



## Comparative Study of Effectiveness of Transabdominal Preperitoneal (TAPP) or Totally Extraperitoneal (TEP) Technique for Bilateral Inguinal Hernia: A Randomized Controlled Trial

Dr. Kaushlendra Singh Narwariya<sup>1</sup>, Dr. Spandan Kumar<sup>2</sup>

1. Assistant Professor, Department of General Surgery, S.R.V.S. Medical College, Shivpuri, Madhya Pradesh, India.
2. Assistant Professor, Department of General Surgery, RG Medical College & Hospital, Hathras, Uttar Pradesh, India.

\*Corresponding author's E-mail: [spandy87@gmail.com](mailto:spandy87@gmail.com)

Received: 18-03-2024; Revised: 24-05-2024; Accepted: 02-06-2024; Published on: 15-06-2024.

### ABSTRACT

**Introduction:** Laparoscopic surgery was first used to repair inguinal hernias in 1983 by physician Ralph Ger. These days, transabdominal preperitoneal (TAPP) and completely extraperitoneal (TEP) repair are the most frequently performed laparoscopic procedures. Different studies have shown differing results with both approaches. There is a dearth of information regarding the comparative analysis of each of these surgical techniques in India, especially in the north.

**Aims/objective:** To compare the outcome of TAPP and TEP techniques in bilateral, uncomplicated inguinal hernia.

**Materials and Method:** 50 patients had undergone inguinal hernia repair via TAPP technique and 50 patients with TEP technique. Pain severity was measured using visual analogue scale (VAS). Duration of surgery, duration of surgery and hospital stay was noted. Incidence of complications from surgery to 7 days of follow-up was noted. A follow-up was also done at 3 months after discharge for pain and recurrence.

**Results:** Pain severity with respect to VAS score were significantly lower in patients undergoing hernia surgery via TAPP technique versus TEP technique ( $p > 0.05$ ). Patients undergoing hernia repair via either TAPP or TEP technique had similar length of hospital stay ( $p > 0.05$ ). There was significantly less duration of surgery via TEP technique as compared to TAPP technique ( $p < 0.05$ ). However, patients undergoing TAPP hernia repair took less time to attain routine activity ( $p < 0.05$ ). There was no significant difference between TAPP and TEP group with respect to incidence of complications ( $p > 0.05$ ).

**Conclusion:** Inguinal hernia repair via TAPP technique had greater intra-operative time but less pain post-operative pain and less time to attain routine activity.

**Keywords:** Inguinal Hernia, TAPP, TEP, Pain Severity, Duration of Surgery.

### INTRODUCTION

A protruding portion of the abdominal cavity content via the inguinal canal is called an inguinal hernia. This kind of hernia is the most prevalent and primarily affects men. It is claimed to be frequently linked to aging and persistent abdominal strain<sup>1</sup>. With a 5% to 7% occurrence, hernias are a widespread issue in the modern world. Because so many people work in agriculture, building, lifting weights, and other physical labour, there is a significant health care burden in developing nations like India, where the prevalence of hernias is significantly higher. About 75% of all groin hernias are in the inguinal region<sup>2,3</sup>.

Ger et al. performed the first laparoscopic hernia repair in 1990<sup>4</sup>. Hernioplasty can be performed using a variety of methods, including robotic TAPP, completely extraperitoneal (TEP), and laparoscopic transabdominal preperitoneal (TAPP). Establishing a synthetic mesh within the pre-peritoneal region is the fundamental idea behind all procedures<sup>5-7</sup>.

A substantial number of hernias in underdeveloped nations are discovered after the patient is sick, which increases the risk of morbidity and death<sup>1</sup>. General surgeons working in nations with low resources have

therapeutic problems while managing inguinal hernias. The absence of contemporary medical equipment like mesh and laparoscopy and the late onset of the illness are two of the main disadvantages in underdeveloped nations<sup>8</sup>.

It is evident from the fact that more than 100 different techniques for repairing inguinal hernias have been documented and used at some point in the past century that none have been deemed unquestionably better than the others. Nowadays, there are just three methods that have been shown effective by science and are advised for usage in therapeutic settings: (1) Shouldice's Method (2) Lichtenstein's hernioplasty with open mesh (3) Hernioplasty using laparoscopic posterior mesh.

