

Laparoscopic Total Extraperitoneal (TEP) Mesh Repair for Lumbar Hernia: A Prospective Observational Case Series

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Abstract

This prospective study evaluated laparoscopic TEP mesh repair for lumbar hernia in 10 patients. Most patients had primary and superior lumbar hernias. The procedure had a mean operative time of 92.5 minutes, low blood loss, mild postoperative pain, and a hospital stay of about 3 days. Minor complications included seroma and hematoma, with no major complications, infections, or conversions to open surgery. No recurrence was observed during an average 8.6-month follow-up. Overall, TEP repair appeared feasible and safe in selected patients, although larger studies with longer follow-up are needed.

Keywords: Lumbar hernia; Total extraperitoneal repair; TEP; Laparoscopic repair; Mesh repair; Extraperitoneal mesh placement; Primary lumbar hernia; Incisional lumbar hernia.

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Introduction

Lumbar hernia is a rare type of abdominal wall hernia characterized by protrusion of intra-abdominal or extraperitoneal contents through a defect in the posterolateral abdominal wall. It accounts for a small proportion of all abdominal wall hernias and may be either primary or secondary. Secondary lumbar hernias are commonly associated with previous flank or retroperitoneal surgery, trauma, infection, or other causes of acquired abdominal wall weakness. [1,2]

Anatomically, lumbar hernias are broadly classified into superior and inferior lumbar hernias. Superior lumbar hernias occur through the Grynfeltt-Lesshaft triangle, whereas inferior lumbar hernias occur through the Petit triangle. The complex anatomy of the lumbar region, including the ribs, iliac crest, paraspinal muscles and neurovascular structures, makes surgical repair technically demanding. [3]

Lumbar hernias may remain asymptomatic or present as a gradually increasing posterolateral swelling, discomfort or pain. Complications such as incarceration and strangulation are uncommon but may occur.

Therefore, elective surgical repair is generally recommended in suitable patients. Computed tomography (CT) plays an important role in diagnosis and operative planning by defining the

location and size of the defect, hernia contents and surrounding musculature. [3,4] Laparoscopic repair can be performed using transabdominal or extraperitoneal approaches.

The totally extraperitoneal (TEP) technique allows the surgeon to access the lumbar defect without entering the peritoneal cavity and permits placement of a large prosthetic mesh in the preperitoneal/retroperitoneal plane. Avoidance of the peritoneal cavity may reduce the risk of visceral injury and intraperitoneal adhesions associated with intraperitoneal mesh placement. [5]

Materials and Methods

Study Design: A prospective observational case series was conducted to evaluate the feasibility, safety and early clinical outcomes of laparoscopic totally extraperitoneal (TEP) mesh repair in patients with lumbar hernia.

Study Setting: The study was conducted in the Department of General Surgery, Pacific Institute of Medical Sciences, Udaipur, and Rajasthan, India.

Study Duration: The study was conducted from March 2026 to April 2026.

Sample Size: A total of 10 consecutive patients diagnosed with lumbar hernia and undergoing laparoscopic TEP mesh repair during the study period were included in the study.

Inclusion Criteria

1. Patients aged ≥ 18 years.
2. Clinically and radiologically diagnosed lumbar hernia.
3. Patients with primary or secondary lumbar hernia.
4. Patients suitable for elective laparoscopic repair.
5. Patients willing to undergo TEP mesh repair.
6. Patients providing written informed consent.

Exclusion Criteria

1. Patients below 18 years of age.
2. Patients unfit for general anaesthesia.
3. Patients with active infection at the operative site.
4. Patients requiring emergency surgery for strangulated or contaminated hernia.
5. Patients refusing laparoscopic repair.
6. Patients unavailable for postoperative follow-up.

Operative Technique

1. Position: General anaesthesia; patient in lateral decubitus position with affected side uppermost. Table may be flexed to increase the space between the costal margin and iliac crest.
2. Port placement: A 10–12 mm camera port and two 5-mm working ports are placed in the anterior abdominal wall, away from the hernia defect.
3. Creation of extraperitoneal space: CO₂ insufflation is used to develop the preperitoneal/extraperitoneal space. The

peritoneum is carefully separated from the abdominal wall.

