MAR Gastroenterology (2024) 3:8

Research Article

Inguinal Hernia Repair Using Laparoscopic TransAbdominal PrePeritoneal (TAPP)

Vinod Kumar Singhal 1*, Adil Mohammed Suleman [2], Nufra Senopher [3], Faris Dawood Alaswad[4], Riya Singhal[5]

1. Vinod Kumar Singhal, Consultant surgeon, Department of General Surgery, Prime hospital, Dubai, UAE.

2. Adil Mohammed Suleman, Specialist General Surgeon, Department of General Surgery, Prime Hospital, Dubai, UAE.

3. Nufra Senopher, Department of General Surgery, Prime Hospital, Dubai, UAE.

4. Faris Dawood Alaswad, Consultant General Surgeon, Department of Surgery, Gladstone Hospital, Perth, Australia.

5. Riya Singhal, Student, SMCH, Dubai, UAE.

***Correspondence to**: Vinod Kumar Singhal, Consultant surgeon, Department of General Surgery, Prime hospital, Dubai, UAE.

Received: 16 Sep 2024

Published: 17 Sep 2024

Background

Laparoscopic groin hernia repair is an advanced laparoscopic procedure that needs to be added to the armamentarium of any surgeon. The surgeon's understanding of the anatomy of pre peritoneum and training in basic laparoscopic procedures play crucial roles in learning transabdominal pre-peritoneal (TAPP) or totally extraperitoneal (TEP) repairs. For a beginner, TEP may be technically challenging since the trocars need to be in the pre peritoneum and the working space is limited compared to TAPP.[1] It is also known that controversies exist about which procedure is superior. Some studies say that TEP may be superior, citing the slightly higher rates of abdominal injuries and post operative complications in TAPP. But there is no conclusive evidence for the same.[2] With this background, this study aims to analyse the learning curve and short term outcomes of TAPP repairs for inguinal hernia and compare it with historic TEP controls.

Materials and Methods

This retrospective study was conducted employing multi-database systematic search on laparoscopic TAPP inguinal hernia repairs performed by a single surgeon in a tertiary care set up in United Arab Emirate. Consecutive 100 TAPP repairs done on 69 patients over two years (July 2014 to January 2016) were included in the study. The post operative follow-up period ranged from 6 months to 2 years. 14 patients were lost to follow-up and were excluded from the study. Out of the 55 patients included, 31 had unilateral hernias while the remaining 24 had bilateral hernias, thereby making a total of 79 TAPP repairs; the procedure of which is briefed as follows.

The patients were routinely evaluated about 2 weeks prior to surgery. Strain factors like LUTS, constipation were identified, investigated and optimized. They were admitted the day before the procedure. Surgery was done under GA and prophylactic antibiotic was administered during induction. Operative technique involved creation of pneumoperitoneum by open technique through the 10 mm umbilical trocar. A 30 degree telescope was used with a CO2 gas pressure of 12 mm Hg. After a quick diagnostic exploration, the 5 mm trocars were placed on either sides, lateral to the rectus sheath below the level of umbilicus. The median umbilical fold was visualized and the hernial orifices inspected. The next step was to reduce hernial contents, if any. The peritoneal incision was then made about 3 cm above the hernia and the preperitoneal space delineated. Medially, the dissection was carried out just medial to Cooper's ligament and laterally, upto the Psoas muscle with the overlying lateral femoral cutaneous and genitofemoral nerves. The inferior epigastric vessels were identified and the hernial sac with the cord structures located. If indirect, the sac was dissected off from the cord structures and reduced. In direct hernia, the sac and preperitoneal fat were freed from the thinned out

transversalis fascia and cord structures separated from them.

After dissection, hemostasis was secured and the mesh was introduced. The mesh used in all our cases is the Johnson and Johnson light polypropylene mesh 10x16cm. The mesh was positioned in the space and a single tack at the Cooper's ligament was used for anchorage. Mesh overlap of about 3 cm around the myopectineal orifice was ensured. Following this, peritoneum was closed with 3-0 prolene. The trocars were then removed, pneumoperitoneum released and port closure done. Post operatively, the patients were observed for one day and discharged on POD 1 or 2. They were followed up in clinic at regular intervals.