Regarding the resources needed, the materials needed, the difficulty of mastery, complications and recurrence, recovering time, and the rates of acute and chronic pain, each approach has unique benefits and drawbacks. Nonetheless, mesh repair for inguinal hernias has become commonplace in recent years. Tension-free mesh repairs are becoming more and more common because to the lower recurrence rate (less than 1% with mesh compared to over 15% with tissue repairs), quicker recovery times, and less postoperative pain. Among the surgeon's tools,



laparoscopy repair of inguinal hernias is a comparatively recent development<sup>9</sup>.

Laparoscopic surgery was first used to repair inguinal hernias in 1983 by physician Ralph Ger<sup>10</sup>. These days, transabdominal preperitoneal (TAPP) and completely extraperitoneal (TEP) repair are the most frequently performed laparoscopic procedures. A synthetic mesh and general anaesthesia are required for both surgeries. Entry to the hernia site through the peritoneal cavity is required for TAPP. During TEP, the peritoneal cavity does not get penetrated. Instead, the preperitoneal plane is used to reach the hernia site, and the hernia aperture outside the peritoneum is sealed with mesh. Any direct, indirect, as well as femoral hernias can be seen by using either technique, which makes the whole inguinal floor visible<sup>11</sup>.

Advocates of laparoscopic repair for hernias, both bilateral and recurrent, highlight the benefits of this procedure. Laparoscopic surgery can be used to treat bilateral hernias concurrently, ruling out any hernias on the other side that may not have been discovered. Contralateral hernias can be promptly detected with great efficacy using the TAPP approach<sup>12</sup>.

The results of previous research on pain are controversial. Early postoperative periods following TAPP procedure were associated with increased discomfort (Krishna et al., Bansal et al.). Numerous further research has not discovered any distinction in discomfort between TEP and TAPP procedures<sup>13,14</sup>.

As a result, different studies have shown differing results with both approaches; some have found them to be comparable, while others have found TEP to be superior. The selection of surgery is specifically influenced by a number of patient features. There is a dearth of information regarding the comparative analysis of each of these surgical techniques in India, especially in the north.

Hence, we decided to undertake this study to compare the outcome of TAPP and TEP techniques in bilateral, uncomplicated inguinal hernia. The objectives were to compare the pain severity with respect to visual analogue scale (VAS), duration of surgery, duration of hospital stay, incidence of complications and recurrence rate between two groups.

## MATERIALS AND METHODS

This was an open label randomized controlled trial with parallel 1:1 allocation ratio conducted on patients of inguinal hernia in department of surgery of tertiary care hospital of India from July 2022 to January 2023. The study was started after taking institutional ethics committee approval and taking written informed consent from patients with inguinal hernia under the recommendation of good clinical practice and declaration of Helsinki.

### Inclusion Criteria:

- Patients of male sex of age between 18-75 years
- Patients with reducible Bilateral inguinal hernia

- Patients planned for laparoscopic mesh hernioplasty
- Patients with ASA status I or II

### Exclusion Criteria:

- Patients planned for additional surgical procedures like bowel resection and anastomosis.
- Patients with complicated and irreducible hernia, or needing emergency procedure
- Patients with contraindication to laparoscopic hernia repair such as adhesions caused in previous abdominal surgery, or giant hernia.
- Patients with coagulopathies or any other systemic illness.

**Sample size:** With mean VAS score of  $0.96 \pm 0.4$  in TEP group and 1.28 in TAPP group reported in previous study<sup>13</sup>, the minimum sample size required to generate 95% power with 0.05 alpha value was found to be 82 with 41 patients in each group. To adjust for expected 15% attrition rate, 100 patients were randomized to 50 patients in each group.

Randomization was done using web-generated random numbers.

### Surgical procedure

Following the skin test, a single preventive injection of ceftriaxone 1 gm was given intravenously in the preoperative area. Every patient had a catheter for urine. Using the traditional three ports approach, all surgeries were carried out under general anaesthesia (GA) with the patients in the supine and Trendelenburg positions.

### TAPP Technique

After GA induction, pneumo-peritoneum was established via the supra-umbilical port employing a Verres needle. One 10 mm camera port was positioned in the supraumbilical area once the intra-abdominal pressure reached 14 mm of Hg. The other two 5 mm ports were maintained in both sides of the mid-clavicular line at the same level of the umbilicus. A five-centimetre peritoneal incision was performed from the cranial to the inguinal defect following an abdominal examination. During pre-peritoneal dissection, the medially located Cooper's ligament was discovered.

