Original Article

Minimal Invasive Surgery for Inguinal Hernia: A Case Series of Five Patients

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Abstract

Background: Inguinal hernia repair is one of the most frequently performed procedures in general surgery. With advances in surgical techniques, minimally invasive approaches such as laparoscopic hernia repair have gained wide acceptance due to reduced postoperative pain, faster recovery, and shorter hospital stay. Despite this, open mesh repair continues to be practiced widely, especially in resource-limited settings. This case series aims to describe the clinical profile, operative details, and short-term outcomes of patients undergoing minimally invasive surgery for inguinal hernia. **Material and Methods:** This case series includes five patients diagnosed with inguinal hernia who underwent laparoscopic repair using standard minimally invasive techniques. Detailed clinical evaluation, preoperative assessment, intraoperative findings, and postoperative outcomes were recorded. Variables analyzed included age, type and side of hernia, operative time, intraoperative and postoperative complications, postoperative pain, duration of hospital stay, and early recovery. All patients were followed up in the postoperative period to assess wound-related complications, pain status, and early recurrence. **Results:** The five patients underwent successful laparoscopic inguinal hernia repair without major intraoperative complications. The operative time was within acceptable limits for minimally invasive procedures. Postoperative pain was mild to moderate and was effectively managed with standard analgesics. Early ambulation was achieved in all patients, and the duration of hospital stay was short. Minor postoperative complications, such as seroma or transient discomfort, were observed in a few cases but resolved with conservative management. No early recurrence was noted during the follow-up period. **Conclusion:** Minimally invasive surgery for inguinal hernia is a safe and effective approach with favorable short-term outcomes. The technique is associated with reduced postoperative pain, early mobilization, and shorter hospital stay. This case series supports the role of laparoscopic hernia repair as a valuable option in the management of inguinal hernia.

Keywords: Inguinal hernia, minimally invasive surgery, laparoscopic hernia repair, TAPP, TEP, case series.

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Introduction

Inguinal hernia is one of the most common conditions encountered in general surgical practice and its repair remains one of the most frequently performed operations worldwide. A hernia is defined as the abnormal protrusion of an organ or tissue through a defect in the containing wall, and in the groin region this usually occurs through areas of inherent anatomical weakness.[1] The inguinal region is particularly prone to herniation because of the presence of the inguinal canal and the myopectineal orifice, through which important structures such as the spermatic cord pass.[2] Over the years, the surgical management of inguinal hernia has undergone significant evolution. Traditional tissue-based repairs, such as Bassini and Shouldice techniques, were widely practiced in the past but were associated with tension at the repair site and variable recurrence rates.[3] The introduction of prosthetic mesh marked a major turning point in hernia surgery, leading to the development of tension-free repairs, most notably the Lichtenstein mesh hernioplasty, which became the standard open technique due to its simplicity, reproducibility, and low recurrence rates.[4]

With the advent of minimally invasive surgery, laparoscopic approaches to inguinal hernia repair were introduced, primarily in the form of transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) techniques. These methods aim to place a mesh in the preperitoneal space to reinforce the entire myopectineal orifice, thereby addressing both direct and indirect hernia defects through a posterior approach.[5] Several studies have demonstrated that laparoscopic hernia repair is associated with reduced postoperative pain, earlier return to daily activities, and shorter hospital stay when compared with open repair,

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although it may require a longer operative time and greater technical expertise.[6]

Despite these advantages, the choice between open and laparoscopic repair continues to depend on multiple factors, including patient characteristics, surgeon experience, availability of resources, and institutional practice. In many centers, minimally invasive repair is increasingly preferred, especially for bilateral and recurrent hernias, while its role in primary unilateral hernia continues to be actively evaluated.

Rationale of the Study

Case series play an important role in highlighting real-world clinical outcomes and practical aspects of surgical techniques. Presenting detailed clinical profiles, operative findings, and postoperative recovery patterns helps in understanding both the benefits and the limitations of minimally invasive approaches in routine practice. This case series was undertaken to document the experience with minimally invasive surgery for inguinal hernia in a small group of patients and to describe their short-term outcomes in terms of safety, feasibility, and recovery.

