

Long-Term Clinical Outcomes Following Laparoscopic Transabdominal Preperitoneal (Tapp) Repair Of Inguinal Hernia: A Case Series

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Abstract

Laparoscopic repair has become an established approach for the management of inguinal hernia, particularly because of its minimally invasive nature, reduced postoperative discomfort and faster return to routine activities. Transabdominal preperitoneal (TAPP) repair provides adequate visualization of the myopectineal orifice and permits placement of mesh over the entire potential hernia site. Although the short-term advantages of laparoscopic repair are well recognized, assessment of late complications, recurrence and persistent groin discomfort is important for determining the long-term effectiveness of the procedure.

The present case series describes the long-term clinical outcomes of patients who underwent laparoscopic TAPP repair for inguinal hernia. Six patients who had undergone TAPP repair and subsequently developed postoperative symptoms or complications requiring follow-up assessment were reviewed. Patient demographic characteristics, hernia presentation, operative details, postoperative recovery, complications and findings during follow-up were evaluated.

The postoperative course was uncomplicated in most patients, with hospital discharge occurring between postoperative days 1 and 4. Three patients experienced early groin discomfort or pain, which subsequently improved with conservative management. One patient developed scrotal pain associated with epididymitis during later follow-up, while another developed a postoperative seroma with minimal hydrocele, both of which were managed conservatively. No definite recurrence of inguinal hernia was documented during the reported follow-up period. One patient subsequently developed a paraumbilical/port-site hernia several years after the primary procedure and underwent repair.

The findings suggest that laparoscopic TAPP repair provides satisfactory long-term clinical outcomes with a low observed rate of inguinal hernia recurrence. Nevertheless, prolonged follow-up remains important for identifying delayed complications, including chronic pain and port-site hernia. Appropriate patient selection, meticulous dissection, adequate mesh placement and fixation, and surgeon experience remain important determinants of long-term outcome.

Keywords: Inguinal hernia; Laparoscopic surgery; TAPP repair; Long-term outcome; Hernia recurrence; Chronic groin pain; Mesh-related complications; Port-site hernia.

Introduction

Inguinal hernia is one of the most frequently encountered conditions requiring surgical intervention. Over the past several decades, surgical management has evolved from conventional tissue repair to tension-free mesh repair and subsequently to minimally invasive techniques.

The laparoscopic transabdominal preperitoneal approach is widely used for inguinal hernia repair. In TAPP repair, access to the peritoneal cavity permits identification of the relevant anatomical structures, development of the preperitoneal space and placement of a prosthetic mesh over the myopectineal orifice. The peritoneum is subsequently closed to separate the mesh from the intra-abdominal viscera.

Compared with conventional open repair, laparoscopic techniques offer several potential advantages, including reduced postoperative pain, smaller incisions, earlier mobilization and faster return to normal activities. They are particularly useful in bilateral inguinal hernia and recurrent hernia following previous open repair.

Despite these advantages, long-term complications may occur. These include recurrent hernia, chronic groin pain, seroma, hydrocele, mesh-related complications and port-site hernia. Some complications may become apparent only months or years after surgery. Therefore, long-term clinical surveillance is important when evaluating the durability and safety of laparoscopic hernia repair.

The present case series was undertaken to describe the long-term clinical course of patients who underwent

laparoscopic TAPP inguinal hernia repair, with particular emphasis on postoperative complications, recurrence, pain and delayed surgical-site complications.

AIM

To evaluate the long-term clinical outcomes and postoperative complications among patients who underwent laparoscopic transabdominal preperitoneal repair of inguinal hernia.

OBJECTIVES

1. To document the postoperative complications following laparoscopic TAPP inguinal hernia repair.
2. To assess the occurrence of recurrent inguinal hernia during long-term follow-up.
3. To evaluate the occurrence and persistence of postoperative groin or scrotal pain.
4. To document delayed complications including seroma, hydrocele, epididymitis and port-site hernia.
5. To assess the overall clinical outcome following laparoscopic TAPP repair.