The opposing side's Cooper's ligament served as the medial boundary of dissection. The hernia sac was isolated from the cord structures when the cord structures were discovered. The lateral limit of dissection was the anterior superior iliac spine (ASIS) to the ipsilateral side. The point where the vas deferens turns medially was the lowest limit of dissection. A 15 × 12 centimetre polypropylene mesh was positioned in the pre-peritoneal area following correct dissection. After repairing the supra-umbilical fascial defect using polyglactin suture, absorbable suture was used to sew the peritoneal flap. Non-absorbable nylon suture was then used to close the port site.



### TEP Technique

Following the installation of GA, a 10 mm port was positioned somewhat beneath the umbilicus to accommodate the 10 mm 30 0 telescope. Telescopic blunt dissection was used to generate a preperitoneal gap till the pubic symphysis was visible in the midline. Two more 5 mm working ports were added during the dissection process; one was placed directly above the pubic symphysis, and the other in the middle of the space between the pubic symphysis and the umbilical port. The anterior superior iliac spine was the lateral boundary of preperitoneal flap dissection.

With meticulous dissection, the peritoneum was pushed as low as possible to reveal the deep ring, triangle of doom, psoas major muscle, and nerves. A 15 × 12 centimetre polypropylene mesh was unfolded in the preperitoneal space following the removal of the hernial sac in order to completely cover any potential hernial sites. It was not secured with a suture or clips. After the pneumoperitoneum was released, 1 or 2 interrupted sutures using polyglactin were used to close the umbilical fascia.

### Post-operative period

The urinary catheter was removed immediately after the completion of the procedure. Post-operatively, an injection of paracetamol 1 gram was infused intravenously every eight hours on the day of surgery in all patients of both the groups as per the standard protocol of our department. The additional analgesic requirement was fulfilled by injection of diclofenac 75 mg by the intravenous route, as needed if the visual analogue scale (VAS) score was more than three. An assessment of pain was made using the VAS score in the postoperative and follow-up periods.

Duration of surgery, duration of surgery and hospital stay was noted. Incidence of complications from surgery to 7 days of follow-up was noted. A follow-up was also done at 3 months after discharge for pain and recurrence.

### Statistical Analysis

Data from patients with inguinal hernia were presented in tabular form using Microsoft Excel 365 and transferred to SPSS version 24 for further statistical analysis. Continuous data such as age, duration of surgery, length of hospital stay, and VAS score were expressed as mean ± SD (standard deviation). Statistical significance of difference in continuous data between TAPP and TEP group was evaluated by unpaired t-test. Categorical data, such as incidence of post-operative complications were reported as percentages and frequencies and then compared by chi-square or Fisher's exact test. A p-value of less than 0.05 was taken as cut-off for statistical significance.

### RESULTS

50 patients had undergone inguinal hernia repair via TAPP technique and 50 patients with TEP technique. Their baseline demographic and clinical characteristics is given in Table 1.

**Table 1:** Comparison of Baseline Demographic and Clinical Characteristics between TAPP and TEP Group

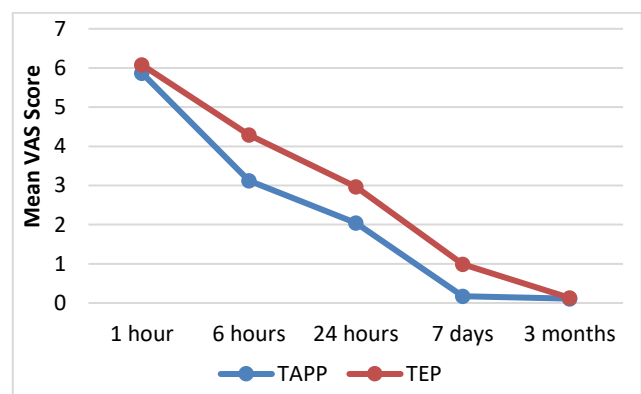
Parameters	Group TAPP N = 50	Group TEP N = 50	P-Value
Age in years (mean ± SD)	49.87 ± 6.24	51.23 ± 6.09	0.27
<b>Type of Hernia</b>			
Direct	18	20	0.84
Indirect	32	30	
<b>Extent</b>			
Incomplete	39	44	0.29
Complete	11	6	
<b>ASA Grade</b>			
1	22	24	0.84
2	28	26	

Most of the patients belonged to 45-60 years of age group in either TAPP or TEP group. Indirect and incomplete hernia were predominant type in either TAPP or TEP group. There was not significant difference between TAPP or TEP group with respect to age, type and extent of hernia, and ASA grade (p>0.05)