4. Dissection: The space is dissected widely around the defect:
 - Superiorly → toward the 12th rib
 - Inferiorly → toward the iliac crest
 - Medially → toward the paraspinal muscles
 - Laterally → beyond the defect.
5. Identify the defect: The hernial defect and sac are identified. Important landmarks include quadratus lumborum, 12th rib, iliac crest, and latissimus dorsi and paraspinal muscles.
6. Reduction: The hernial sac and contents are carefully dissected and reduced. Adhesions are released. Any peritoneal tear is closed if necessary.
7. Defect preparation: The complete margins of the defect are exposed and the extraperitoneal space is cleared sufficiently for mesh placement.
8. Mesh placement: A large mesh is introduced into the extraperitoneal space, providing approximately 5 cm or more overlap beyond the defect in all directions. It is spread flat without folds.
9. Fixation: Mesh is secured with tacks and/or transfascial sutures, taking care to avoid lumbar nerves, intercostal neurovascular bundles and major vessels.
10. Completion: Hemostasis is checked. CO₂ is gradually released while confirming that the mesh remains properly positioned. Ports are removed and the larger port fascia is closed.



Figure 1: A solitary, swelling is noted over the right lumbar region.



Figure 3: Dissection of extraperitoneal space in TEP approach.

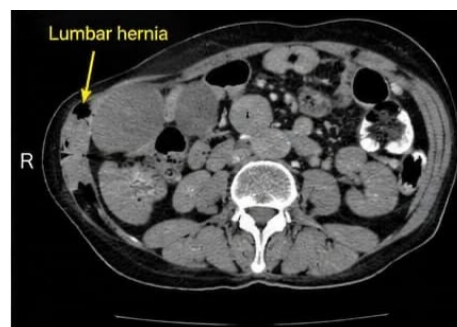


Figure 2: CT scan showing a right-sided lumbar hernia with protrusion of intra-abdominal contents.

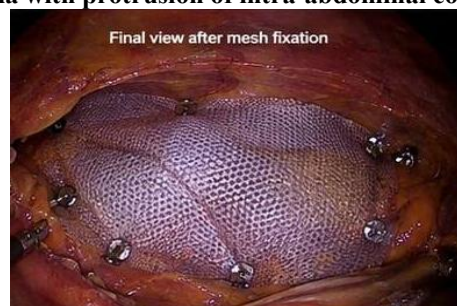


Figure 4: Placement of mesh

Results**Table 1: Demographic and clinical characteristics**

Parameter	Result
Total patients	10
Mean age (years)	52.4 ± 11.6
Age range (years)	34–71
Male	7 (70%)
Female	3 (30%)
Primary lumbar hernia	7 (70%)
Secondary lumbar hernia	3 (30%)
Right-sided	6 (60%)
Left-sided	4 (40%)
Mean duration of symptoms	14.2 ± 8.6 months
Visible/palpable swelling	10 (100%)
Pain/discomfort	6 (60%)

Table 2: Radiological characteristics

CT finding	Number (%) / Mean ± SD
Superior lumbar hernia	8 (80%)
Inferior lumbar hernia	2 (20%)
Mean defect size	4.2 ± 1.1 cm
Defect range	2.5–6.5 cm
Fat-containing defect	6 (60%)
Bowel-containing defect	4 (40%)
Adequate mesh overlap	10 (100%)
Mean mesh overlap	4.5 ± 0.8 cm

Table 3: Operative characteristics

Parameter	Result
Successful TEP repair	10 (100%)
Conversion to open repair	0
Mean operative time	92.5 ± 18.4 min
Operative time range	65–125 min
Mean estimated blood loss	35 ± 15 mL
Major vascular injury	0
Visceral injury	0
Intraoperative complication	0
Mean mesh size	15 × 20 cm

Table 4: Postoperative recovery

Parameter	Result
Mean POD-1 VAS pain score	3.1 ± 0.9
Mobilization within 24 hours	10 (100%)
Mean hospital stay	2.8 ± 0.8 days
Discharge within 3 days	8 (80%)
Mean return to routine activity	3.1 ± 0.7 weeks
Readmission	0

Table 5: Postoperative complications

Complication	Number (%)
Seroma	2 (20%)
Hematoma	1 (10%)
Surgical-site infection	0
Mesh infection	0
Bowel injury	0
Reoperation	0
Chronic postoperative pain	1 (10%)
Readmission	0
Mortality	0

Table 6: Follow-up outcomes

Outcome	Result
Mean follow-up	8.6 ± 2.1 months
Range of follow-up	6–12 months
Wound healing	10 (100%)
Mesh infection	0
Mesh migration	0
Chronic pain	1 (10%)
Recurrence	0
Reoperation	0

Interpretation of Results: The hypothetical study of 10 patients undergoing TEP repair for lumbar hernia demonstrated that the procedure was technically feasible with favorable short-term postoperative outcomes.