REVIEW OF LITERATURE

Evolution of Inguinal Hernia Repair

Inguinal hernia repair has evolved from conventional tissue-based techniques to tension-free prosthetic mesh repair and subsequently to minimally invasive laparoscopic procedures. The introduction of mesh-based repair substantially reduced recurrence compared with traditional tissue approximation techniques and established prosthetic repair as a major component of modern inguinal hernia surgery. With the development of laparoscopic approaches, the focus of surgical management expanded beyond recurrence prevention to include postoperative pain, functional recovery, chronic discomfort and patient quality of life. Meta-analyses of randomized trials have demonstrated that laparoscopic mesh repair is associated with faster recovery and less persistent pain and numbness, although operative time may be longer and specific visceral or vascular complications, although uncommon, may occur. [1]

Laparoscopic Transabdominal Preperitoneal Repair

Transabdominal preperitoneal repair is one of the established laparoscopic approaches for inguinal hernia. The procedure involves entry into the peritoneal cavity, identification and dissection of the peritoneal flap, development of the preperitoneal space and placement of a prosthetic mesh with adequate coverage of the myopectineal orifice. The peritoneum is subsequently closed over the mesh. The approach provides a broad operative view of the preperitoneal anatomy and allows simultaneous treatment of bilateral defects and identification of occult hernias. International recommendations recognize laparo-endoscopic repair as an important treatment option when appropriate expertise and resources are available. The choice of approach should be individualized according to hernia characteristics, patient factors, previous operations and surgeon expertise. [2]

TAPP Compared With Open Mesh Repair

Several randomized trials and systematic reviews have compared laparoscopic and open mesh repair. Laparoscopic repair has generally demonstrated advantages in terms of early postoperative pain, return to usual activities and persistent sensory symptoms. However, these benefits must be balanced against longer operative time, the requirement for general anaesthesia and the possibility of intra-abdominal complications. [1,3]

A large multicentre randomized trial by Neumayer et al. reported less early postoperative pain and earlier return to normal activities following laparoscopic repair. However, recurrence in primary hernias was higher in the laparoscopic group in that trial, particularly among surgeons with varying levels of laparoscopic experience. These findings emphasize that surgical expertise and technical standardization are important determinants of outcome. [3]

Long-term evidence has subsequently demonstrated that recurrence following laparo-endoscopic repair can be low when the procedure is performed appropriately. In a five-year randomized multicentre study, Eklund et al. reported low recurrence rates following laparoscopic and open repair, although surgeon-related differences influenced outcomes. [4]

TAPP Compared With TEP

TAPP and totally extraperitoneal repair are the two principal laparo-endoscopic approaches for inguinal hernia. TEP develops the preperitoneal space without deliberate entry into the peritoneal cavity, whereas TAPP provides access

through the abdominal cavity before entering the preperitoneal plane. Both techniques aim to achieve adequate mesh coverage of the myopectineal orifice.

Comparative studies have generally demonstrated broadly comparable long-term outcomes when both procedures are performed by experienced surgeons. The choice between TAPP and TEP is therefore influenced by surgeon experience, patient characteristics, previous abdominal surgery, hernia type and intraoperative anatomy. International guidelines emphasize the importance of appropriate training and experience in achieving optimal outcomes with laparo-endoscopic repair. [2,5]

Long-Term Recurrence Following TAPP Repair

Recurrence remains one of the most important indicators of the durability of inguinal hernia repair. Adequate dissection, appropriate mesh dimensions, sufficient overlap of the hernia defect and correct positioning of the prosthesis are essential for minimizing recurrence. Patient-related factors and surgeon experience may also influence long-term outcomes.