Various intra operative and post operative parameters in this process such as duration of operation, visceral/ vascular injuries, rate of conversion to open, post op infection, seroma formation, scrotal oedema, orchitis, neuropathy, sub-acute intestinal obstruction and recurrence of hernia were analysed.

Results

Of the 55 patients studied, 53 were males and 2 were females. Mean age of presentation was 53.3 years. 31 patients had unilateral hernias and 24 of them had bilateral hernias. 3 patients had recurrent hernias. Out of the 79 total repairs performed, 50 were direct hernias, 23 were indirect hernias and 6 of them had both direct and indirect components. With regard to the size of the hernia, 26 hernias were large, 40 were moderate hernias and 13 of them small. Patient factors tabulated in table-1.

TAPP	**Sex**		**Type**		**Size**		**Side**	
n = 79	Males	53	Indirect	23	Large	26	Unilateral	31
	Females	2	Direct	50	Moderate	40	Bilateral	24
			Both	6	Small	13		

The duration of operative procedure consistently reduced over time for both unilateral and bilateral repairs (Figure 1 and 2). The patients of both unilateral and bilateral hernias were grouped into 3 equal subsets of which the last subset had the lowest mean operative duration (Figure 3).

Figure-1: Learning curve for unilateral TAPP repairs

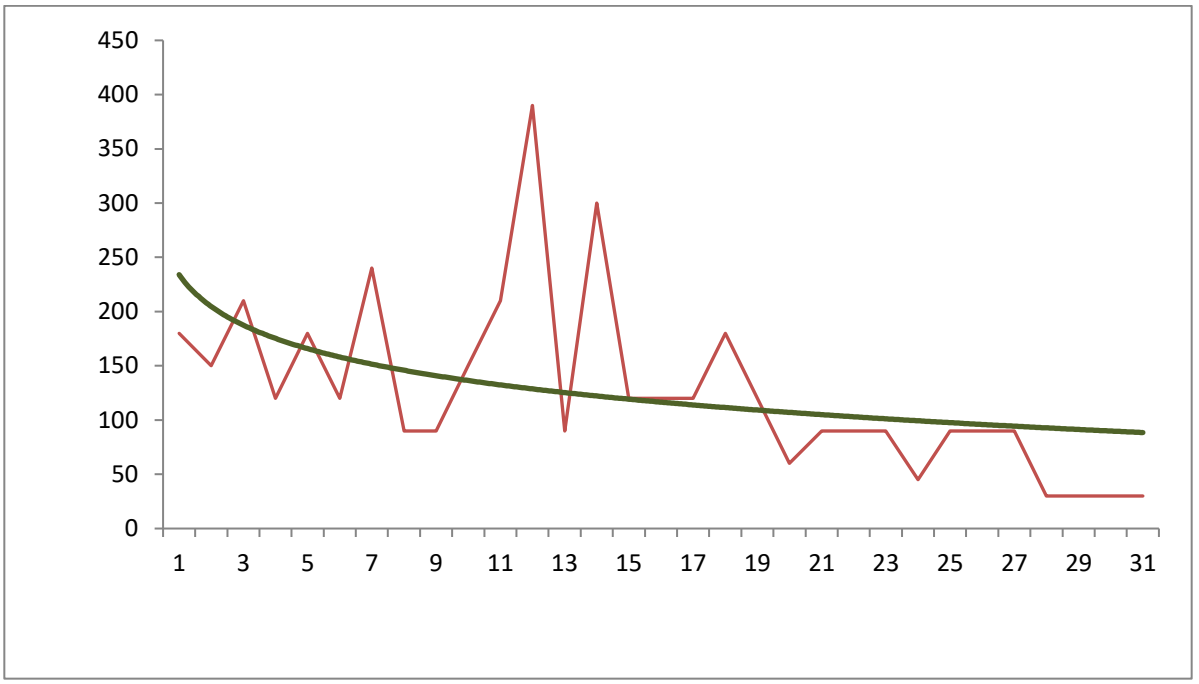


Figure-2: Learning curve for bilateral TAPP repairs

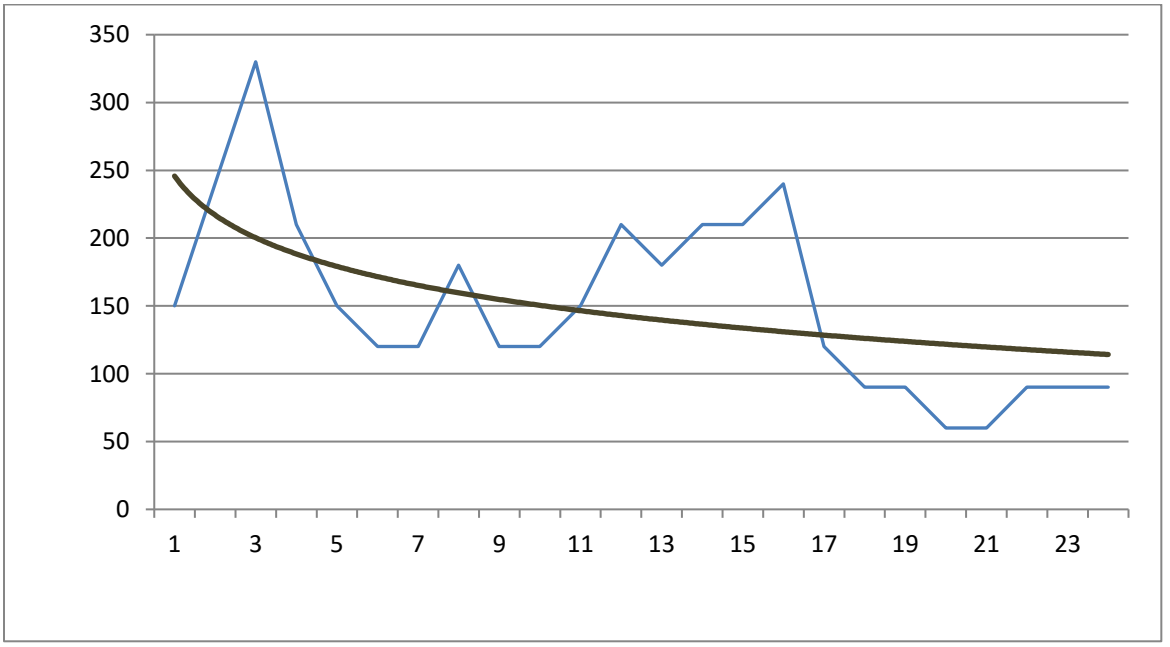
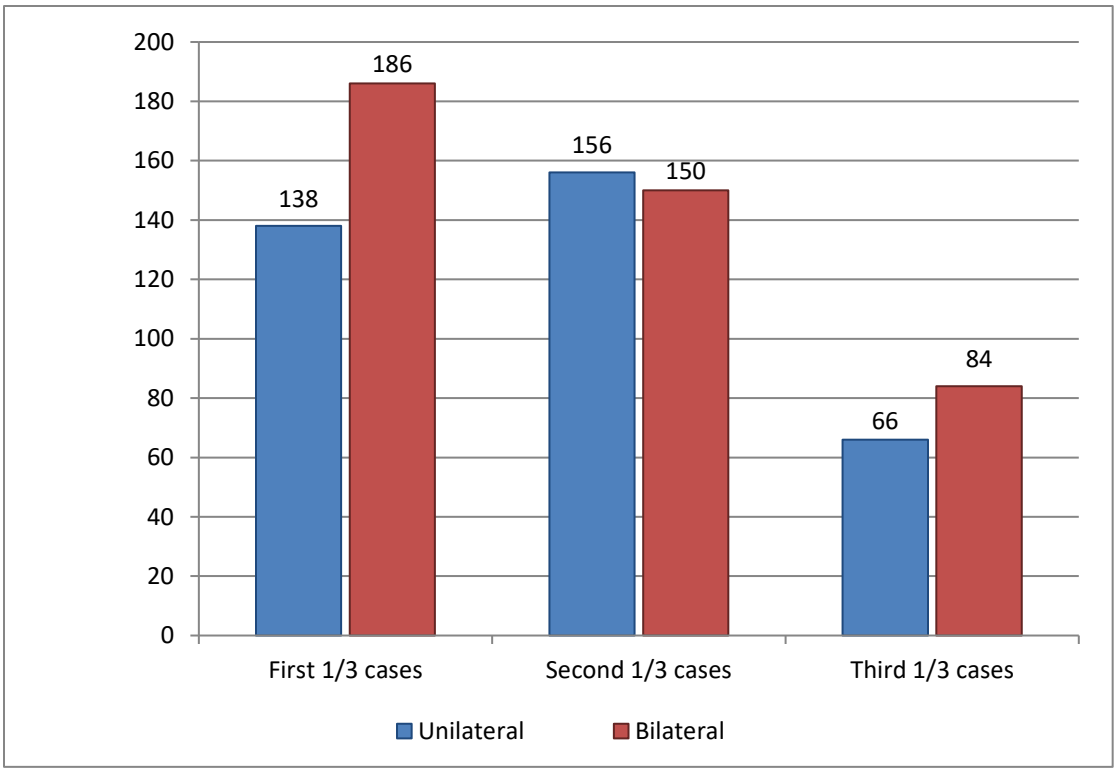
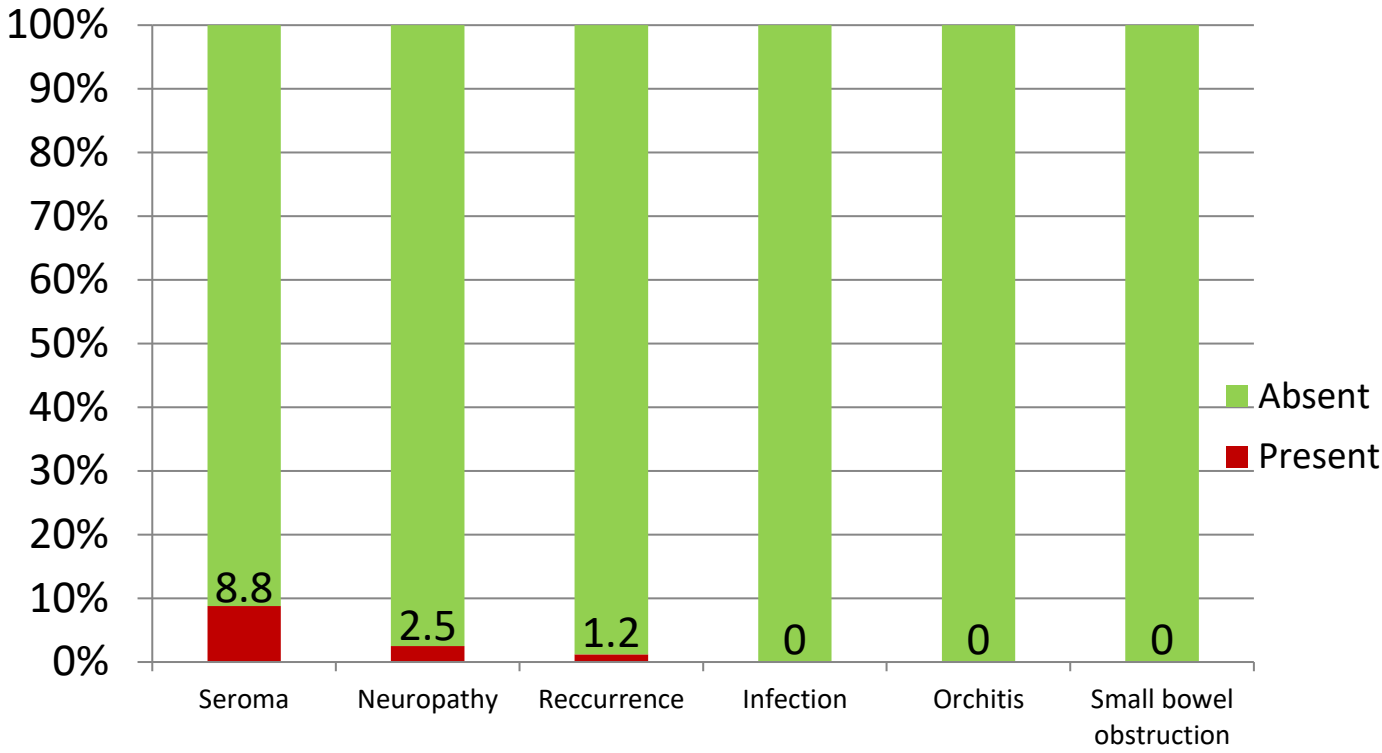