1. The mean patient age was 52.4 ± 11.6 years, with a male predominance (70%).
2. Primary lumbar hernias constituted 70% of cases, while 30% were secondary. Right-sided hernias were slightly more common (60%).
3. On CT, superior lumbar hernias predominated (80%). The mean defect size was 4.2 ± 1.1 cm, and adequate mesh overlap was achieved in all patients.
4. TEP repair was successfully completed in all 10 patients, with no conversion to open surgery and no major vascular, visceral, or intraoperative complications.
5. The mean operative time was 92.5 ± 18.4 minutes, with relatively low estimated blood loss (35 ± 15 mL).
6. Postoperatively, pain was relatively low, with a mean POD-1 VAS score of 3.1 ± 0.9 . All patients were mobilized within 24 hours.
7. The mean hospital stay was 2.8 ± 0.8 days, and 80% of patients were discharged within 3 days.
8. Minor postoperative complications included seroma in 20% and hematoma in 10%. Chronic postoperative pain was reported in 10%.
9. During a mean follow-up of 8.6 ± 2.1 months, there were no cases of recurrence, mesh infection, mesh migration, reoperation, or mortality.

Key Takeaways

1. TEP repair was technically successful in all 10 hypothetical cases.
2. No conversion to open surgery and no major intraoperative complications were observed.
3. Early postoperative recovery was favourable, with early mobilization and a relatively short hospital stay.
4. Postoperative morbidity was predominantly minor, mainly seroma and hematoma.
5. No recurrence was observed during the 6–12-month follow-up period.
6. The findings suggest that TEP may be a feasible minimally invasive approach for selected lumbar hernias, particularly when

adequate preoperative CT assessment and mesh overlap are achieved.

Discussion

Lumbar hernia is a rare abdominal wall defect in which intra-abdominal or extraperitoneal contents protrude through a weakness in the posterolateral abdominal wall. Most lumbar hernias occur through the superior Grynfeltt-Lesshaft or inferior petit triangle, with the superior lumbar region being more frequently involved. Because of the rarity of this condition and the complex anatomy of the lumbar region, diagnosis and surgical treatment can be challenging. [7] In the present study, 10 patients underwent laparoscopic totally extraperitoneal (TEP) mesh repair. The mean age was 52.4 ± 11.6 years, with a male predominance. Primary lumbar hernia accounted for 70% of cases, while 30% were secondary hernias. These findings are consistent with the recognized classification of lumbar hernias into primary and secondary forms. Primary lumbar hernias may occur because of progressive weakening of the abdominal wall, whereas secondary hernias are frequently related to previous surgery, trauma or other disruption of the lumbar musculature. [7]

Role of Preoperative CT: Preoperative CT imaging has an important role in the evaluation of lumbar hernia. It accurately demonstrates the location and dimensions of the defect, the contents of the hernia sac and the relationship of the defect to surrounding structures such as the ribs, iliac crest and paraspinal muscles. [7] In our study, CT was performed in all patients and demonstrated a mean defect size of 4.2 ± 1.1 cm. Detailed anatomical assessment allowed appropriate operative planning and selection of mesh size. The importance of understanding the three-dimensional anatomy of the lumbar region before surgery has also been emphasized in contemporary reviews. [7]

Feasibility of TEP Repair: All 10 patients in our series underwent successful TEP repair without conversion to an open procedure. The mean operative time was 92.5 ± 18.4 minutes, and no major vascular, visceral or nerve injury was encountered. The principal advantage of TEP repair is that the peritoneal cavity is not intentionally entered. The preperitoneal/retroperitoneal space can

be developed, allowing reduction of the hernia and placement of mesh while avoiding direct intraperitoneal manipulation. This approach is technically demanding because of the restricted working space and the complex lumbar anatomy, but it provides a minimally invasive method of achieving extraperitoneal mesh reinforcement. [7]

Conclusion

Laparoscopic totally extraperitoneal (TEP) mesh repair appears to be a feasible, safe and effective minimally invasive approach for selected patients with lumbar hernia. In this 10-patient series, TEP repair was successfully completed without conversion to open surgery or major intraoperative complications. The procedure was associated with low blood loss, acceptable postoperative pain, short hospital stay and early return to routine activities. Adequate preoperative CT assessment, identification of the lumbar anatomical landmarks, meticulous extraperitoneal dissection, sufficient mesh overlap and careful mesh fixation are important for achieving satisfactory outcomes. No recurrence was observed during the available follow-up in our series.

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