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Radiological Assessment and Surgical Correlation in Hernia Repair: From Diagnosis to Postoperative Follow-Up

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Abstract

Background: Inguinal hernias are among the most common surgical conditions, with diagnosis traditionally based on clinical exam. Imaging – particularly computed tomography (CT) – plays a valuable adjunctive role in diagnosis, characterization, and surgical planning, especially in equivocal or complicated cases. With the rise of laparoscopic repair techniques (totally extraperitoneal [TEP] and transabdominal preperitoneal [TAPP]), preoperative imaging can enhance operative strategy. This article reviews the current evidence on CT imaging of inguinal hernias, correlates preoperative findings with laparoscopic intraoperative observations, and outlines imaging protocols for postoperative follow-up.

Methods: We conducted a comprehensive literature review of publications up to 2025 on inguinal hernia imaging and laparoscopic repair. Key topics include CT diagnostic performance, classification of hernias on imaging, correlation with laparoscopic anatomy and technique, imaging for preoperative planning (e.g. myopectineal orifice assessment), and postoperative imaging findings.

Results: CT can detect inguinal hernias with moderate sensitivity (approximately 80–84%) and specificity, and can accurately classify hernia type in over 90% of cases using standardized systems. CT is particularly useful in identifying hernia contents (e.g. small bowel, omentum, bladder) and atypical or sliding hernias, which may affect surgical approach and duration. In laparoscopic (TAPP/TEP) repairs, intraoperative findings generally correlate well with preoperative CT: studies show 81–84% concordance in hernia presence and over 90% in type classification. Novel methods use CT-based three-dimensional reconstruction to measure the myopectineal orifice preoperatively, which closely matches laparoscopic measurements and can guide mesh sizing.

Postoperative imaging: CT (and MRI/US) detect complications such as seromas, hematomas, abscesses, and recurrence, with characteristic findings of fluid collections or bowel obstruction. However, guidelines discourage routine imaging for uncomplicated cases; imaging is reserved for diagnostic uncertainty or suspected complications.

Introduction

Inguinal hernias – protrusions of abdominal contents through the inguinal canal – affect a significant portion of the population (up to 25% of men during their lifetime). They may present with a palpable groin bulge or pain, sometimes aggravated by Valsalva maneuvers. The differential includes direct (medial) hernias, indirect (lateral) hernias, femoral hernias, and rare variants (e.g. sliding bladder, Amyand's hernia). Clinicians traditionally rely on physical examination, which has high specificity (~96%) but moderate sensitivity (~74%). International guidelines emphasize that most inguinal hernias can be diagnosed by exam alone. Imaging is recommended primarily when the diagnosis is equivocal or to detect occult femoral hernias. Ultrasonography is the first-line modality for uncertain cases. CT and MRI are considered alternative modalities when ultrasound or exam is inconclusive.

Despite guidelines advising conservative imaging use, CT plays a critical role in many scenarios: complex or recurrent hernias, incarcerated hernias, identification of unusual hernia contents, or preoperative planning for laparoscopic repair. CT provides a comprehensive view of the abdominal wall and pelvis, delineating the size of defects, the nature of hernia sac contents (fat, bowel, bladder), and the relationship to key landmarks (e.g. inferior epigastric vessels). This can influence surgical strategy, such as choice between open versus laparoscopic repair or mesh selection. Conversely, laparoscopic surgery (TAPP or TEP) offers direct visualization of the posterior inguinal anatomy. Correlating CT findings with what surgeons observe intraoperatively can validate imaging interpretations and reveal discrepancies.

Moreover, surgeons increasingly employ laparoscopic repair for its benefits (bilateral evaluation, faster recovery). In this context, radiologists must understand laparoscopic anatomy (e.g. the myopectineal orifice, triangle of doom/pain) and mesh placement planes. Postoperative imaging is also important: CT (or ultrasound/MRI) may be needed when patients present with pain or complications such as seroma, abscess, hemorrhage, or suspected recurrence. Familiarity with normal postoperative appearances and potential mesh-related changes prevents misdiagnosis.

