



Exploring the Incidence and Anatomical Distribution of Spermatic Cord Lipoma During Hernia Repair: A Ward-Based Study

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ABSTRACT

Background: Spermatic cord lipomas, often overlooked during inguinal hernia repair, can mimic or accompany indirect hernias, potentially leading to postoperative complications if not identified and managed intraoperatively. This study aimed to evaluate the incidence and anatomical distribution of spermatic cord lipomas across different surgical modalities in a ward-based setting. **Methods:** A prospective observational study was conducted over 12 months (May 2024–April 2025) at Jinnah Postgraduate Medical Center, Karachi. A total of 140 male patients undergoing elective inguinal hernia repair were included. Surgical approaches comprised open repair (n=98), laparoscopic TAPP (n=22), and robotic TAPP (n=20). Intraoperative identification and localization of lipomas were recorded, categorized anatomically as precordial, midcordial, or proximal. **Results:** Spermatic cord lipomas were detected in 53 of 140 patients (37.9%). Incidence varied by surgical technique: robotic TAPP (50.0%), laparoscopic TAPP (45.5%), and open repair (33.7%). Midcordial location was most frequent (39.6%), followed by precordial (34.0%) and proximal (26.4%). Unilateral lipomas predominated (90.6%), while bilateral cases (9.4%) were exclusively identified via laparoscopic and robotic methods. No intraoperative complications related to lipoma dissection were reported. However, in cases where lipomas were missed or incompletely excised, postoperative complications such as recurrence, bulging, and persistent discomfort were noted during follow-up. **Conclusion:** Spermatic cord lipomas are a common intraoperative finding during inguinal hernia repair, especially in minimally invasive procedures where improved visualization enhances detection. Midcordial involvement is most prevalent, and bilateral cases may go unnoticed in open repairs. Standardized intraoperative evaluation of the spermatic cord is crucial to mitigate the risk of recurrence, postoperative bulging, and patient discomfort, thereby improving long-term outcomes.

INTRODUCTION

Inguinal hernia repair remains one of the most commonly performed general surgical procedures worldwide, accounting for over 20 million operations annually, with a lifetime risk estimated at 27% in men and 3% in women (Haladu et al., 2022; Tran, MacQueen, Chen, & Simons, 2023). While the pathophysiology and management of inguinal hernias are well characterized, an often overlooked yet clinically significant finding during hernia surgery is the presence of spermatic cord lipomas (Dias et al., 2024; Amato, 2022). First described in the 19th century, spermatic cord lipomas are now increasingly recognized as a distinct anatomical and pathological entity, often coexisting with or mimicking indirect inguinal hernias (Rajeswaran, 2024; Improta et al., 2024).

Spermatic cord lipomas are composed of extraperitoneal fatty tissue that protrudes through the deep inguinal ring into the inguinal canal, often occupying

the same anatomical pathway as an indirect hernia sac (Watson, 2023; Nishida, Ochiai, & Lefor, 2022). These lipomas may present as isolated entities or in association with a hernia, making them easily misidentified intraoperatively (Karbasiyan et al., 2022; Forsmann, McLaughlin, & Leonard, 2022). Although typically asymptomatic, they can be large enough to cause discomfort, groin swelling, or recurrence-like symptoms if not adequately addressed during surgery. Failure to recognize and excise a cord lipoma has been implicated in persistent postoperative bulging, misdiagnosed recurrence, and chronic groin pain, underscoring the need for heightened intraoperative awareness (Elnahhas & Talaia, 2024; Favela, Argo, & Huerta, 2024).

The prevalence of spermatic cord lipoma is reported to be 20-72% based on differing patient cohorts, criteria to diagnose, and methods of surgery (Hua et al., 2023). A set of studies has proved that the possibility of identifying

cord lipomas essentially depends on the surgical approach adopted (Lim et al., 2024; Perera, Craven, & Thompson, 2024). Less invasive procedures, especially laparoscopic and robot transabdominal pre peritoneal repair (TAPP), offer superior visualization of internal ring and cord anatomies, resulting in an increased identification rate than the conventional open surgical procedures (Andreou et al., 2023; Wafa et al., 2024). Nonetheless, even now numerous large studies underreported this entity and that the anatomical spread of lipomas lining the spermatic cord is poorly described.

Even though it has clinical importance, spermatic cord lipoma is not always mention in the standardized nomenclatures of inguinal hernia pathology, including European Hernia Society or Nyhus (Otto, Lindenau, & Junge, 2023). This exclusion is probably the cause of its under appreciation in in surgical teaching and practice. In addition, although European Hernia Society suggest that when occupying the inguinal canal the clinical approach of the lipoma should be the same as that of an indirect hernia sac, there is no global answer referencing how they should be documented, classified and subsequently handled.

