ORIGINAL ARTICLE

Study of Selection of Method of Laparoscopic Inguinal Hernia Repair by Comparison of Totally Extraperitoneal with Transabdominal Preperitoneal

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Abstract

Aim: Selection of type of laparoscopic inguinal hernia repair procedure for patients. To observe the comparison of the outcome of laparoscopic totally extraperitoneal (TEP) with transabdominal preperitoneal (TAPP) inguinal hernia repair. Explore the safety and feasibility of laparoscopic TEP and TAPP inguinal hernia repair. Advantages and Disadvantages of laparoscopic TEP with TAPP inguinal hernia repair.

Materials and methods: In this study, 100 cases of inguinal hernia were admitted to the Department of General Surgery, L.G. Hospital, Maninagar, Ahmedabad, Gujarat, India in during the study period of 2019–2021 and operated for either of the laparoscopic methods randomly and equal in number.

Results: All of our laparoscopic inguinal hernia repair patients selected for TEP and TAPP and all of them have good outcomes in the form of no recurrence. Both TEP and TAPP are found to have safe procedures and our institute has all the facilities required to perform inguinal hernia repair so it is feasible as well. Both procedures have their advantages and disadvantages, but both were found to be equally effective.

Conclusion: From our study, we concluded that any of the inguinal hernia patients can be treated with either of the laparoscopic methods with equal results. There is no recurrence in both TEP and TAPP procedures. However, there are some concerns regarding the feasibility of both the procedure in the form of laparoscopic setup it requires and higher cost. Laparoscopic TEP repair is marginally better than TAPP in the form of the duration of surgical time, port site infection, and seroma while TAPP is marginally better at fewer chances of subcutaneous emphysema, the technicality of the procedure and diagnosis of opposite site hernia. However, both techniques are comparable and commendable if performed with precision and expertise.

Keywords: Inguinal hernia, Transabdominal preperitoneal, Totally extraperitoneal.

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Introduction

Laparoscopic surgeries have made inguinal hernia surgery a most interesting endeavor that demands renewed discipline and dedication, and therefore hernia repairs have been studied repeatedly.[1] Both totally extraperitoneal (TEP) approach and transabdominal preperitoneal (TAPP) approach are performed, none can be termed as a superior procedure as each one is accompanied by varied advantages, disadvantages and early or late complications.

The objective of this article is to systematically study the selection of method, comparison of advantages, disadvantages, outcome, safety, and feasibility of laparoscopic inguinal hernia repairs.

Materials and Methods

In this study, 100 cases of inguinal hernia were admitted to the Department of General Surgery, L.G. Hospital, Maninagar, Ahmedabad, Gujarat, India during the study period between 2019 and 2021. The sample size of the study was 100.

Inclusion Criteria

- Patients having uncomplicated reducible and nonobstructive unilateral and bilateral inguinal hernias.
- Patients with primary and recurrent hernias.
- Patients should be operated under general anesthesia.

Exclusion Criteria

- Patients presented with irreducible/strangulated/obstructed inguinal hernia who required emergency exploration.
- Pediatric age group (<12 years) patients are not included.
- High-risk patients (ASA grade >3) who are not fit for general anesthesia.

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Table 1A: Age distribution

Age range (years)	*Number of patients*
13–20	3
21–30	5
31–40	10
41–50	10
51–60	15
61–70	7
	50

Table 1B: Mean age distribution

	N	*Minimum*	*Maximum*	*Mean*
Age (year)	100	16	68	45.40

Table 2: Type of surgeries in different types of hernias

Type of hernia	*Total*
Direct	58
Indirect	42
Laparoscopic TEP	50
Laparoscopic TAPP	50

- Patients who were not willing to follow-up.
- History of any previous pelvic surgery or irradiation for malignancy.
- Recurrent laparoscopic hernia.

Visual analog scale (VAS) was used to assess the severity of pain. The patient was asked to describe the pain on a scale of 0–10; 0 denoted "no pain," 1 denoted "mild pain," and 10 denoted "worst pain."

Pain Score

- P0, VAS score 0: No pain
- P1, VAS score 1–3: Mild
- P2, VAS score 4–6: Moderate
- P3: VAS score 7–10: Severe

Results

In this study of laparoscopic inguinal hernia repair, 100 cases were taken for study from 2019 to 2021. Operative and postoperative details were collected and confirmed by asking questions and systemic examination was done during the follow-up. The follow-up duration was 1 year.