This article aims to provide a comprehensive, evidence-based overview of the use of CT in inguinal hernia management. We first review CT's diagnostic performance and how hernia types are characterized on imaging. We then correlate imaging with laparoscopic surgical findings and techniques (TAPP and TEP), examining how preoperative CT can predict intraoperative observations and influence surgical planning (including mesh sizing via myopectineal orifice measurements). Finally, we survey the protocols for postoperative imaging follow-up and expected findings after repair. Throughout, we reference recent literature, guidelines, and consensus statements to support best practices.

Methods

A comprehensive literature review was performed using PubMed, Google Scholar, and professional society guidelines up to mid-2025. Search terms included "inguinal hernia", "computed tomography", "laparoscopic repair", "TAPP", "TEP", "postoperative imaging", and "hernia complications". We prioritized recent (last 5–10 years) studies and reviews, evidence-based consensus (e.g. HerniaSurge 2018 guidelines, EHS guidelines), and high-impact journals. Landmark older studies on imaging vs laparoscopic findings were included for context. Relevant case reports were examined for illustrative examples (e.g. bladder-sliding hernia on CT). Data were extracted on CT sensitivity/specificity, detection of hernia type, imaging features (direct vs indirect, femoral differentiation), and reported concordance between CT and laparoscopy. We also reviewed literature on laparoscopic anatomy (triangles of pain/doom) and mesh repairs, to discuss imaging correlates. Postoperative follow-up protocols and imaging appearances (seromas, mesh changes) were collated from imaging series and reviews.

In parallel, the HerniaSurge 2018 International Guidelines and consensus updates (e.g. HerniaSurge consensus 2020) were consulted for recommendations on imaging use. The 2022 ACR Appropriateness Criteria and guidelines (American Hernia Society, EHS) were reviewed for imaging indications. We synthesized these findings into a structured article, integrating quantitative results (e.g. sensitivities, classification accuracies) and qualitative recommendations, targeting a professional audience of radiologists and surgeons. Citations of key studies and guidelines are provided throughout for reference.

Results

CT in Diagnosis and Characterization of Inguinal Hernias

CT can directly visualize inguinal canal defects and hernia sacs, often with higher anatomical detail than ultrasound. In adult patients with suspected inguinal hernias, CT detection rates are moderate. One series found that CT detected inguinal hernias with ~81–84% sensitivity, and confirmed hernia presence with about 80–84% accuracy. Specificity is lower (in one report ~65%), reflecting false-positive interpretations (e.g. fat protrusions or prior repair changes mimicking recurrence). By comparison, MRI has reported sensitivity ~95%, and ultrasound ~86%, but these are context-dependent. A 2020 systematic review concluded that ultrasound generally has the highest sensitivity and specificity among imaging modalities for inguinal hernia, though CT also showed high values in some studies. In practice, therefore, CT is often reserved for equivocal cases where ultrasound is inconclusive or when evaluating complicated or large hernias.

CT can distinguish direct versus indirect hernias by the location of the sac relative to the inferior epigastric vessels: indirect hernias travel lateral to the vessels (often into the scrotum), whereas direct hernias protrude medially through the floor. Reconstruction in multiple planes facilitates this assessment. One CT study using multidimensional reconstructions correctly differentiated femoral versus inguinal hernias in 74 of 75 cases based on the anteroposterior relationship to the inguinal ligament. In practical terms, if the sac is seen passing above the inguinal ligament (anterior to it), it is likely inguinal; if below (posterior), it is likely femoral. CT can also assess hernia size and contents: omental fat or small bowel loops are readily identified, which is important for surgical planning. CT may detect sliding hernias involving the bladder or colon by showing part of an organ within the sac; for example, Katoh et al. reported two cases of indirect hernias with bladder sliding preoperatively noted on CT. These “sliding” hernias are often large and may prolong surgery, as was observed (operative times ~185–291 minutes). Recognizing bladder involvement on CT can alert the surgeon to avoid injury.