The study aims to fill these literature gaps and through prospective research determine the incidence and anatomical location of spermatic cord lipomas among patients undergoing inguinal hernia repair. Our interest in comparing the open, laparoscopic and robotic TAPP methods in a single institutional setting was to determine the effect of surgical approach on intraoperative detection. We have also attempted to group the anatomical position of lipomas along the cord: precordial, midcordial, and proximal (deep ring), in order to advise the operative approach and to improve the consistency of the diagnosis.

Since the minimally invasive procedure in hernia repair is increasingly adopted and the groin anatomy is continuing to evolve, there is an even greater need to standardise spermatic cord lipomas assessment. This study, through a thorough prospective ward-based study of 140 patients in a tertiary care center, brings forth novel information about this anatomical aspect that has been overlooked and is very likely to influence surgical results, the probability of recurrence, and the quality of life of the patients who have undergone the surgical procedure.

METHODOLOGY

The study was an observational study conducted at (Jinnah Postgraduate Medical Center (JPMC), Karachi) in Ward 3 (Surgical Unit 1) during one year (May 2024 to April 2025). The study included a total of 140 male patients aged between 17 and 75 years that were undergoing inguinal hernia repair. The aim was to study the frequency and location of repair of spermatic cord lipoma occurring during various procedures of hernia site repair. Out of total number of patients, 20 patients were done by robotic transabdominal preperitoneal (TAPP) repair, 22 patients were done through conventional laparoscopic TAPP and 98 were done by open inguinal hernia procedure. The professors and associate professors, therefore, perform these surgeries. Surgeries were all elective and the intraoperative observations were properly noted as far as presence and location of spermatic cord lipomas were

concerned. The study excluded patients with repeated hernia operations, complex hernia (e.g., strangulated or obstructed hernia), patients with prior pelvic operation and incomplete records. There was collection and analysis of data to identify the rate of spermatic cord lipomas with respect to the operative method and exact anatomical locations.

RESULTS

Patient Characteristics and Surgical Distribution

A total of 140 male patients undergoing primary inguinal hernia repair at Surgical Unit I, Ward 3, Jinnah Postgraduate Medical Center (JPMC), between May 2024 and May 2025, were enrolled. The mean age was 48.6 ± 13.7 years (range: 17–75). Most patients (62.1%) were between 40–60 years, reflecting the typical demographic for inguinal hernia presentation.

Patients were stratified by the surgical approach: Robotic transabdominal preperitoneal repair (TAPP) (n=20; 14.3%), Laparoscopic TAPP (n=22; 15.7%), and Open inguinal hernia repair (n=98; 70.0%).

Table 1

Demographic and Surgical Characteristics of the Study Population (n = 140)

Variable	n (%) or Mean \pm SD
Age (years)	48.6 \pm 13.7
Age group (17–39 yrs)	40 (28.6%)
Age group (40–60 yrs)	87 (62.1%)
Age group (61–75 yrs)	13 (9.3%)
Open Inguinal Repair	98 (70.0%)
Laparoscopic TAPP	22 (15.7%)
Robotic TAPP	20 (14.3%)

Incidence of Spermatic Cord Lipoma

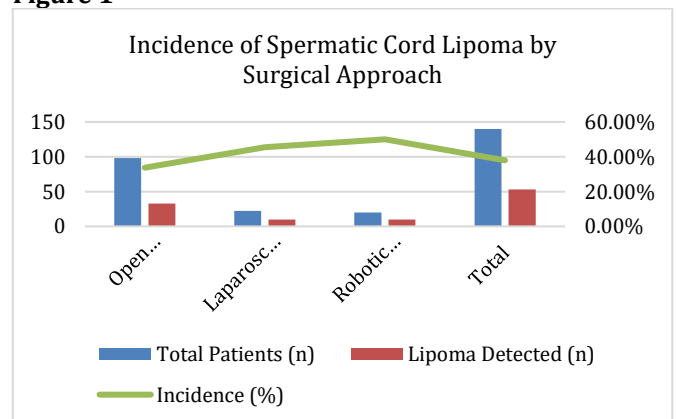
Spermatic cord lipomas were identified in 53 of 140 patients, yielding an overall incidence of 37.9%. Detection rates varied significantly across surgical modalities, with a notably higher incidence in patients undergoing Robotic TAPP (50.0%) and Laparoscopic TAPP (45.5%), compared to Open repair (33.7%).

Table 2

Incidence of Spermatic Cord Lipoma by Surgical Approach

Surgical Approach	Total Patients (n)	Lipoma Detected (n)	Incidence (%)
Open Inguinal Repair	98	33	33.7%
Laparoscopic TAPP	22	10	45.5%
Robotic TAPP	20	10	50.0%
Total	140	53	37.9%

Figure 1



Advanced visualization techniques in robotic and laparoscopic modalities likely contributed to the higher intraoperative detection of lipomas.

Anatomical Distribution of Lipomas

Anatomical localization was classified into three zones: precordial (superficial ring), midcordial (along the cord), and proximal (deep inguinal ring). Among the 53 identified lipomas:

- Midcordial location was the most frequent (39.6%)
- Precordial and proximal zones accounted for 34.0% and 26.4%, respectively.