Objective of the Case Series

The objective of this case series is to present five cases of inguinal hernia managed by minimally invasive (laparoscopic) techniques and to analyze their clinical presentation, operative details, and early postoperative outcomes.

Materials and Methods

Study Design: This study is presented as a descriptive case series of five patients diagnosed with inguinal hernia who were managed using minimally invasive surgical techniques. The cases were selected from patients undergoing surgical treatment for inguinal hernia in a tertiary care surgical unit. The focus of this case series was to document the clinical profile, operative details, and short-term postoperative outcomes following laparoscopic hernia repair.

Study Setting and Duration: The cases included in this series were managed in a hospital setting with facilities for laparoscopic surgery. The surgeries were performed during the study period after appropriate preoperative evaluation and patient optimization. All patients were admitted electively and operated upon under standard institutional protocols.

Selection of Patients: Patients with a clinical diagnosis of inguinal hernia who were deemed fit for general anesthesia and laparoscopic surgery were included in this case series. Both direct and indirect inguinal hernias were considered. Patients with complicated hernias such as strangulated or obstructed hernia requiring emergency surgery, and those with significant contraindications to laparoscopy, were excluded.

Preoperative Evaluation: All patients underwent a detailed clinical assessment including history and physical examination with emphasis on the duration of symptoms, side of hernia, and any previous surgical interventions. Routine preoperative investigations were performed as per institutional protocol. Associated comorbidities such as diabetes mellitus, hypertension, and chronic respiratory disease were evaluated and optimized prior to surgery. Informed consent was obtained from all patients after explaining the nature of the procedure, possible risks, benefits, and alternative treatment options.

Surgical Technique: All patients underwent laparoscopic inguinal hernia repair using a minimally invasive approach. Depending on the intraoperative findings and surgeon preference, either the transabdominal preperitoneal (TAPP) or totally extraperitoneal (TEP) technique was employed. After creation of adequate working space, the hernia sac was identified and reduced, and a prosthetic mesh was placed in the preperitoneal space to cover the myopectineal orifice. The mesh was positioned to ensure adequate overlap of all potential hernia sites. Hemostasis was secured, and ports were closed in the standard manner.

Postoperative Care and Follow-up: Postoperatively, patients were monitored for pain, urinary retention, wound-related complications, and any other immediate postoperative issues. Analgesics were administered as per standard protocol. Early ambulation was encouraged in all patients. The duration of hospital stay was recorded. Patients were followed up in the outpatient department to assess wound healing, pain status, return to normal activities, and any early complications or recurrence.

Outcome Measures: The main outcome measures included operative time, intraoperative and postoperative complications, postoperative pain, duration of hospital stay, and early clinical outcome. These parameters were used to assess the safety and feasibility of minimally invasive surgery for inguinal hernia in this group of patients.

Case 1

A 45-year-old male presented with a history of right-sided groin swelling and intermittent discomfort for approximately two years. The symptoms were aggravated by physical activity, prolonged standing, and coughing, and were relieved on lying down. There was no history suggestive of bowel obstruction, irreducibility, or acute complications. The patient had no significant past surgical history and did not have major comorbid illnesses.

On clinical examination, a reducible right inguinal hernia was noted, which became more prominent on coughing and straining. The cough impulse was positive, and there were no signs of strangulation or obstruction. Routine preoperative investigations were within normal limits, and the patient was planned for elective laparoscopic repair.

The patient underwent laparoscopic transabdominal preperitoneal (TAPP) repair under general anesthesia. Intraoperatively, an indirect inguinal hernia sac was identified on the right side. The peritoneum was incised, and the preperitoneal space was developed. The hernia sac was carefully dissected and reduced. A polypropylene mesh was then placed in the preperitoneal space to cover the myopectineal orifice with adequate overlap, and it was secured in position. The peritoneal flap was closed, and hemostasis was confirmed.

The postoperative period was uneventful. The patient experienced mild postoperative pain, which was controlled with standard analgesics. Early ambulation was encouraged, and the patient was discharged after a short hospital stay. On follow-up, the patient had good wound healing, no significant complications, and no evidence of early recurrence.