Overall, CT provides a detailed map of groin anatomy. It easily distinguishes inguinal from femoral hernias and defines size and laterality. In one series, prone-position CT (to accentuate herniation) achieved detection accuracy ~84% and hernia-type classification ~91% when using the European Hernia Society (EHS) classification system. These figures indicate that CT can reliably predict what surgeons find intraoperatively. However, guidelines emphasize that CT (and other imaging) are not needed for uncomplicated, clinically obvious hernias. The HerniaSurge consensus specifically recommends ultrasound as the first-line imaging when needed, but acknowledges CT (and MRI) as alternative tools. The American Academy of Family Physicians (AFP) has cautioned against routine preoperative imaging, noting that many patients undergo unnecessary scans. In practice, CT is most valuable when exam and ultrasound disagree, when occult hernias (e.g. femoral) are suspected, or when complications (incarceration, strangulation) are concerns.

Laparoscopic Repair Techniques and CT Correlation

Laparoscopic inguinal hernia repair has two principal approaches: the transabdominal preperitoneal (TAPP) technique and the totally extraperitoneal (TEP) technique. In TAPP, the surgeon enters the peritoneal cavity, incises the peritoneum at the groin, and places mesh over the myopectineal orifice (MPO) from within the abdomen. In TEP, the peritoneal cavity is not entered; instead, a space is created in the preperitoneal plane, and mesh is placed without violating the peritoneum. Both approaches allow assessment of both groins and coverage of potential femoral spaces. From an imaging standpoint, the distinction matters because CT cannot see surgical planes postoperatively (mesh is usually radiolucent polypropylene). However, preoperatively, CT findings do not directly change the choice between TAPP vs TEP; rather, the decision is based on surgeon expertise and patient factors. Nevertheless, both techniques benefit from preoperative CT information. For example, bilateral or large hernias are readily addressed laparoscopically, and CT can confirm bilaterality. CT may reveal a large defect or sliding component that would challenge a laparoscopic repair, influencing the surgeon to choose an open approach or prepare for a longer laparoscopic case.

CT findings can be discussed in the context of laparoscopic anatomy. Surgeons identify three key zones in laparoscopy: the triangle of doom (bounded by vas deferens and spermatic vessels, containing major vessels and nerves), triangle of pain (lateral to spermatic vessels, containing nerves), and circle of death (a vascular arcade). On CT, these landmarks are not explicitly visualized as zones, but the inferior epigastric vessels and pubic symphysis are visible, helping to predict the spatial orientation of a hernia defect. Surgeons rely on imaging to know if e.g. epigastric vessels run along the hernia's medial border (indicating a direct hernia). CT can also show the state of the contralateral groin: in about 12% of patients with unilateral hernias, laparoscopy finds a patent processus vaginalis (occult hernia) on the opposite side. While CT might not always show a very small asymptomatic defect, awareness of contralateral risk (fourfold higher incidence over 5 years) may lead some surgeons to inspect both groins during laparoscopy regardless of imaging.

We found only a few studies directly comparing preoperative CT to laparoscopic findings. Katoh et al. (2022) reported on 47 patients undergoing elective TAPP repairs; preoperative prone CT detected hernias in 81–84% of groins and correctly classified them 84–91% of the time. Their study specifically correlated CT classification (using the Japanese Hernia Society and EHS systems) with laparoscopic findings, showing high concordance. This suggests that CT can predict the type of hernia that laparoscopy will encounter. For example, small medial (direct) hernias on CT corresponded to direct defects seen behind the arcuate line intraoperatively, and similarly for lateral (indirect) hernias through the internal ring. When CT and laparoscopy disagreed, it was often due to very small defects or partially reducible hernias that were not apparent in one modality.

Laparoscopic TAPP vs TEP (correlation considerations): Both TAPP and TEP allow full exploration of the myopectineal orifice, including femoral spaces. However, TEP involves blunt dissection in the preperitoneal plane, which can be challenging if a hernia sac is large or contains adherent viscera (e.g. bladder). Preoperative CT that shows a large sliding bladder hernia (as in [5]) would alert the surgeon that a TEP approach might risk bladder injury, possibly favoring a TAPP approach for better visualization. CT may also reveal iliopubic tract or Cooper's ligament anomalies that could impact mesh placement. While CT does not visualize nerves, it can show the course of the external iliac vessels and psoas muscle, indicating where nerves likely run.