**Table 2:** Comparison of Pain Severity (VAS Score) between TAPP and TEP Group

VAS Score in mean ± SD	Group TAPP N = 50	Group TEP N = 50	P-Value (Unpaired t-test)
VAS at 1 hour	5.87 ± 0.47	6.08 ± 0.53	0.04
VAS at 6 hours	3.12 ± 0.26	4.29 ± 0.41	<0.0001
VAS at 24 hours	2.04 ± 0.35	2.97 ± 0.38	<0.0001
VAS at 7 days	0.17 ± 0.04	0.99 ± 0.13	<0.0001
VAS at 3 Months	0.11 ± 0.02	0.13 ± 0.03	0.0002

Pain severity with respect to VAS score were significantly lower in patients undergoing hernia surgery via TAPP technique versus TEP technique (p>0.05).



**Figure 1:** Comparison of VAS Score between Two Groups

**Table 3:** Comparison of Duration of Surgery, Length of Hospital Stay and Time to Attain Routine Activity between TAPP and TEP Group

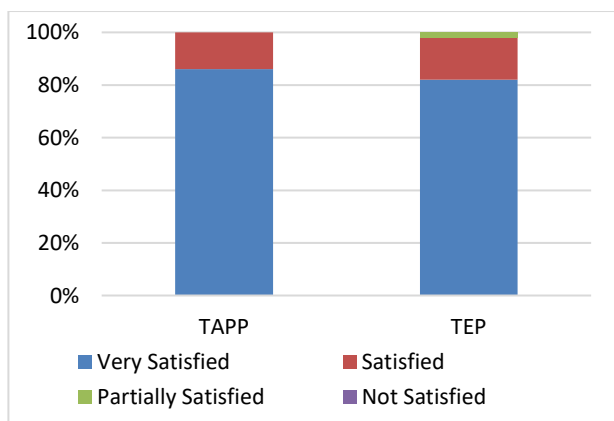
Parameters	Group TAPP N = 50	Group TEP N = 50	P-Value (Unpaired t-test)
Duration of Surgery in Minutes (mean $\pm$ SD)	97.66 $\pm$ 10.59	78.43 $\pm$ 8.74	<0.0001
Length of Hospital Stay in Hours (mean $\pm$ SD)	41.22 $\pm$ 4.07	40.17 $\pm$ 3.95	0.19
Time to Attain Routine Activity in Days (mean $\pm$ SD)	31.57 $\pm$ 2.86	33.36 $\pm$ 3.07	0.03

Patients undergoing hernia repair via either TAPP or TEP technique had similar length of hospital stay ( $p>0.05$ ). There was significantly less duration of surgery via TEP technique as compared to TAPP technique ( $p<0.05$ ). However, patients undergoing TAPP hernia repair took less time to attain routine activity ( $p<0.05$ ).

**Table 4:** Comparison of Complications between TAPP and TEP Group

Complications	Number of Patients	
	Group TAPP N = 50	Group TEP N = 50
Hematoma	1	2
Seroma	3	4
Wound Infection	2	2
Scrotal Oedema	4	5
Intestinal Obstruction	1	0
Recurrence	1	0

There was no significant difference between TAPP and TEP group with respect to incidence of complications ( $p>0.05$ ).

**Figure 2:** Patient Satisfaction Score

## DISCUSSION

The current study is an RCT conducted in a hospital to compare the results of the two laparoscopic hernia repair procedures. In this investigation, there was a statistically significant difference between two groups' operating times. The stitching of the peritoneum for covering the mesh may have contributed to the prolonged operational

time for TAPP in the present research. This outcome was in line with the findings of the earlier investigation<sup>14</sup>. On the other hand, operating times for TEP were longer than for TAPP in two studies by Gong et al. (including uncomplicated unilateral inguinal hernia) as well as Sharma et al. (including uncomplicated bilateral inguinal hernia)<sup>14,16</sup>. They cited two factors as the cause of the longer intraoperative stay in TEP: a small workspace and trouble understanding anatomical landmarks.

One of the most frequent and problematic complaints during the recovery phase following hernia surgery is pain. In our investigation, we found that the TEP group experienced noticeably more pain than the TAPP group. In comparison to the TAPP group, the TEP group required more extra analgesics. These findings aligned with those of previous research<sup>16</sup>.