Figure 1: Intraoperative laparoscopic view showing placement of polypropylene mesh in the preperitoneal space during TAPP repair of right inguinal hernia.

This figure demonstrates the properly positioned mesh covering the myopectineal orifice after reduction of the hernia sac, ensuring adequate overlap to prevent recurrence.

Case 2

A 52-year-old male presented with a history of left-sided groin swelling for approximately one year, associated with a dull aching discomfort that increased on exertion, prolonged standing, and coughing. The swelling was reducible and there was no history suggestive of intestinal obstruction or strangulation. The patient was a known hypertensive on regular medication, with no previous history of abdominal surgery.

On physical examination, a left inguinal hernia was noted, which was reducible with a positive cough impulse. The opposite groin was clinically normal. There were no local skin changes and no features suggestive of complications. Routine preoperative investigations were within acceptable limits, and the patient was planned for elective laparoscopic repair.

The patient underwent laparoscopic totally extraperitoneal (TEP) repair under general anesthesia. Intraoperatively, a direct inguinal hernia was identified on the left side. The preperitoneal space was created, and careful dissection was carried out to delineate the hernia defect. The hernia sac was reduced, and a polypropylene mesh was placed in the preperitoneal space to cover the myopectineal orifice with adequate overlap. The mesh was positioned properly, and hemostasis was ensured before completion of the procedure.

The postoperative course was uneventful. The patient reported mild postoperative pain, which was managed with standard analgesics. Early mobilization was encouraged, and oral intake was resumed on the same day. The patient was discharged after a short hospital stay. On follow-up, there were no wound-related complications, and the patient had resumed normal daily activities without significant discomfort. No early recurrence was noted.

This figure demonstrates the properly positioned polypropylene mesh spread over the myopectineal orifice in the preperitoneal space following reduction of the hernia sac during totally extraperitoneal (TEP) repair. The mesh is seen covering the potential sites of herniation with adequate overlap, ensuring reinforcement of the posterior inguinal wall and reducing the risk of recurrence.

Figure 2: Intraoperative laparoscopic view showing placement of polypropylene mesh in the preperitoneal space during TEP repair of left inguinal hernia.

Case 3

A 38-year-old male presented with a history of right-sided groin swelling for about eight months, associated with mild discomfort, especially during physical exertion and prolonged standing. The swelling was reducible and there was no history of acute pain, irreducibility, vomiting, or abdominal distension. The patient had no significant medical comorbidities and no prior history of abdominal or groin surgery.

Clinical examination revealed a reducible right inguinal hernia with a positive cough impulse. The hernia was clinically classified as an indirect inguinal hernia. The contralateral groin was normal on examination. Routine preoperative investigations were within normal limits, and the patient was planned for elective laparoscopic repair.

The patient underwent laparoscopic transabdominal preperitoneal (TAPP) repair under general anesthesia. Intraoperatively, an indirect hernia sac was identified on the right side. The peritoneum was incised, and the preperitoneal space was developed carefully. The hernia sac was dissected free from the cord structures and reduced completely. A polypropylene mesh was then placed in the preperitoneal space to cover the myopectineal orifice with adequate overlap and was positioned appropriately before closure of the peritoneal flap.

The postoperative recovery was uneventful. The patient experienced mild postoperative pain, which was managed with routine analgesics. Early ambulation was encouraged, and oral intake was resumed on the same day. The patient was discharged after a short hospital stay. On follow-up, there were no wound-related complications, and the patient had returned to normal daily activities without significant discomfort. No early recurrence was detected.

This figure illustrates the polypropylene mesh positioned over the myopectineal orifice in the preperitoneal space following reduction of the indirect hernia sac during transabdominal preperitoneal (TAPP) repair. The mesh is seen adequately spread with sufficient overlap to cover all potential hernia sites, ensuring reinforcement of the posterior inguinal wall and reducing the risk of recurrence.