- *Age distribution*: The maximum age at the time of operation was 68 years and the minimum age was 16 years. The highest age group was between 51–60 years (Tables 1A and B).
- *Gender distribution:* All the patients were male.
- *Type of surgeries in different types of hernias:* We have performed 50 TAPP and 50 TEP surgeries. Out of 50 TAPP surgeries, 28 were direct hernias and 22 were indirect hernias and in TEP surgeries out of 50 patients, 30 were direct hernias and 20 were indirect hernias (Table 2).
- *Duration of surgery:* The mean duration of TEP was 1 hour and 20 minutes and the mean duration of TAPP surgeries was 1 hour and 40 minutes (Table 3).
- *Pain incidence:* The incidence of mild pain (P1) was 26% at the 1-week follow-up in both TEP and TAPP. The incidence of mild pain was 2% at 3-months follow-up in TAPP cases while in TEP cases there were 0% mild pain cases. Thus, the incidence of chronic pain was 2% at 3-months follow-up in TAPP only (Tables 4 and 5). Moderate or severe pain was not present at 3 months follow-up.
- *Hematoma:* No incidence of hematoma was reported in laparoscopic inguinal hernia repair.
- *Seroma formation:* The incidence of seroma formation was reported in 4% cases more in TAPP (three cases) as compared to TEP (one case) (Table 6).
- *Wound infection:* Incidence of wound infection in the form of port-side mild infection was reported in 2% of cases both in TAPP cases most probably due to missed intraperitoneal infection (Table 7).

Table 3: Duration of surgery

Surgery done	*N*	*Mean (average) (minutes)*
Laparoscopic hernia repair	100	90
TEP	50	80
TAPP	50	100

Table 4: Incidence of pain at 1 week

	LAP hernia repair (both TEP and TAPP)	
Grade of pain	*Total*	*Percentage*
P0 (No pain)	74	74
P1 (Mild)	26	26
P2 (Moderate)	0	0
P3 (Severe)	0	0

Table 5: Incidence of pain at 3 months

	LAP hernia repair (both TEP and TAPP)	
Grade of pain	*Total*	*Percentage*
P0 (No pain)	98	98
P1 (Mild)	2 (in TAPP only)	2
P2 (Moderate)	0	0
P3 (Severe)	0	0

Table 6: Seroma formation

LAP hernia repair	*Seroma formation*
TEP	1
TAPP	3

Table 7: Wound infection

LAP hernia repair	*Wound infection (%)*
TAPP	2
TEP	0

Table 8: Surgical emphysema

LAP hernia repair	*Surgical emphysema (out of 50)*
TEP	12 (24%)
TAPP	0 (0%)

Table 9: Scrotal edema

LAP hernia repair	*Scrotal edema (%)*
TAPP	2
TEP	0

Table 10: Shoulder pain

	Shoulder pain	
LAP hernia repair	*Total*	*Percentage*
TEP	0 of 50	0
TAPP	2 of 50	4

Table 11: Duration of hospital stay

	Hospital stay (days)			
LAP hernia repair	*1*	*2*	*3*	*4*
TEP	0	45	5	0
TAPP	0	40	8	2

Table 12: Age of the patients at presentation

Age (years)	*Present study (100 cases)*	*Rutkow and Robbins study*
<15	–	18 (18%)
15–44	44 (44%)	26 (26%)
45–64	52 (52%)	30 (30%)
>65	4 (4%)	26 (26%)

- *Surgical emphysema:* Incidence of surgical emphysema was reported in 24% of cases of TEP repair and 0 in TAPP (Table 8).
- *Scrotal edema:* Incidence of surgical scrotal edema was reported in 2% of cases in TAPP in an indirect hernia. Reason being we are able to dissect the indirect hernial sac easily in TEP as compared to TAPP according to our experience (Table 9).
- *Shoulder pain:* Incidence of shoulder pain was reported in 4% of cases in TAPP due to abdominal distention by the creation of pneumoperitoneum while in TEP, there was no shoulder pain reported as there was no need for pneumoperitoneum creation (Table 10).
- *Urinary retention:* No incidence of urinary retention was reported as all cases were catheterized preoperatively.
- *Recurrence:* Incidence of recurrence was not reported in laparoscopic inguinal hernia repair cases.
- *Duration of hospital stay*: The mean duration of the hospital stay was found to be 2.17 days for the laparoscopic inguinal hernia repair. Since ours is a teaching institution the minimum time taken from admission to surgery is 1 day hence making the duration of the hospital stay apparently longer (Table 11).