Figure-3: Comparative reduction in mean surgical duration



The mean duration of hospital stay was 2.1 days. There was no infection or orchitis in any patient. Seroma occurred in 7 patients (8.8%) who had large hernia sacs that required considerable dissection. Neuropathy was encountered in 2 patients (2.5%). None of the patients had symptoms of small bowel obstruction. There was only one case of recurrence that occurred after 2 years of follow up (1.2%).(Figure-4)

Figure-4: Postoperative complications



Discussion

The study primarily focuses on the performance and learning curve of laparoscopic TAPP repair by a single surgeon. As there is no established superiority of one laparascopic hernia repair technique over another, and as the operating surgeon had already been trained in other laparoscopic abdominal surgeries, TAPP was the technique preferred.[2] Hernias of different sizes were able to be managed with the chosen procedure and many of them were either large or moderate sized.[3]

Duration of surgery was used as the marker to monitor the learning curve of the operating surgeon. The mean time in first one third of surgeries was 186 and 138 minutes for bilateral and unilateral hernias respectively. In the last one third of the cases, the surgical duration reduced to less than half of the time taken for the initial one third; 84 and 66 minutes for bilateral and unilateral hernias respectively.(Figure-3) It was noted that for the last four consecutive cases of unilateral hernia repairs, the operative duration was consistently about 30 minutes.(Figure-1) A similar study performed by Bokeler et al., showed the mean operating time for unilateral TAPP repair to be 59 minutes.[4] Other published works on difference in operative time of TAPP compared to TEP showed either no major difference, or a slightly higher duration for TEP.[5-8]

Duration of operations plotted in chronology revealed that after 16 cases the mean operative time stabilized and consistently remained low in the current study.(Figure 1 & 2) This is comparable to the findings of Bansal et al., who suggest that mean duration for TAPP optimizes after 13 surgeries.[9] On the contrary, Studies on TEP show a wide range in the number of procedures that are to be performed to achieve a stabilization of operative time. This varies from 60 cases as suggested by Choi et al., 30 cases by Lim et al., 18 cases by Mathur et al. and 14 cases by Bansal et al.[9-12]

It was observed that the higher operating time directly correlated with the size of the hernia sacs. Also, presence of both direct and indirect components in a hernia and sliding hernias contributed to the increase in duration. The surgical duration of one patient in the study was about 6 hours since he developed an intraoperative pneumoperitoneum related complication which delayed the surgical progress.

Several authors have reported higher incidence of visceral injuries with TAPP than with TEP.[2,6] However no visceral / vascular injuries occurred in any of the 79 TAPP procedures performed in the current study. Two cases required conversion to open; one being a large cystocoele with dense adhesions and another in a patient who had undergone radiotherapy for prostate cancer. Literature however shows that the conversion to open occurs more often in TEP than TAPP.[6, 7, 13]

When considering the mean duration of hospital stay, studies suggest that patients undergoing TAPP require slightly prolonged hospital stay (2.9 days) than those undergoing TEP (2.3 days).[7] In the present study, the mean duration of hospital stay was 2.1 days. Prolonged hospital stay was noted in a patient who developed a large seroma and persistent electrolyte abnormality after surgery.

Postoperatively, seroma was found to be the commonest complication and occurred in 7 patients (8.8%). All the patients who developed this complication had a large hernial sac requiring considerable dissection with electocautery. In a study involving 1194 cases of TAPP repair by Castorina et al., the incidence of postoperative seroma was found to be 10%.[14] Although studies indicate a higher rate of seroma in TAPP compared to TEP (3.5% vs 0.6%), this may be due to the fact that large sacs and scrotal hernias are most preferably dealt by TAPP repair.[6] However high rates of seroma can also occur in TEP as demonstrated in a randomized control trial done by Krishna et al.[13]

Neuropathy is an infrequent complication which is reported to occur in about 1% of the patients after TAPP.[15] In the current study, two patients (2.5%) developed neuropathy which was noticed during the follow up period. One patient complained of chronic pricking type of inguinal pain, while the other developed numbness over the lateral aspect of groin and thigh (meralgia).

There was one medial recurrence (1.2%) noted during the follow up period in a patient who had a large hernial sac with both direct and indirect components. This is comparable to the documented recurrence rate of 0.9% for TAPP.[5] Studies also state that there is no major difference in recurrence rates between TAPP and TEP.[2, 6, 7] None of the patients in the study developed any mesh related wound infection, orchitis or intestinal obstruction.