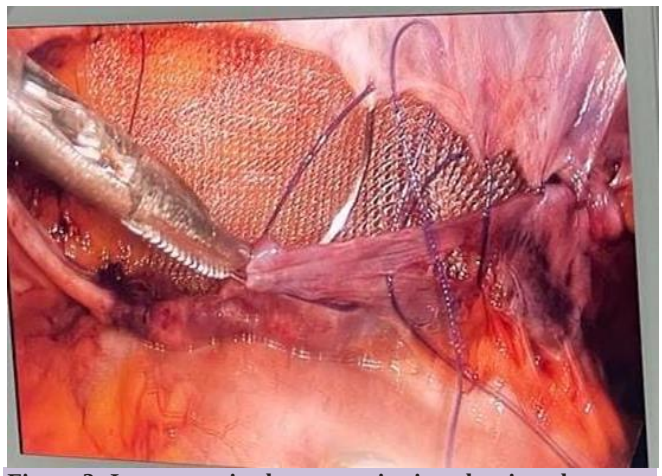

Figure 3: Intraoperative laparoscopic view showing placement of polypropylene mesh in the preperitoneal space during TAPP repair of right inguinal hernia.

Case 4

A 60-year-old male presented with a history of right-sided groin swelling for nearly two years, associated with intermittent dull aching pain that increased on exertion and coughing. The swelling was reducible and there was no history of acute pain, irreducibility, vomiting, or features suggestive of intestinal obstruction. The patient was a known diabetic on regular treatment, with satisfactory glycaemic control, and had no prior history of abdominal or groin surgery.

On clinical examination, a reducible right inguinal hernia was noted with a positive cough impulse. The hernia was clinically suggestive of a direct inguinal hernia. The contralateral side was normal. Preoperative evaluation, including routine laboratory investigations and anesthetic assessment, was within acceptable limits, and the patient was planned for elective laparoscopic repair.

The patient underwent laparoscopic totally extraperitoneal (TEP) repair under general anesthesia. Intraoperatively, a direct hernia defect was identified on the right side. The preperitoneal space was created carefully, and the hernia sac was reduced. Adequate dissection was performed to expose the myopectineal orifice. A polypropylene mesh was then placed in the preperitoneal space with sufficient overlap to cover all potential hernia sites. Proper positioning of the mesh was ensured before completion of the procedure, and hemostasis was confirmed.

The postoperative period was uneventful. The patient had mild postoperative pain, which was managed with routine analgesics. Early ambulation was encouraged, and oral feeds were resumed on the same day. The patient was discharged after a short hospital stay. On follow-up, wound healing was satisfactory, and there were no postoperative complications or evidence of early recurrence.

This figure demonstrates the final position of the polypropylene mesh after reduction of the hernia sac during totally extraperitoneal (TEP) repair. The mesh is seen adequately spread and fixed to cover the entire myopectineal orifice with sufficient overlap, ensuring reinforcement of the posterior inguinal wall and minimizing the risk of recurrence.

Figure 4: Intraoperative laparoscopic view showing polypropylene mesh secured in the preperitoneal space during TEP repair of right inguinal hernia.

Case 5

A 48-year-old male presented with complaints of left-sided groin swelling for approximately one year, associated with intermittent discomfort that increased during physical activity and prolonged standing. The swelling was reducible, and there was no history of acute pain, irreducibility, vomiting, or abdominal distension. The patient was a chronic smoker but had no other significant medical comorbidities and no prior history of abdominal surgery. On clinical examination, a reducible left inguinal hernia with a positive cough impulse was noted. The clinical findings were suggestive of an indirect inguinal hernia. The right groin was normal on examination. Routine preoperative investigations were within normal limits, and the patient was planned for elective laparoscopic repair after appropriate preoperative preparation and counseling.

The patient underwent laparoscopic transabdominal preperitoneal (TAPP) repair under general anesthesia. Intraoperatively, an indirect hernia sac was identified on the left side. The peritoneum was incised, and the preperitoneal space was developed carefully. The hernia sac was dissected from the cord structures and completely reduced. A polypropylene mesh was placed in the preperitoneal space to cover the myopectineal orifice with adequate overlap, and proper positioning was ensured before closure of the peritoneal flap. Hemostasis was confirmed, and the procedure was completed without complications.