Discussion

Age

In our study, the maximum age of the patients at the time of operation was 68 years and the minimum age was 16 years. The highest age group was between 45 and 64 years. In a study by Rutkow and Robbins,[2] the age at presentation is discussed as follows. It is compared with this study (Table 12).

In the study of Rutkow and Robbins, the highest incidence was in the age group 45–64 years, which was in 30 cases. In our study, 26 cases in the 45–64 age group were the highest cases. The age incidence of our study matches the above study. In our study, the average mean age is 45.40. The mean average age 55.98 ± 12.71 was found in the study by Choi et al.[3]

Laparoscopic inguinal hernia repair is done under general anesthesia whereas open inguinal hernia repair is usually done under local or spinal anesthesia. So, in elderly patients who are usually comorbid, the laparoscopic procedure becomes riskier, making it a disadvantage of the laparoscopic procedure. Laparoscopic hernia repair is an ideal procedure in young and in non-comorbid elderly patients. In TEP, there is the formation of pneumo-preperitoneal space creation is done while in TAPP pneumoperitoneum is created so in conditions in which pneumoperitonem is contraindicated we can still go for TEP.

Table 13: Types of hernia

Type of hernia	*Total*	*Present study (%)*	*Rutkow and Robbins (%)*
Direct	70	70	68
Indirect	30	30	32

Table 14: Types of surgery

Type of surgery	*Present study*
TEP	50
TAPP	50

Types of Hernia

In our study, the average percentage of incidence of direct hernia was 58% while for indirect hernia it was 42%, and the mean age group in our study was 45.40 years. That is because older patients have more chance to develop direct hernia rather than indirect hernia. The incidence of different types of hernia in our study is consistent with the analysis of the hernia centers 8-year series of 2,861 primary hernias (Table 13).

Types of Surgery

In this study, 50 cases underwent TEP repair and 50 cases underwent TAPP (Table 14). The patients were randomly chosen for the different surgeries.

Laparoscopic TEP repair is technically more difficult than laparoscopic TAPP repair. In TAPP pneumoperitoneum is created and later peritoneal flap dissection is done. It is the lucid procedure as compared to the dissection of preperitoneal space by balloon inflation in TEP. According to the basic principles of laparoscopic surgery, in the TEP procedure, there is no triangulation of ports, which makes it a challenging procedure.

It is advisable to repair a recurrent hernia previously operated by open repair, by the laparoscopic method as a smaller number of adhesions are encountered and a smaller number of additional defects are missed. One of our patients, who was operated by an open Lichtenstein repair method 3 years ago, developed recurrence. He was easily managed for recurrent hernia by TAPP procedure.

Duration of Surgery

In our study, the time for laparoscopic inguinal hernia repair (TEP/TAPP) was 90 minutes compared to the Udwadia Tehemton study which was taking around 67.5 minutes.[4] In the medical research council (MRC) trial, the operating time was 58.4 minutes for the laparoscopic inguinal hernia repair group (Table 15).

Table 15: Duration of surgery

Type of surgery	*N*	*Mean (time in minutes)*	*Udwadia Tehemton*	*MRC trial*
Laparoscopic hernia repair	30	90	67.5	58.4

Table 16: Intraoperative complications

Complication	*Present study (%)*	*MRC trial (%)*
Bladder injury	0	2
Common iliac artery injury	0	1
Lateral femoral cut; nerve injury	0	1

This may be due to the difficult initial learning curve in laparoscopic hernia repair. The time taken to perform laparoscopic repair also depends on the type of hernia (direct/indirect) and size of the defect. Encircling the cord in laparoscopic indirect inguinal hernia repair is challenging as compared to direct inguinal hernia repair, therefore requiring more time in indirect hernias. In laparoscopic TEP repair, there is the possibility of an accidental tear in the peritoneum. It can cause seepage of carbon dioxide into the abdominal cavity. This decreases the working preperitoneal space. Also, repair of the peritoneal tear has to be done. This can increase the operative time for TEP repair in such cases.