Conclusions

This study substantiates the existing fact that TAPP is easier to learn and perform. In this study, the surgeon required 16 laparoscopic TAPP repairs to master the technique. Until proven conclusively, a well performed TAPP is similar, if not better than TEP, owing to its brief learning curve and ability to repair large hernias or scrotal hernias. The intraoperative and postoperative complication rates and recurrence rates are similar in comparison to TEP repair.

Reference

1. Chobey P (ed.): Endoscopic repair of abdominal wall hernias, 1 edn. New Delhi: Byword Viva; 2004.

2. Wake BL, McCormack K, Fraser C, Vale L, Perez J, Grant AM: Transabdominal pre-peritoneal (TAPP) vs totally extraperitoneal (TEP) laparoscopic techniques for inguinal hernia repair. Cochrane Database Syst Rev 2005(1):CD004703.

3. Morales-Conde S, Socas M, Fingerhut A: Endoscopic surgeons' preferences for inguinal hernia repair: TEP, TAPP, or OPEN. Surg Endosc 2012, 26(9):2639-2643.

4. Bokeler U, Schwarz J, Bittner R, Zacheja S, Smaxwil C: Teaching and training in laparoscopic inguinal hernia repair (TAPP): impact of the learning curve on patient outcome. Surg Endosc 2013, 27(8):2886-2893.

5. Bracale U, Melillo P, Pignata G, Di Salvo E, Rovani M, Merola G, Pecchia L: Which is the best laparoscopic approach for inguinal hernia repair: TEP or TAPP? A systematic review of the literature with a network meta-analysis. Surg Endosc 2012, 26(12):3355-3366.

6. Kockerling F, Bittner R, Jacob DA, Seidelmann L, Keller T, Adolf D, Kraft B, Kuthe A: TEP versus TAPP: comparison of the perioperative outcome in 17,587 patients with a primary unilateral inguinal hernia. Surg Endosc 2015, 29(12):3750-3760.

7. Gass M, Banz VM, Rosella L, Adamina M, Candinas D, Guller U: TAPP or TEP? Population-based analysis of prospective data on 4,552 patients undergoing endoscopic inguinal hernia repair. World J Surg 2012,

36(12):2782-2786.

8. Sato H, Shimada M, Kurita N, Iwata T, Nishioka M, Morimoto S, Yoshikawa K, Miyatani T, Goto M, Kashihara H et al: The safety and usefulness of the single incision, transabdominal pre-peritoneal (TAPP) laparoscopic technique for inguinal hernia. J Med Invest 2012, 59(3-4):235-240.

9. Bansal VK, Krishna A, Misra MC, Kumar S: Learning Curve in Laparoscopic Inguinal Hernia Repair: Experience at a Tertiary Care Centre. Indian J Surg 2016, 78(3):197-202.

10. Choi YY, Kim Z, Hur KY: Learning curve for laparoscopic totally extraperitoneal repair of inguinal hernia. Can J Surg 2012, 55(1):33-36.

11. Lim JW, Lee JY, Lee SE, Moon JI, Ra YM, Choi IS, Choi WJ, Yoon DS, Min HS: The learning curve for laparoscopic totally extraperitoneal herniorrhaphy by moving average. J Korean Surg Soc 2012, 83(2):92-96.

12. Mathur S, Lin SY: The learning curve for laparoscopic inguinal hernia repair: a newly qualified surgeon perspective. J Surg Res 2016, 205(1):246-251.

13. Krishna A, Misra MC, Bansal VK, Kumar S, Rajeshwari S, Chabra A: Laparoscopic inguinal hernia repair: transabdominal preperitoneal (TAPP) versus totally extraperitoneal (TEP) approach: a prospective randomized controlled trial. Surg Endosc 2012, 26(3):639-649.

14. Castorina S, Luca T, Privitera G, El-Bernawi H: An evidence-based approach for laparoscopic inguinal hernia repair: lessons learned from over 1,000 repairs. Clin Anat 2012, 25(6):687-696.

15. Muschalla F, Schwarz J, Bittner R: Effectivity of laparoscopic inguinal hernia repair (TAPP) in daily clinical practice: early and long-term result. Surg Endosc 2016.

Medtronic