The postoperative recovery was uneventful. The patient experienced mild postoperative pain, which was controlled with standard analgesics. Early ambulation was encouraged, and oral intake was resumed on the same day. The patient was discharged after a short hospital stay. On follow-up, there were no wound-related complications, and the patient had returned to normal activities without significant discomfort. No early recurrence was noted.

This figure illustrates the final step of transabdominal preperitoneal (TAPP) repair, where the peritoneal flap is closed over the previously placed polypropylene mesh. The closure restores the peritoneal continuity, isolates the mesh from the intraperitoneal contents, and confirms completion of the procedure with proper coverage of the myopectineal orifice, thereby reducing the risk of adhesion formation and recurrence.

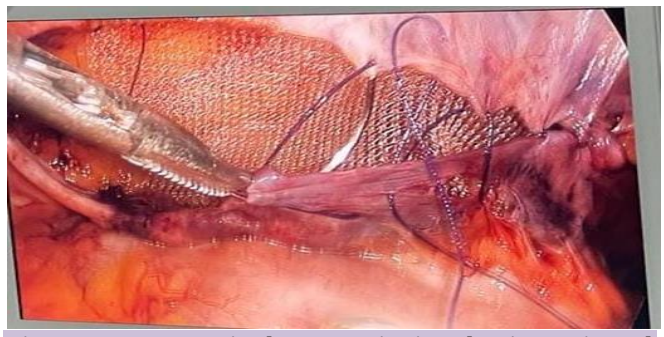

Figure 5: Intraoperative laparoscopic view showing peritoneal closure over the mesh following TAPP repair of right inguinal hernia.

[Figure 1 to 5] collectively illustrate the key operative steps and technical endpoints of minimally invasive inguinal hernia repair using laparoscopic techniques in this case series. [Figure 1] demonstrates the intraoperative stage of mesh placement in the preperitoneal space during TAPP repair, highlighting adequate coverage of the myopectineal orifice after reduction of the hernia sac. [Figure 2] depicts polypropylene mesh placement during TEP repair, emphasizing proper positioning of the mesh in the preperitoneal plane without breaching the peritoneal cavity. [Figure 3] shows the mesh being spread and positioned during TAPP repair, reinforcing the importance of sufficient overlap over all potential hernia sites to ensure durable posterior wall reinforcement. [Figure 4] illustrates the mesh secured in its final position during TEP repair, confirming stable fixation and complete coverage of the hernia defect and surrounding weak areas. [Figure 5] demonstrates the final step of TAPP repair with peritoneal closure over the mesh, restoring peritoneal continuity and isolating the prosthesis from intraperitoneal contents. Taken together, these figures document the standardized operative sequence and technical adequacy of laparoscopic inguinal hernia repair in this series, supporting the feasibility, safety, and anatomical soundness of the minimally invasive approach.

Results

Summary of the Case Series: This case series included five male patients diagnosed with inguinal hernia who were managed using minimally invasive laparoscopic techniques. The age of the patients ranged from early forties to sixty years. Three patients presented with right-sided inguinal hernia, while two had left-sided involvement. Clinically, both direct and indirect inguinal hernias were encountered in this series. All patients presented with reducible groin swellings associated with varying degrees of discomfort, and none had features suggestive of obstruction or strangulation at the time of presentation.

Operative Details: Laparoscopic repair was successfully performed in all five cases. The transabdominal preperitoneal (TAPP) approach was used in three patients, while the totally extraperitoneal (TEP) approach was employed in two patients. In all cases, the hernia sac was adequately dissected and reduced, and a polypropylene mesh was placed in the preperitoneal space with sufficient overlap to cover the myopectineal orifice. Proper positioning of the mesh was ensured in each case, and in TAPP procedures, the peritoneal flap was closed over the mesh at the end of the procedure. There were no intraoperative complications and no case required conversion to open surgery.

Postoperative Outcome: The postoperative course was uneventful in all patients. Postoperative pain was mild and was effectively managed with routine analgesics. Early ambulation was encouraged, and oral intake was resumed on the same day of surgery in all cases. The duration of hospital stay was short, and all patients were discharged in stable condition. No immediate postoperative complications such as wound infection, hematoma, or seroma were observed.