Bulleted Summary – **Key Laparoscopic Imaging Correlations:**

- **Direct vs Indirect:** CT shows sac location relative to epigastric vessels; laparoscopy confirms direct defects medial to vessels, indirect lateral.
- **Femoral Hernias:** CT differentiates femoral (sac below inguinal ligament) with high accuracy; laparoscopy/TEP will encounter them ventrally near the lacuna vasorum.
- **Sliding/Bladder Hernias:** CT can identify bladder in sac; surgeons must reduce and protect bladder.
- **Contralateral Occult Hernias:** CT may not show small PPVs, but laparoscopy routinely inspects both sides.
- **Myopectineal Orifice (MPO):** CT can measure MPO dimensions, guiding mesh size (see below).
- **Posterior Anatomy:** CT shows pubis and ligament landmarks; laparoscopy correlates these with Cooper's ligament placement.

By correlating CT with laparoscopic observations, radiologists can more accurately report the surgical anatomy. For instance, instead of simply noting "groin hernia, likely indirect", a radiologist familiar with laparoscopy may comment on sac size, whether sac extends through superficial ring, presence of any trapped bowel, and whether hernia abuts any important structures. This level of detail helps surgeons plan port placement and anticipate difficult dissections.

Intraoperative Findings Compared with Preoperative Imaging

Several studies have directly examined how often preoperative imaging matches intraoperative findings. In general surgery, concordance is high but not perfect. Van den Berg et al. (1999) compared physical exam, ultrasound, and MRI to laparoscopic findings: MRI identified 94.5% of hernias and US 92.7%, whereas exam alone found only 74.5%. CT was not part of that series, but modern CT similarly has limitations. In Menchaca et al.'s (2021) surgical series, CT of the abdomen/pelvis was used for suspected recurrence, but many "recurrences" on CT turned out to be pseudo-recurrences (e.g. scar tissue) on laparoscopy, highlighting CT's propensity for false positives in some post-repair settings.

Katoh's 2022 series provides the clearest data: in 47 patients, CT detected 81–84% of hernias preoperatively. This implies about 16–19% were missed on CT but found at surgery. The missed cases were typically small or extremely reducible hernias. Conversely, classification accuracy was very high (84–91% correct classification of direct vs indirect). This indicates that when CT calls a hernia direct or indirect, it almost always matches the laparoscopic finding. Intraoperatively, surgeons may note additional details such as extent of sac, peritoneal thinning, or any fibrous adhesions, but these usually do not contradict the CT classification.

In summary, CT and laparoscopy generally agree on the presence and type of hernia. Surgeons should be aware that a negative CT does not absolutely rule out a small hernia seen on exam, and a positive CT might show a hernia that the surgeon must confirm by dissection. The combination of exam, imaging, and laparoscopy provides the most reliable diagnosis.

Imaging in Surgical Planning

Anatomical Assessment: CT imaging helps in delineating the myopectineal orifice (MPO) – the region bounded by the lacunar ligament and pectineal (Cooper's) ligament – which is where mesh must cover during repair. Zhang et al. (2025) introduced a technique of 3D CT reconstruction to measure the MPO before TAPP repair. In their cohort (21 patients undergoing TAPP), the MPO dimensions on pre-op CT (approximately 7.05 × 6.27 cm, area ~19.5 cm²) closely matched laparoscopic measurements taken during surgery (7.18 × 6.17 cm). The differences were not statistically significant. This suggests that CT can reliably predict the size of the anatomical defect requiring coverage. As a result, surgeons can pre-select an appropriately sized mesh (often rectangular, e.g. 10×15 cm) to ensure adequate overlap. This planning is especially useful for large or bilateral hernias.

Content and Complexity: CT identifies hernia sac contents that might alter the surgical approach. For example, hernias containing small bowel or omentum may risk incarceration or strangulation, prompting the surgeon to prepare for gentle reduction. The presence of a sliding bladder hernia on CT alerts the surgeon to remove the bladder from the sac and watch for potential cystotomy. If CT shows signs of possible incarceration (bowel obstruction, bowel wall thickening within the sac), surgery may be expedited or changed from laparoscopic to open if safe reduction seems unlikely. CT can also uncover unexpected findings, such as an Amyand hernia (appendix in the sac) or a Richter's hernia (segment of bowel wall incarcerated), allowing surgical teams to plan accordingly.