According to our research, the TEP group may have experienced more discomfort because of a thorough dissection that extended from the umbilicus onto the pubic symphysis. The TEP group may have experienced more discomfort because they underwent a higher number of indirect inguinal hernia operations than the TAPP group did. Indirect inguinal hernias experienced more postoperative pain than direct hernias, as demonstrated by Sharma et al.<sup>16</sup>. There was no discernible difference in pain after surgery between the TAPP and TEP groups, according to the Varcus et al. study<sup>17</sup>. But according to one study, the TAPP group experienced more pain than the TEP group<sup>18</sup>.

Both the patient as well as the hospital incur additional costs as a result of the length of stay. Because laparoscopic hernia surgery is a minimally invasive treatment, it has a shorter postoperative hospital stay than open hernia repair. The mean duration of hospital stay for the two groups in our study was similar. There could be two possible explanations for the lack of a significant difference in length of stay in our study. First off, neither group's patients were released from the hospital as soon as possible because the majority of them came from distant and isolated locations. Our findings agreed with those of three previous research<sup>16, 19-21</sup>.

In the Kockerling et al. trial, the TAPP group had lengthier hospital stays than the TEP group because they had more full hernia cases and had undergone surgery with larger defects<sup>22,23</sup>. Extended hospital stays are a result of a higher rate of postoperative complications. The TAPP group in research by Sudarshan et al. spent more time in the hospital than the TEP group, but the cause for this difference in length was not stated.<sup>24</sup> The TAPP group had a noticeably longer post-operative hospital time in the meta-analysis conducted by Bracale et al.<sup>25</sup>

With regard to the occurrence of complications, there was no discernible difference between the TAPP and TEP groups. Despite the fact that none of the groups experienced any serious problems, Bansal et al. found that the TAPP group had a statistically significant greater

frequency of cord edema<sup>14</sup>. By the time of the three-month follow-up, none of the patients still had seroma. The rate of wound infections did not differ statistically significantly between the two groups. TAPP accesses the posterior wall of the inguinal canal intra-abdominally, but TEP requires more extensive dissection to achieve its target. This could explain the variation in the frequency of postoperative seroma and hematoma. The likelihood of hematoma and seroma may be higher due to the raw surfaces produced during TEP dissection.

This study's short follow-up period to determine late post-operative pain or recurrence was a limitation. Even so, an early manifestation of recurrence may not always result from a failed primary repair. Additional research with follow-up periods of at least a year could yield additional proof that one strategy is better than the other. The results of both approaches may have a high degree of dependability in the meta-analysis.

### CONCLUSION

Inguinal hernia repair via TAPP technique had greater intra-operative time but less pain post-operative pain and less time to attain routine activity. Hematoma, seroma, wound infection and scrotal oedema were common complications but their incidence was less than 10% and similar in TAPP or TEP group. The TAPP technique is a viable laparoscopic option for the patient with an inguinal hernia who wants an easy recovery in the initial postoperative phase. Long term studies should be conducted to effectively compare long-term recurrence rate between TAPP and TEP technique.

**Acknowledgement:** We are thankful to the healthcare workers of Venkateshwara Institute of Medical Sciences, Gajraula.

**Source of Support:** The author(s) received no financial support for the research, authorship, and/or publication of this article