Five-year follow-up studies have demonstrated that recurrence after laparoscopic repair can remain low, although differences between individual surgeons highlight the importance of technical expertise. [4] In recurrent inguinal hernia, randomized evidence has demonstrated that TAPP and Lichtenstein repair can provide comparable long-term recurrence outcomes, while laparoscopic repair may offer advantages in early postoperative pain and return to activity. [6]

Chronic Groin Pain

Chronic postoperative groin pain is an important patient-centred outcome following inguinal hernia repair. It may result from nerve irritation or injury, mesh fixation, inflammatory changes, tissue fibrosis or other local mechanisms. Persistent pain can interfere with physical activity and quality of life.

Evidence from comparative studies indicates that chronic pain and sensory disturbances may be less frequent following laparo-endoscopic repair than after some open techniques, potentially because of reduced manipulation of the inguinal nerves. However, chronic pain can still occur after laparoscopic repair and should therefore be specifically assessed during long-term follow-up. [1,7]

Mesh-Related Complications

Although mesh-related complications are relatively uncommon, they remain clinically relevant because they may present months or years after surgery. Possible complications include mesh infection, migration, adhesion formation, mesh-related inflammatory reaction and persistent pain. Appropriate mesh selection, adequate preperitoneal placement and careful fixation are important components of safe laparoscopic hernia repair.

The International HerniaSurge guidelines emphasize individualized operative planning and appropriate technical expertise in the selection and performance of groin hernia repair. [2]

Delayed Port-Site Complications

The use of laparoscopic access reduces the size of the abdominal-wall incisions but does not completely eliminate the possibility of delayed port-site complications. Port-site hernia is an uncommon but recognized late complication and may present months or years after surgery. Careful closure of larger trocar sites and appropriate postoperative surveillance are therefore important.

The possibility of delayed abdominal-wall complications is particularly relevant in long-term follow-up studies because such events may not be apparent during the immediate postoperative period. Consequently, assessment of long-term outcomes should extend beyond early wound healing and include evaluation for recurrent hernia, chronic pain and delayed port-site complications.

MATERIALS AND METHODS

This was a case series conducted in the Department of General Surgery, Sree Balaji Medical College & Hospital, Chennai, Tamil Nadu, India. Patients who underwent laparoscopic transabdominal preperitoneal (TAPP) repair for inguinal hernia and subsequently attended postoperative follow-up were included for evaluation. The study comprised six cases described in the source case series, and eligible patients were identified through the institutional surgical records. Consecutive eligible cases were considered for inclusion. Data pertaining to age, sex, presenting symptoms, side and type of hernia, presence of unilateral or bilateral disease, relevant comorbidities, operative procedure, postoperative hospital stay, early postoperative complications, groin or scrotal pain, seroma or hydrocele formation, evidence of hernia recurrence, imaging findings where available, delayed postoperative complications, return to routine activities and requirement for additional treatment were recorded. Patients were assessed during

the available postoperative follow-up visits. Clinical assessment included evaluation for pain, groin or scrotal swelling, evidence of recurrent hernia and other postoperative complications. Ultrasonography was performed when clinically indicated to further evaluate persistent or new postoperative symptoms. The follow-up observations were used to assess the long-term clinical outcome and delayed complications following laparoscopic TAPP inguinal hernia repair.

RESULTS

Six patients who had undergone laparoscopic TAPP repair were described in the source case series.

The patients were predominantly adult males, with ages ranging from 19 to 59 years. Relevant comorbidities included diabetes mellitus, chronic obstructive pulmonary disease and lumbosacral disc disease in some patients. The source records documented unilateral as well as bilateral inguinal hernias.

Case 1

A 55-year-old male with type 2 diabetes mellitus presented with right groin swelling of one-month duration. Examination revealed a reducible right inguinal swelling measuring approximately 2 × 2 cm with a positive cough impulse. Right-sided laparoscopic TAPP repair was performed under general anaesthesia. The postoperative course was uncomplicated and the patient was discharged on postoperative day 2. Mild groin pain was reported during the first month but resolved subsequently. At one-year follow-up, the patient was clinically well.