Approach Selection: While both TAPP and TEP can repair most inguinal hernias, imaging may influence approach choice in certain cases. For instance, a large scrotal hernia extending far into the sac (common in elderly men) may be more easily managed via a TAPP approach where the peritoneal cavity provides space for reduction. Conversely, very small hernias might be quickly fixed with TEP or even an open anterior approach. Radiologists should note in reports the size and extent of hernia, advising if a "big sac" or "scrotal extension" is present. HerniaSurge guidelines recommend tailoring the surgical method to hernia characteristics and surgeon expertise, and CT helps define these characteristics.

Mesh Planning: Apart from sizing, CT can demonstrate the preexisting muscular defects. In complex cases (multiple prior repairs, radiation), CT may reveal scar tissue or atrophy, which can influence mesh placement and fixation. For large medial (direct) hernias, CT shows weakness of the transversalis fascia in Hesselbach's triangle; surgeons may choose a larger onlay patch in addition to a plug. For large indirect hernias, CT may show a widened internal ring; a plug and patch or a 3D (plug-and-patch) mesh may be planned. These choices are often at the surgeon's discretion, but CT findings provide rationale.

In practice, surgical teams often review imaging preoperatively. A well-described CT report noting hernia location (e.g. L1 = lateral small; M3 = medial large, using EHS terminology) and content gives the surgeon a preview of the case. This imaging "roadmap" is particularly important for trainees or in complex cases.

Postoperative Imaging Follow-Up

Routine imaging after uncomplicated inguinal hernia repair is generally not indicated. Clinical guidelines (Choosing Wisely, AAFP) discourage routine postoperative imaging in the absence of symptoms. However, when patients present with concerning findings (persistent pain, swelling, fever, or suspicion of recurrence), imaging becomes essential. In this context, CT is a useful modality, complemented by ultrasound or MRI depending on the scenario.

Expected Postoperative Findings: On early postoperative CT (days to weeks), one may see expected changes at the repair site: mild soft tissue swelling, small fluid collections (seromas), or residual gas from surgery. Mesh itself is often not directly seen on CT (polypropylene is radiolucent), but its footprint may appear as a subtle density or can be inferred by anatomic displacement. Importantly, radiologists must be familiar with normal post-repair anatomy to avoid false-positive diagnoses. For example, preperitoneal fat stranding and mild collection can be normal, but large fluid collections or gas bubbles with rim enhancement suggest an abscess. One euroRAD case report illustrated moderate air in the operative groin with non-hemorrhagic fluid, which resolved without intervention.

Complications and CT Findings: CT can detect several complications of inguinal hernioplasty:

- **Seroma/Hematoma:** Appear as simple fluid or mixed-density collection at the repair site (spermatic cord sheath or groin). Seromas are common; small ones are benign. A large hematoma may appear as high-attenuation fluid around the cord or in the scrotum.
- **Abscess/ Infection:** A fluid collection with thick enhancing wall or gas may indicate an abscess involving the mesh. CT can localize abscesses even deep in the preperitoneal space. Mesh infection is a dreaded late complication. Case reports show CT demonstrating rim-enhancing collections around the mesh years after repair. Any fluid around the mesh on CT should raise concern, and combined imaging (MRI) can further characterize.
- **Recurrence:** Re-herniation through the repair site is often diagnosed clinically, but CT can confirm by showing bowel or omentum protruding. However, caution is needed: scar tissue or remodeled fascial planes can mimic recurrence on CT. Menchaca et al. noted many false-positive recurrent hernias on CT 【23†】. Therefore, CT-diagnosed recurrence should be correlated with exam or surgical exploration.
- **Chronic Pain Syndromes:** While not directly imaged, CT (or MRI) may be performed in chronic pain to rule out meshoma (mesh curling), nerve entrapment (though nerve visualization is limited), or other pathology (e.g. osteitis pubis).
- **Urinary/Scrotal Complications:** Occasionally, post-op patients develop hydrocele (fluid around testis) or epididymitis. CT will show fluid in the scrotal sac (hydrocele) or inflammation around the cord structures. These findings are generally clinical and managed medically, but may lead a clinician to image if diagnosis is unclear.
- **Other:** Obturator or femoral hernias repaired in the same setting can recur or present with complications, which CT can identify as pelvic internal herniations.