**Conflict of Interest:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### REFERENCES

- Chioh AKH, Chong KC, Tan SM. Inguinal hernias: a current review of an old problem. *Proc Singapore Healthc.* 2010;19:202–211.
- Fitzgibbons RJ, Richards AT, Quinn TH. *ACS Surgery: Principles and Practice.* 6th ed. Philadelphia: Decker Publishing Inc; 2002. Open hernia repair; pp. 828–849.
- Ruhl CE, Everhart JE. Risk factors for inguinal hernia among adults in the US population. *Am J Epidemiol.* 2007;165:1154–1161.
- Ger R, Monroe K, Duvivier R, Mishrick A. Management of indirect inguinal hernias by laparoscopic closure of the neck of the sac. *Am J Surg.* 1990;159:370–373.
- Neumayer L, Giobbie-Hurder A, Jonasson O, et al. Open mesh versus laparoscopic mesh repair of inguinal hernia. *N Engl J Med.* 2004;350:1819–1827.
- Jacob BP, Ramshaw B. Springer New York Heidelberg Dordrecht London. NY, USA: Springer, New York, NY; 2013. The SAGES manual of hernia repair.
- Miller HJ. Inguinal hernia: mastering the anatomy. *Surg Clin North Am.* 2018;98:607–621.
- Rao S, Singh P, Gupta D, Narang R. Clinicoepidemiologic profile of inguinal hernia in rural medical college in central India. *J Mahatama Gandhi Inst Med Sci.* 2016;21:116–121.
- Bhandarkar DS, Shankar M, Udadia TE. Laparoscopic surgery for inguinal hernia: current status and controversies. *J Minim Access Surg.* 2006;2:178–186.
- Ger R. The management of certain abdominal herniae by intra-abdominal closure of the neck of the sac. *Ann R Coll Surg Engl.* 1982;64:342–344.
- Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. *Lancet.* 2003;362:1561–1571.
- Bittner R, Arregui ME, Bisgaard T, et al. Guidelines for laparoscopic (TAPP) and endoscopic (TEP) treatment of inguinal hernia [International Endohernia Society (IEHS)] *Surg Endosc.* 2011;25:2773–2843.
- 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;26:639–649.
- Bansal VK, Misra MC, Babu D, et al. A prospective, randomized comparison of long-term outcomes: chronic groin pain and quality of life following totally extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) laparoscopic inguinal hernia repair. *Surg Endosc.* 2013;27:2373–2382.
- Gong K, Zhang N, Lu Y, et al. Comparison of the open tension-free mesh-plug, transabdominal preperitoneal (TAPP), and totally extraperitoneal (TEP) laparoscopic techniques for primary unilateral inguinal hernia repair: a prospective randomized controlled trial. *Surg Endosc.* 2011;25:234–239.
- Sharma D, Yadav K, Hazrah P, Borgharia S, Lal R, Thomas S. Prospective randomized trial comparing laparoscopic transabdominal preperitoneal (TAPP) and laparoscopic totally extra peritoneal (TEP) approach for bilateral inguinal hernias. *Int J Surg.* 2015;22:110–117.
- Vărcuș F, Duță C, Dobrescu A, Lazăr F, Papurica M, Tarta C. Laparoscopic Repair of Inguinal Hernia TEP versus TAPP. *Chirurgia (Bucur).* 2016;111:308–312.
- Bansal VK, Krishna A, Manek P, et al. A prospective randomized comparison of testicular functions, sexual functions and quality of life following laparoscopic totally extra-peritoneal (TEP) and trans-abdominal pre-peritoneal (TAPP) inguinal hernia repairs. *Surg Endosc.* 2017;31:1478–1486.
- Aiolfi A, Cavalli M, Del Ferraro S, et al. Total extraperitoneal (TEP) versus laparoscopic transabdominal preperitoneal (TAPP) hernioplasty: systematic review and trial sequential analysis of randomized controlled trials. *Hernia.* 2021;25:1147–1157.



20. 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 Jan 25;2005(1):CD004703. doi: 10.1002/14651858.CD004703.pub2. PMID: 15674961; PMCID: PMC8845481.
21. Wei FX, Zhang YC, Han W, Zhang YL, Shao Y, Ni R. Transabdominal preperitoneal (TAPP) versus totally extraperitoneal (TEP) for laparoscopic hernia repair: a meta-analysis. *Surg Laparosc Endosc Percutan Tech.* 2015;25:375–383.
22. Köckerling F, Koch A, Adolf D, Keller T, Lorenz R, Fortelny RH, Schug-Pass C. Has Shouldice repair in a selected group of patients with inguinal hernia comparable results to Lichtenstein, TEP and TAPP techniques? *World J Surg.* 2018;42:2001–2010.
23. Gass M, Banz VM, Rosella L, Adamina M, Candinas D, Güller U. TAPP or TEP? Population-based analysis of prospective data on 4,552 patients undergoing endoscopic inguinal hernia repair. *World J Surg.* 2012;36:2782–2786.
24. Sudarshan PB, Sundaravadanan BS, Prabu Shankar S. A comparative study of totally extraperitoneal versus transabdominal preperitoneal repair of inguinal hernias. *Int Surg J.* 2017;4:1244–1248.
25. 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. *Bracale U, Melillo P, Surg Endosc.* 2012;26:3355–3366.

For any questions related to this article, please reach us at: [globalresearchonline@rediffmail.com](mailto:globalresearchonline@rediffmail.com)

New manuscripts for publication can be submitted at: [submit@globalresearchonline.net](mailto:submit@globalresearchonline.net) and [submit\\_ijpsrr@rediffmail.com](mailto:submit_ijpsrr@rediffmail.com)

