Table 1 : Overall results of the study

Variable under review	Group A (TEP) Mean \pm SD	Group B (Lichtenstein) Mean \pm SD	P value	Significant/Not Significant
1. Age (yrs)	44.94 \pm 13.52	46.76 \pm 15.712	0.536	Not significant
2. Operative time (mins)	38.38 \pm 11.086	49.22 \pm 11.162	0.000	Significant
3. Dose of analgesia	2.10 \pm 0.647	3.30 \pm 0.580	0.000	Significant
4. Pain score on the evening of the surgery	57.12 \pm 14.617	72.04 \pm 11.395	0.000	Significant
5. Pain score on 1st POD	30.6 \pm 12.166	39.20 \pm 11.445	0.000	Significant
6. Pain Score on the 2nd POD	13.60 \pm 7.048	24.12 \pm 10.881	0.000	Significant
7. Duration of hospital stay(days)	1.44 \pm .760	2.96 \pm 1.029	0.000 *	Significant
8. Return to normal activity(days)	1.34 \pm .519	2.74 \pm .600	0.000 *	Significant
9. Return to recreational activity(days)	3.22 \pm .790	4.70 \pm 1.111	0.000 *	Significant
10. Complications	1 (2%)	2 (4%)	-	No Significant Difference

*as per Mann-Whitney Test

References:

1. McKernan JB. Laparoscopic extraperitoneal repair of inguofemoral herniation. *Endosc Surg Allied Technol* 1993; 1(4): 198-203.
2. Phillips EH, Carroll BJ, Fallas MJ. Laparoscopic preperitoneal inguinal hernia repair without peritoneal incision. Technique and early clinical results. *Surg Endosc* 1993;7(3): 159-162.
3. Arregui M. Laparoscopic inguinal herniorrhaphy. *Surg Clin North Am* 1993; 73(3): 513-526.
4. Hernia. 2009 August; 13(4): 343-403.
5. Douek M, Smith G, Oshowo A, Stoker DL, Wellwood JM. Prospective randomised controlled trial of laparoscopic versus open inguinal hernia mesh repair: five year follow up. *Bmj* 2003; 326(7397): 1012-1013.
6. Neumayer L, Giobbie-Hurder A, Jonasson O, Fitzgibbons R, Jr., Dunlop D, Gibbs J, Reda D, Henderson W. Open mesh versus laparoscopic mesh repair of inguinal hernia. *N Engl J Med* 2004; 350(18): 1819-1827.
7. Tamme C, Scheidbach H, Hampe C, Schneider C, Kockerling F. Totally extraperitoneal endoscopic inguinal hernia repair (TEP). *Surg Endosc* 2003;17(2): 190-195.
8. McCormack K, Scott NW, Go PM, Ross S, Grant AM. Laparoscopic techniques versus open techniques for inguinal hernia repair. *Cochrane Database Syst Rev* 2003(1): CD001785.
9. Vidovic D, Kirac I, Glavan E, et al. Laparoscopic totally extraperitoneal hernia repair versus open Lichtenstein hernia repair: results and complications. *J Laparoendosc Adv*

- Surg Tech A. Oct 2007;17(5):585-90.
10. Scott NW, Grant AM, Ross SJ, Smith A, Macintyre IMC, O'Dwyer PJ. Patient-assessed outcome up to three months in a randomised controlled trial comparing laparoscopic with open groin hernia repair. *Hernia* 2000;4: 73-79.
 11. Grant AM, Scott NW, O'Dwyer PJ. Five-year follow-up of a randomized trial to assess pain and numbness after laparoscopic or open repair of groin hernia. *Br J Surg* 2004; 91(12): 1570-1574.
 12. Eklund A, Rudberg C, Leijonmarck CE, Rasmussen I, Spangen L, Wickbom G, Wingren U, Montgomery A. Recurrent inguinal hernia: randomized multicenter trial comparing laparoscopic and Lichtenstein repair. *Surg Endosc* 2007; 21(4): 634-640