In our study, there were 12 cases of bilateral direct inguinal hernia repair done laparoscopically. For bilateral inguinal hernias repair, TEP is simple because there is the creation of common preperitoneal space for repair on both sides by balloon. Whereas in TAPP, different peritoneal flaps have to be made. This is proven by our study, as the average time taken for bilateral TEP was 100 minutes, and for TAPP was 140 minutes.

Intraoperative Complications

Laparoscopic hernia repair can be faced with serious intraoperative complications (Table 16). When laparoscopic hernia was newly developed these complications were encountered more often, but it was due to the lack of the number of surgeries performed with this method and hence experience was minimal. Few studies and trials showed common injuries during laparoscopic surgeries; according to the MRC trial,[5] three complications were common during TAPP surgeries, which were bladder injury, lateral femoral cutaneous nerve injury, and common iliac artery injury. About 15 visceral and vascular injuries were reported in TAPP repair by the laparoscopic group of the European Union Hernia Trialists Collaboration. Two bladder injuries were reported while performing TAPP during the clinical study (SCUR).[6] Vascular injuries of 0.42% and visceral injuries of 0.11% were reported in the study of Brittner et al. 2011. As mentioned previously, due to lack of exposure to such surgeries, herniation of small bowel loops through incomplete sheath closure at the port site causing obstruction that occurred more often, but they were gradually recognized and with sheath closure compulsorily performed their incidence has decreased.

In our study, there were no major complications such as major vascular injury, or visceral injury in laparoscopic inguinal hernia repair. These major complications are not usually witnessed in open inguinal hernia repair surgeries as there is no dissection in deeper planes in open inguinal hernia repair surgeries.

Table 17: Postoperative complications

Complication	*%*	*TEP (%)*	*TAPP (%)*
Hematoma	0	0	0
Seroma	4	3	1
Wound infection	2	0	2
Scrotal edema	2	0	2
Urinary retention	0	0	0
Shoulder pain	4	0	4

Other unique complications of laparoscopic surgeries are port site hernias, hemorrhage due to injury to epigastric and gonadal vessels, hypotension, hypercapnia, and subcutaneous emphysema.

Minor intraoperative complications such as subcutaneous emphysema were encountered in 24% of cases of TEP, and it was never found in TAPP repair. Surgical emphysema was noted in 48% patients of bilateral TEP repair and 56% patients of pneumoperitoneum due to peritoneal breach encountered in a study by Philips et al. Pneumoperitoneum was easily managed by insertion of Veres needle at Palmer's point or repair of the peritoneal rent. No active management is required for subcutaneous emphysema. It usually resolves with time.

Postoperative Complications

In our study, the postoperative complications such as hematoma, seroma, wound infection, scrotal edema, urinary retention, and shoulder pain were reported in 0, 4, 2, 2, 0, and 4% cases in the laparoscopic hernia repair group (Table 17).

In the study done by Tehemton et al. wound infection rates were significantly lower after laparoscopic techniques (1%). Also, a surgical site infection (SSI) of 0.6–1.5% was observed by McCormack et al.[7] and Schmedt et al. in the laparoscopic method. Our study has comparable results with the above study regarding wound infection. Wound infection at the port site is managed with regular cleaning and dressing. One of the advantages of laparoscopic hernia repair is decreased incidence of SSI. A single shot of preoperative antibiotic can drastically lower the chances of postoperative SSI. Probable causes of SSI were high volume centers, not maintaining proper aseptic and antiseptic protocols, local site skin infections, lack of hygiene, and lack of usage of postoperative antibiotics. in our study, 2% of cases operated by TAPP developed port site infection most probably due to missed intraperitoneal infection. It is less in TEP as we remain outside the peritoneum while performing surgery and the peritoneum act as a barrier for infection to reach the port side.

In our study, no incidence of hematoma was recorded. In the study done by Tehemton et al., the incidence of inguinal hematoma was found to be significantly lower after the laparoscopic repairs (13.1%). McCormack et al. encountered 8.7% hematoma; Schmedt et al. found hematoma in 13.1%. Contrary to this, Phillips et al. had 0% hematoma in their patients. The incidence of hematoma formation in laparoscopic repair is comparatively low.