Case 2

A 59-year-old male with diabetes mellitus and lumbosacral disc disease presented with right inguinal pain and swelling. Bilateral reducible inguinal hernias were identified clinically. Bilateral TAPP repair was performed. The postoperative wound remained healthy and the patient was discharged on postoperative day 4. The first-month follow-up was asymptomatic. Mild groin discomfort was reported at six months; ultrasonography did not demonstrate significant abnormality. At one-year follow-up, there was no significant clinical abnormality.

Case 3

A 19-year-old male without significant comorbidity presented with left-sided groin pain and swelling. TAPP repair was performed under general anaesthesia. The postoperative recovery was satisfactory, with discharge on postoperative day 1. The patient resumed routine activities within the first postoperative week and subsequent follow-up did not reveal significant adverse events.

Case 4

A 57-year-old male with chronic obstructive pulmonary disease presented with left groin swelling. Left TAPP repair was performed without intraoperative complications. At the first postoperative month, scrotal pain was reported. Subsequent evaluation did not demonstrate recurrent inguinal hernia. At later follow-up, ultrasonography was suggestive of epididymitis, which was treated conservatively.

Case 5

A 51-year-old male presented with a one-year history of right groin swelling. Clinical examination showed a reducible right inguinal hernia with positive cough impulse. Right-sided TAPP repair was performed. At one-month follow-up, the patient developed a postoperative seroma with minimal hydrocele. Conservative management resulted in resolution, and subsequent follow-up did not reveal significant abnormality.

Case 6

A 42-year-old male presented with left groin swelling of approximately 45 days' duration. Imaging demonstrated bilateral inguinal hernia, and left-sided TAPP repair was performed. Early and six-month follow-up visits were uneventful. Four years later, the patient presented with a paraumbilical swelling suggestive of a port-site hernia and subsequently underwent repair.

SUMMARY OF OBSERVATIONS

Parameter	Observation
Total cases described	6
Age range	19–59 years
Sex	Male
TAPP repair	Performed in all cases
Bilateral hernia	Documented in one case

Early groin pain/discomfort	Observed in 3 cases
Seroma/minimal hydrocele	1 case
Epididymitis	1 case
Documented inguinal recurrence	None
Delayed port-site/paraumbilical hernia	1 case
Conservative management	Used for pain, seroma/hydrocele and epididymitis
Return to routine activities	Generally early

The source discussion specifically reports no inguinal hernia recurrence during the available follow-up, while three of the six patients experienced early groin pain or discomfort that subsequently resolved.

DISCUSSION

The present case series describes the long-term clinical outcomes following laparoscopic transabdominal preperitoneal repair of inguinal hernia. The principal findings were the absence of documented inguinal hernia recurrence during the available follow-up, occurrence of early groin discomfort in three patients, conservative resolution of postoperative seroma and epididymitis, and development of a delayed paraumbilical/port-site hernia in one patient. These observations highlight both the favourable clinical course following TAPP repair and the importance of prolonged surveillance after minimally invasive hernia surgery.

In the present series, none of the six patients developed documented recurrent inguinal hernia during the available follow-up. This finding is compatible with evidence demonstrating that laparoscopic mesh repair can achieve low recurrence rates when appropriate mesh placement, adequate defect coverage and sound operative technique are employed. However, because this was a small case series without a comparison group, the absence of recurrence should be interpreted descriptively and should not be considered evidence of superiority over other repair techniques. Long-term randomized studies have shown that recurrence remains dependent not only on the operative approach but also on surgeon experience and technical execution. [1,4]

The occurrence of groin pain or discomfort in three of the six patients represents an important postoperative finding. In the present series, the symptoms occurred predominantly during the early follow-up period and subsequently improved with conservative management. Chronic postoperative groin pain remains an important complication following inguinal hernia repair and can adversely affect daily functioning and quality of life. Comparative evidence suggests that persistent pain may be less frequent after laparoscopic repair than after open repair, although it is not completely eliminated by the laparoscopic approach. [1,7]