Bulleted – **Postoperative Imaging Findings:**

- **Normal:** Mild edema, small seromas, subtle preperitoneal changes.
- **Seroma:** Simple fluid collection; common after mesh placement.
- **Hematoma:** Higher-attenuation fluid (acute bleed) if present.
- **Abscess/Infection:** Fluid with rim enhancement and/or gas. May involve mesh or wound tract.
- **Recurrence:** New hernia sac containing bowel/omentum at repair site. Must distinguish from normal postoperative changes.
- **Mesh-related:** Occasionally visible as thin line of fat interposed; complications include mesh migration (rarely imaged).

Imaging Modalities: Ultrasound remains valuable postoperatively for evaluating superficial collections or guiding aspirations. MRI can assess chronic pain or occult recurrence without radiation. CT is often used in the early postoperative period if complications are suspected (especially if infection or bowel involvement is a concern) because of its wide availability and speed. CT protocols typically include intravenous contrast to highlight abscess walls or active bleeding, and possibly oral contrast if assessing for bowel obstruction. Low-dose CT protocols may be considered for groin evaluation to minimize radiation.

Timing and Surveillance: There are no standard guidelines for routine imaging follow-up. In practice, imaging is symptom-driven. Early (<30 days) CT may be performed for acute complications (e.g. suspected mesh infection, small-bowel obstruction). Late imaging (>months/years) is usually for chronic pain, recurrent hernia, or late-onset complications like meshitis. For suspected recurrence, physical exam is first, and imaging (preferably ultrasound or CT) is obtained if uncertain. AAFP data suggest many imaging studies are unnecessary, so radiologists should be judicious and advise correlation with clinical findings.

In summary, postoperative imaging findings must be interpreted in the context of surgical technique. Radiologists should know whether an open (e.g. Lichtenstein) or laparoscopic repair was done, and the type of mesh used. Each approach has characteristic expected changes. For example, in TAPP repairs, there may be a small defect in the peritoneum that re-seals (visible as a subtle discontinuity), whereas in TEP there is no peritoneal incision. Mesh plugs (in open repairs) appear as dense structures if polypropylene impregnated with barium. Knowledge of these details avoids mistaking normal findings for pathology.

Discussion

The evidence indicates that CT imaging, while not necessary for every inguinal hernia, is extremely valuable in selected cases and complements laparoscopic surgery. CT’s strengths are its high-resolution anatomy and ability to reveal unexpected findings. For radiologists, understanding the laparoscopic view of the groin is crucial. For instance, a lateral (indirect) hernia on CT corresponds to a sac protruding through the internal ring, seen endoscopically as a peritoneal protrusion lateral to the epigastric vessels. Direct hernias on CT correlate with weakness of the transversalis fascia and are seen laparoscopically as a defect in the floor. Radiologists should describe not only the presence of a hernia but also its type, size, laterality, and contents, as these details guide surgeons.

Our review highlights that CT and laparoscopy generally agree on hernia characterization. Katoh et al.’s study showed CT could predict hernia type with ~90% accuracy. This means that preoperative CT reporting should use standardized terminology (e.g. EHS classification: lateral [L] vs medial [M], small [1] vs large [3]) to allow direct surgical correlation. When discrepancies arise, they often involve very small hernias detectable only by one modality. Surgeons should therefore be prepared to find additional small defects even if not seen on CT.

One of the most promising applications is the use of 3D CT reconstruction for surgical planning. The MPO measurement study. demonstrates a novel way CT can directly inform laparoscopic repair. Currently, mesh sizing is often done by intraoperative judgment or by rough preoperative estimate; CT provides quantitative data to choose the right mesh size and ensure adequate overlap. This could reduce recurrence (which is often due to inadequate mesh coverage) and avoid undersizing. It also exemplifies how technology can improve “pre-habilitation” before hernia surgery.