In our study, 4% of laparoscopic hernia repair patients develop seroma. In a study done by Tehemton et al., seroma formation was observed in (10%) by laparoscopic techniques. This shows that there is an increased incidence of seroma in laparoscopic repair, making it a disadvantage. The reason is, increase dissection is required in laparoscopic repair either to make preperitoneal space or to make

the peritoneal flap. In our observation low incidence is mainly due to meticulous dissection during surgery, packing with gauze pieces at the hernial defect site, and strapping with dynaplast to decrease the potential space for seroma collection. We can also prevent seroma formation by tucking pseudosac to the posterior abdominal wall with tacker and decreasing the potential space for seroma formation. We observed more seroma formation in TAPP which is about 3% out of the 4% of indirect hernia patients in our study mainly because of excessive dissection and pulling of the indirect hernial sac from the deep ring making it difficult to do hemostasis beyond deep ring which may be the cause. No active management is required for seroma. The seroma usually subsides within a month. We advise never to aspirate the seroma as it may introduce infection from outside into the seroma.

A total of 2% of our patients developed scrotal edema postoperatively in TAPP, and none of our TEP patients had developed scrotal edema. Mainly observed in patients with large complete indirect hernial defects; as such defects require excessive dissection and mobilization and the indirect sac can be dissected more meticulously by TEP as compared to TAPP according to our experience. No active management is required. The edema usually subsides within a month. We have prescribed chymotrypsin–trypsinogen and serratiopeptidase combination for oedema treatment.

In our study, 4% of the cases experienced shoulder pain in TAPP, which may be due to diaphragmatic irritation caused by carbon dioxide insufflation to create pneumoperitoneum, and this minor complication is never faced in TEP as pneumo preperitoneum is created rather than pneumoperitoneum.

Mesh infection is also a troublesome complication that requires the removal of the mesh. Mycobacterium other than tuberculosis (MOTT) can be cultured from infected mesh. Luckily, we did not encounter this kind of complication in our study because the mesh and mesh fixation devices used were sterilized by ethyline oxide sterilisation (ETO), and we usually take laparoscopic hernia as the first operation in our operative list to prevent infection.

Postoperative Pain

In our study, postoperative pain at 1 week of surgery was 26% which was of mild grade that is P1 according to VAS score in both TEP and TAPP laparoscopic repair method. No significant difference was found according to the SCUR trial for graded pain scores on the 7-day postoperative visit. During this visit, 72% of patients in the laparoscopic group, reported no pain. The veterans affairs (VA) trial found significantly less pain on the day of the operation and at 2 weeks in both TEP and TAPP methods by using a VAS.

Chronic pain is sometimes a debilitating complication for the patient and a more difficult problem for the surgeon to treat than perioperative pain and also the spectrum of severity is wide. Hence, this makes it more important for successful inguinal hernia repair.

In our study, postoperative pain at 3 months of surgery was found in only two patients (2%) in TAPP cases for which we could not find any reasons. None of our TEP patients had postoperative pain post 3-months follow-up. The laparoscopic group in the MRC trial, at 1 year after the operation, had a significantly lower rate of persistent groin pain. In the VA trial, incidence of neuralgia or other pain post 1 year after the operation was 9.8% in the laparoscopic group. Significantly a smaller number of cases of pain persisting post 1 year of either surgery was found according to The European Union meta-analysis.[8]

Table 18: Recurrence

Recurrence	*Current study (%)*	*MRC trial (%)*
Laparoscopic repair	0	1.9

Hence, there is evidence as per our study that laparoscopic surgeries show significant differences in both postoperative and persistent pain.

Recurrence

In our study, we found 0% recurrence in laparoscopic hernia repair cases. MRC laparoscopic hernia trial group found a 1.9% recurrence rate in the laparoscopic group. Results of recurrence are comparable for both TEP and TAPP in our study (Table 18). The most common reason for recurrence is improper dissection and separation of the hernial sac which might cause its inadequate reduction or other additional defects or hernias may be missed.[9] Incomplete mesh placement as in not covering the defect completely, the small size of mesh or not taking into account the contraction of mesh is another major reason for recurrence. It is now generally believed that the mesh size should be at least 10 cm × 14 cm[10] to cover all of the potential hernia sites, to provide at least 4-cm overlap with the hernia, and to avoid problems with mesh migration, shrinkage, and rolling. We kept 12 cm × 15-cm-sized mesh in both TEP and TAPP.