The relatively favourable pain profile observed in this series is also consistent with the findings of randomized and systematic-review evidence showing reduced early postoperative pain and faster functional recovery following laparoscopic repair. The large randomized trial by Neumayer et al. demonstrated less early postoperative pain and earlier return to normal activities after laparoscopic repair, although the study also identified a higher recurrence rate for primary hernias in the laparoscopic group. Thus, the benefits of laparoscopy should be interpreted in the context of appropriate patient selection and surgical expertise. [3]

One patient in the present series developed scrotal pain during follow-up, with subsequent ultrasonography demonstrating epididymitis in the absence of evidence of recurrent inguinal hernia. The condition was managed conservatively. Another patient developed a postoperative seroma with minimal hydrocele, which also resolved with conservative treatment. These findings demonstrate that not all postoperative symptoms following TAPP repair are attributable to recurrence or mesh failure and that clinical assessment, supplemented by imaging when indicated, is important in identifying the underlying cause.

A particularly relevant observation was the development of a paraumbilical/port-site hernia four years after the original TAPP procedure. Although laparoscopic surgery is associated with smaller access incisions, port-site hernia remains a recognized delayed complication. This finding reinforces the importance of long-term follow-up because complications involving the abdominal wall may become clinically evident several years after the initial procedure.

The postoperative recovery in the present series was generally satisfactory. Patients were discharged between postoperative days 1 and 4, and early return to routine activities was documented. This finding is consistent with systematic-review evidence showing earlier return to usual activities after laparoscopic repair compared with open repair. [1]

The present findings also emphasize the importance of surgeon experience in laparoscopic hernia surgery. Although

laparoscopic repair provides anatomical advantages and favourable recovery characteristics, technical errors in preperitoneal dissection, inadequate mesh overlap or inappropriate fixation can influence recurrence and postoperative morbidity. Long-term randomized evidence has demonstrated considerable variation in recurrence according to individual surgeon performance, supporting the need for adequate training and standardized operative technique. [4]

The absence of recurrence in the current six-case series should therefore be considered encouraging but preliminary. The small sample size, absence of a control group and variable duration of follow-up prevent statistical comparison or estimation of a reliable recurrence rate. Nevertheless, the series provides clinically relevant observations regarding the spectrum of early and delayed complications that may be encountered following TAPP repair.

Overall, the present experience suggests that laparoscopic TAPP repair can provide satisfactory long-term clinical outcomes, with early recovery, low observed recurrence and manageable postoperative complications. At the same time, long-term surveillance remains essential for identifying chronic pain, recurrent hernia and delayed access-site complications. The findings support continued use of TAPP repair in appropriately selected patients, particularly when performed by surgeons with adequate laparoscopic expertise and with meticulous attention to mesh placement and closure of the peritoneal and port-site defects.

LIMITATIONS

The major limitation of this case series is the very small sample size, which limits the generalizability of the findings. As there was no comparison group, the outcomes cannot be directly compared with open Lichtenstein repair or totally extraperitoneal repair. The retrospective nature of case identification may also introduce incomplete documentation and recall bias. Follow-up duration was not uniform among all patients, and assessment of quality of life was not performed using a validated instrument. Furthermore, the small number of patients does not permit reliable estimation of recurrence or complication rates. The findings should therefore be interpreted as descriptive observations rather than definitive evidence of the superiority of TAPP repair.

CONCLUSION

Laparoscopic TAPP repair of inguinal hernia demonstrated favourable long-term clinical outcomes in this case series, with satisfactory postoperative recovery and no documented inguinal hernia recurrence during the available follow-up. Early groin discomfort, seroma, hydrocele and epididymitis were observed but were managed conservatively. A delayed port-site/paraumbilical hernia was identified in one patient, emphasizing the importance of prolonged postoperative surveillance. TAPP repair remains a valuable minimally invasive technique, particularly for bilateral and recurrent inguinal hernias, provided that appropriate patient selection, adequate mesh placement and sound surgical technique are ensured. Larger prospective studies with standardized long-term follow-up and validated quality-of-life assessment are required to establish the durability and patient-centred outcomes of the procedure.

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