Follow-up and Early Results: On follow-up, all patients showed satisfactory wound healing and good recovery. There were no reports of persistent groin pain, mesh-related complications, or early recurrence during the follow-up period. All patients were able to return to their normal daily activities without significant discomfort, indicating favorable short-term outcomes of the minimally invasive approach in this series.

Discussion

Inguinal hernia repair remains one of the most commonly performed procedures in general surgery, and the introduction of minimally invasive techniques has significantly influenced contemporary surgical practice.[7] Laparoscopic approaches, particularly transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) repairs, aim to provide a tension-free posterior wall reinforcement with the advantages of reduced postoperative pain, early ambulation, and faster return to normal activities.[8,9] The present case series highlights the practical application of these techniques and demonstrates their safety and feasibility in routine clinical practice.[10]

In this series, all five patients were successfully managed using laparoscopic methods without the need for conversion to open surgery. Both TAPP and TEP approaches were utilized depending on the clinical scenario and intraoperative considerations.[11] The consistent finding across all cases was the effective placement of polypropylene mesh in the preperitoneal space with adequate coverage of the myopectineal orifice, which is a critical factor in reducing recurrence.[12] The operative steps illustrated in the figures further emphasize the standardized nature of the technique and the importance of proper anatomical dissection and mesh positioning.[13,14]

Postoperative outcomes in this series were favorable. All patients experienced only mild postoperative pain, which was managed with routine analgesics, and early ambulation was achieved in every case.[15] The short duration of hospital stay and the absence of significant postoperative complications such as wound infection, hematoma, or seroma further support the advantages of minimally invasive repair. These observations are in line with the widely reported benefits of laparoscopic inguinal hernia surgery, particularly in terms of patient comfort and early recovery.[16,17]

Another important aspect demonstrated in this series is the versatility of laparoscopic repair in managing both direct and indirect inguinal hernias on either side.[18] The use of TAPP allowed clear visualization of the groin anatomy and facilitated secure placement of the mesh with subsequent peritoneal closure,

while the TEP approach avoided entry into the peritoneal cavity and provided effective preperitoneal reinforcement. The selection of technique can therefore be individualized based on surgeon expertise and patient factors without compromising surgical outcomes.[19,20]

Despite the encouraging results, this case series has certain limitations. The number of patients is small, and the follow-up period is limited, which restricts the ability to draw conclusions regarding long-term outcomes and recurrence rates. Larger studies with longer follow-up are necessary to further validate the durability and cost-effectiveness of minimally invasive approaches in different clinical settings.

Overall, the findings from this case series support the role of laparoscopic inguinal hernia repair as a safe and effective option with favorable short-term outcomes. Proper patient selection, meticulous surgical technique, and adherence to anatomical principles remain essential to achieving optimal results.

Conclusion

Minimally invasive laparoscopic repair of inguinal hernia using TAPP and TEP techniques was found to be a safe and effective approach in this series of five patients. All cases were successfully managed with proper placement of polypropylene mesh in the preperitoneal space, resulting in satisfactory reinforcement of the posterior inguinal wall. The postoperative outcomes were favorable, with minimal pain, early mobilization, short hospital stay, and absence of significant complications or early recurrence.

This case series highlights the practical feasibility of laparoscopic inguinal hernia repair in routine surgical practice and supports its advantages in terms of patient comfort and early recovery. Although the number of cases is limited, the consistent clinical outcomes observed in this series reinforce the role of minimally invasive techniques as a valuable option in the management of inguinal hernia. Further studies with larger sample sizes and longer follow-up are required to assess long-term outcomes and recurrence rates more comprehensively.

Ethical Considerations

This case series was conducted in accordance with institutional ethical standards and the principles outlined in the Declaration of Helsinki. As this work represents a descriptive report of routinely performed clinical procedures, formal interventional ethical approval was not required. Patient confidentiality was strictly maintained, and no identifying information has been included in the manuscript or figures.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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