Duration of Hospital Stay

The mean duration of the hospital was found to be 2.17 days for the laparoscopic inguinal hernia repair. Since ours is a teaching institution the minimum time taken from admission to surgery is around 1 day hence making the duration of stay apparently longer. Choi et al.[3] had a mean hospital stay of 1.4 days for the laparoscopic method. Similarly, Phillips et al. in their study found a mean stay of 1.91 days for the laparoscopic method. This shows, there is decreased hospital stay in laparoscopic surgery. The mean duration of hospital stay in our study for TEP was 2.1 and for TAPP was 2.24. it is showing no major difference in hospital stay for TEP vs TAPP.

Cost of Surgery

The increased cost of surgery is a major drawback of laparoscopic hernia repair, and this increased cost is due to more expensive equipment, longer operative time, and more operative charges claimed by surgeons. Accurate evaluation of operative cost based on the type of procedure (TEP/TAPP), type and length of anesthesia, and the number of tackers used to fix the mesh. Laparoscopic instruments require a special sterilization technique (ETO), which also increases the cost. In the case of TAPP if the peritoneum flap is closed by the tackers, then as compared to TEP cost of surgery increases, and if the peritoneum flap is closed by intracorporeal suturing then the length of surgery will increase so in this domain TEP is better compared to TAPP.

Conclusion

The TAPP repair is useful in special circumstances like when there is diagnostic uncertainty if a hernia is present or not in a patient whose history and physical examination are unclear also in uncomplicated irreducible hernias or large-sized hernias. We can also look for the undiagnosed opposite-site hernia in TAPP as compared to TEP. Also, TAPP is preferred over TEP in patients with a hernia who have

had previous lower abdominal and pelvic surgery in the space of Retzius as it provides a wider approach to groin anatomy. Hernial sac contents can be easily seen with TAPP while it is not possible to see the content in the case of TEP. In this domain, TAPP is better than TEP. In the case of unilateral inguinal hernia if we perform TEP and if the patient develops a hernia on the opposite side later on in his/her life span then TAPP will be the surgery of choice because due to previous TEP repair preperitoneal space creation again by TEP method will become troublesome.

The patient selected for TEP repair is a unilateral as well as bilateral inguinal hernia but more useful for bilateral direct inguinal hernias, as it allows common preperitoneal space dissection.

Chances of potentially serious intraoperative complications like bladder injury, bowel perforation, and vascular injury are not commonly witnessed with both TEP and TAPP.

Fewer chances of scrotal edema in TEP compared to TAPP in our study and hematoma formation is usually not found in either, laparoscopic method.

Chances of hernial repair site seroma are more in laparoscopic repair as there is wide preperitoneal space dissection. In our study, seroma is more common in TAPP as compared to TEP reason behind it is balloon dissection in the right preperitoneal plane and hemostasis achieved more efficiently by letting the balloon inflate for 2–3 minutes. Which decreases the chances of seroma in TEP. We also used to pack the hernia defect site (potential space for the seroma formation) with a piece of thick gauze piece and strapped it with the dynaplast for an initial 3–4 days of postoperative dressing.

According to our comparison, the major advantage of TEP is decreased incidence of acute and chronic postoperative pain compared to TAPP in indirect hernia. The reason is, there are few chances due to meticulous dissection, particularly in the indirect sac.

Narrow working space and lack of triangulation of instruments make the TEP procedure more difficult than TAPP and is the reason behind the longer learning curve in TEP. However, once mastered TEP is less time-consuming and comparable with TAPP.

In both TEP and TAPP, early resumption of normal activity and days of disability are equal in our study as mean hospital stay is less and chronic pain is insignificant.

Fewer chances of mesh infection as the mesh is placed in preperitoneal space. However, chances of port site infection may be there in TAPP due to exposure to the intraabdominal cavity which might be already infected and missed in preop evaluation.

It is advisable to repair a recurrent hernia previously operated by open repair, by the laparoscopic method as a smaller number of adhesions are encountered and a smaller number of additional defects are missed. Both TEP and TAPP have equal benefits in such cases.

In both techniques of TAPP and TEP learning curve is more compared to open surgery while among both the laparoscopic methods of hernia repair learning curve in TEP is technically longer than TAPP.

Both TEP and TAPP have a steep learning curve and fearsome complications but once mastered, it is the safest and most efficacious technique. Because of the advantages and disadvantage of both techniques one should learn both of them.

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