Table 3

Anatomical Distribution of Spermatic Cord Lipomas ($n = 53$)

Anatomical Location	n (%)
Midcordial	21 (39.6%)
Precordial	18 (34.0%)
Proximal (Deep Ring)	14 (26.4%)

No intraoperative complications were directly attributed to the presence or dissection of lipomas in any zone.

Laterality of Lipomas

Among patients with lipomas, the majority exhibited unilateral involvement ($n=48$; 90.6%), whereas bilateral lipomas were documented in only 5 patients (9.4%). All bilateral cases were detected during laparoscopic or robotic approaches.

Table 4

Laterality of Spermatic Cord Lipomas

Laterality	n (%)
Unilateral	48 (90.6%)
Bilateral	5 (9.4%)

DISCUSSION

This study highlights the significant incidence of spermatic cord lipomas among patients undergoing inguinal hernia repair, with a detection rate of 37.9%. These findings underscore the clinical relevance of cord lipomas, which are frequently underrecognized yet can contribute to symptoms, recurrence, and operative complexity. Our results align with existing literature suggesting that lipomas of the spermatic cord are not merely incidental findings but often accompany or mimic indirect inguinal hernias, requiring careful intraoperative assessment and management.

Notably, the incidence of cord lipomas varied substantially with the surgical technique. Detection was highest in patients undergoing robotic TAPP (50.0%) and laparoscopic TAPP (45.5%), compared to open repair (33.7%). This likely reflects the superior magnification, illumination, and panoramic visualization offered by minimally invasive approaches, enabling more accurate identification of adipose tissue extending through the internal ring or embedded within the spermatic cord fascia. Previous studies have similarly shown that laparoscopic techniques are associated with a higher sensitivity for identifying occult hernias and cord lipomas, which may be overlooked in open surgery, particularly when small or partially reducible.

The anatomical distribution of lipomas in our cohort was consistent with prior cadaveric and intraoperative

studies. The midcordial region was most commonly involved (39.6%), followed by the precordial region (34.0%) and proximal segment near the deep ring (26.4%). This pattern is clinically significant, as lipomas at or near the internal ring may mimic hernial sacs or lead to diagnostic confusion, particularly during laparoscopic exploration. Failure to recognize and reduce these lipomas may contribute to persistent groin discomfort or postoperative recurrence, as unaddressed lipomatous tissue can exert traction or pressure along the inguinal canal.

The predominance of unilateral lipomas (90.6%) in our sample mirrors previous surgical series; however, the identification of bilateral lipomas exclusively in the laparoscopic and robotic groups suggests that traditional open repairs may underestimate contralateral or subclinical involvement. This highlights the potential diagnostic advantage of bilateral inspection during minimally invasive repair, even in cases of unilateral hernia.

The findings from this study emphasize the importance of deliberate inspection and dissection of the spermatic cord during all types of hernia repair. Given the non-negligible incidence of cord lipomas, particularly in adult male patients, surgeons must maintain a high index of suspicion and adopt a standardized approach for identification and management. Complete reduction or excision is recommended to minimize the risk of postoperative bulging, neuralgia, or misdiagnosed recurrence.

This study's strength lies in its prospective, ward-based design and the inclusion of a sizable cohort undergoing a range of modern hernia repair techniques. However, it is not without limitations. The lack of histopathological confirmation of all lipomatous tissue may lead to misclassification, although most were identified with typical macroscopic features. Furthermore, long-term follow-up data were not included, preventing correlation with recurrence or symptom persistence.

Finally, spermatic cord lipomas is a common serious condition in inguinal hernia surgery. They are more prevalent in procedures that require less tissue penetration since visibility is poor, and the most frequent place they inhabit is the mid cordial area. Standard identification and management of cord lipomas during hernia repair may need to be viewed as a method of enhancing surgical outcomes and decreasing the likelihood of a recurrence.

CONCLUSION

The present ward-based prospective study highlights the clinical significance of the spermatic cord lipomas during the repair of inguinal hernias, with the overall incidence of 37.9 percent. Laparoscopic and robotic TAPP procedures achieved significantly higher detection rates than any open surgery, which underscores the benefits of the minimally invasive approach in this type of procedure. Most localization was in midcordial location and bilateral lipomas were detected solely due to enhanced laparoscopic screening. The results have emphasized intraoperative examination and handling of the cord

lipoma systematically to avoid false recurrence, post-operative protrusion, and pain caused to the patient. Owing to their usual complex relationship with neighboring anatomy and high incidence of being coupled with hernia sacs, surgeons are advised to think of cord lipomas with a high index of suspicion and to include cord

lipomas as a regular aspect of the operative plan. Naming and classifying future hernia systems should include the concept of cord lipomas as diversity units to enhance a standardized diagnosis and training of surgeons in anatomic locations in the groin.

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