From a guideline perspective, this article underscores the tailored use of imaging. The HerniaSurge and ACR guidelines remind us that imaging should not replace sound clinical evaluation. For radiologists, this means we should focus CT on patients who will benefit (e.g. chronic pain, incarceration, unusual anatomy). It also means communicating with surgeons to avoid redundant scans. The AAFP has highlighted that many patients undergo unnecessary ultrasound before hernia consultation. A better approach is early surgical referral when exam is equivocal; the surgeon can then decide if imaging is needed for operative planning. When CT is obtained, reports should clearly answer specific clinical questions (Is there a hernia? Where? What is in it? Any complication?).

Intraoperatively, surgeons should provide feedback to radiologists about imaging findings. For example, if CT suggested a sliding bladder hernia, the surgeon can confirm and note how that affected the procedure. This iterative process improves future CT interpretations. Studies of learning curves in groin hernia imaging suggest that radiologists improve accuracy when given operative correlations. In multidisciplinary centers, review of imaging and surgical findings together can enhance mutual understanding of anatomy.

Postoperatively, communication is equally important. A radiologist reading a CT of the post-herniorrhaphy groin should know the repair technique and mesh type. Misinterpretation can occur (e.g. calling a normal postoperative fluid collection an abscess). Therefore, radiology reports for postoperative groin imaging should refer to the operative note details if available. Documentation of "no evidence of recurrent hernia" or "expected postoperative changes, no fluid collections" can reassure clinicians. If unexpected findings (e.g. abscess or bowel obstruction) are seen, the report should emphasize urgency.

Future directions include advanced imaging techniques and protocols. Dynamic maneuvers (Valsalva CT) have been explored; one study found Valsalva-CT has very high specificity for hernias, though sensitivity remains moderate【60†】. If implemented, combining normal and Valsalva CT phases might improve detection of intermittent hernias. MRI, with its excellent soft tissue contrast, may increasingly be used, especially in young patients or when radiation avoidance is desired. Diffusion-weighted MRI has shown promise in detecting mesh infections. Additionally, development of specialized CT protocols (e.g. 3D mapping software for hernias) could further integrate imaging and surgery.

Limitations: The literature is somewhat limited by heterogeneity. Many studies on imaging are retrospective or small. Direct comparisons of CT vs laparoscopy are few. Our review is also limited by available sources; there may be unpublished institutional experiences. Finally, while CT provides valuable information, it incurs cost and radiation. High-volume hernia centers might rely more on ultrasound or clinical judgment for straightforward cases. We emphasize that CT should not be routine, but rather a tool for selected, challenging cases.

Conclusion

Computed tomography is a powerful adjunct in the management of inguinal hernias, bridging the gap between radiological diagnosis and surgical treatment. CT reliably identifies most hernias and accurately classifies their type, as confirmed by laparoscopic findings. It is especially useful in complex or equivocal cases: diagnosing occult femoral hernias, defining large or sliding hernias, and assisting in planning for mesh size and surgical approach. Laparoscopic repair techniques (TAPP/TEP) benefit from preoperative CT by anticipating anatomical challenges. Intraoperative observations generally validate CT interpretations, reinforcing radiologists' confidence in describing hernia anatomy.

Postoperatively, imaging (CT, ultrasound, or MRI) is reserved for patients with symptoms or suspected complications. Radiologists must recognize normal postoperative anatomy and common complications (seroma, hematoma, abscess, recurrence) to guide further management. Evidence-based guidelines support judicious use of imaging: routine pre- or postoperative scans for uncomplicated hernias are discouraged. Instead, a collaborative approach – with the surgeon determining the need for imaging and the radiologist providing targeted, actionable information – yields the best outcomes.

In summary, CT plays a complementary role to clinical exam and ultrasound in inguinal hernia care. It enhances surgical planning by quantifying hernia defects and predicting operative findings. As advanced techniques like 3D reconstruction become more available, CT's utility in customized hernia repair planning will likely grow. Ultimately, high-quality imaging combined with sound surgical technique and adherence to guidelines can minimize complications and recurrences, improving patient care in inguinal hernia management.

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