

Mesh Entrapment Appendiceal Perforation with Hernia Repair Mesh-Associated Abscess

Anthony Esposito III, MS¹, Steven Chen, MD^{2*}, Yayone L. Rivaud, MD²

¹Temple-St. Luke's School of Medicine, Bethlehem, PA, USA

²Department of Radiology, St. Luke's University Hospital Network, Bethlehem, PA, USA

*Correspondence: Steven Chen, MD, Department of Radiology, St. Luke's University Hospital Network, Bethlehem, PA, USA

✉ Steven.Chen@sluhn.org

Radiology Case. 2026 April; 20(4):1-8 :: DOI: 10.3941/jrcr.6031

AUTHORS' CONTRIBUTIONS

Anthony Esposito – Chart review and writing of manuscript.
Steven Chen, MD – Editing
Yayone L. Rivaud, MD – Editing, Imaging preparation

ACKNOWLEDGEMENTS

If you would like to thank a particular person.

DISCLOSURES

The authors have nothing to disclose.
If, please explain who & what kind of disclosure (e.g. financial, competing interest, etc.).

CONSENT

No, consent was not obtained for publication. All medical information has been anonymized.

HUMAN AND ANIMAL RIGHTS

No experimental results are being reported.

ABSTRACT

While appendicitis is the most common emergent indication for abdominal surgery worldwide and abdominal hernia repair is also one of the most common abdominal surgeries, the scenario in which the appendix becomes entrapped or entangled with the hardware associated with a hernia repair has rarely been documented. The patient in this case underwent a bilateral inguinal hernia repair procedure approximately 20 years ago. Years later, the patient developed appendiceal perforation with imaging and surgical findings indicating involvement of the inguinal hernia repair hardware.

CASE REPORT

BACKGROUND

Acute appendicitis typically presents with varying combinations of classic clinical findings including generalized periumbilical pain that migrates to the right lower quadrant (RLQ) at McBurney's point, RLQ guarding, rebound tenderness, RLQ tenderness on deep palpation of the left lower quadrant, psoas sign, obturator sign, anorexia, nausea, and fever. Lab findings suggestive of bacterial infection (neutrophilia, elevated C reactive protein, etc.) are also common. In contrast, the presentation of chronic appendiceal and periappendiceal inflammatory processes is often both subtle and non-specific. Patients often experience near constant, low grade, aching pain in the right lower quadrant that increases over time. On computed tomography (CT) imaging acute and chronic appendicitis are virtually indistinguishable with similar rates of periappendiceal fat stranding, appendiceal dilation (> 6 mm),

cecal apical thickening, adenopathy, appendicoliths, arrowhead sign, abscess, phlegmon, and fluid collection [1].

The other aspect of this case that lends to its complexity is the history of previous inguinal hernia repair with a synthetic mesh. One of the complications of any hardware implantation is migration of the implant. With abdominal implants, migration can be particularly problematic because they can embed in bowel and result in perforation, peritoneal infection with gut flora, and abscess or phlegmon formation. Prior publications have described scenarios where appendiceal pathologies arise due to involvement with surgically implanted hardware. However, the presentation of radiology findings has been limited, and pathology results are largely absent. With this case we present CT imaging at several points throughout this patient's treatment course from years prior, through acute

symptom onset, to resolution of his symptoms. The radiology findings are also corroborated by the intraoperative narrative and gross pathology exam photos.

CASE REPORT

The patient is a 51-year-old male with a past surgical history of bilateral laparoscopic hernia repair with mesh implantation about 20 years ago. Approximately three years prior to his acute presentation, the patient received a non-contrast renal stone protocol CT which demonstrated a non-inflamed appendix, abutting the anterior abdominal wall and containing a metallic density object consistent with mesh fixation hardware (Figure 1). The patient presented to his family medicine doctor with bilateral groin pain, worse on the right side. He underwent bilateral inguinal ultrasound one week after, which was negative for recurrent hernia and no other pathologies were identified. After two months of continuing groin and lower abdominal pain, he followed up with general surgery. CT of the abdomen and pelvis showed inflammatory changes near the right deep inguinal ring with a 2.0 x 2.0 x 2.3 cm centrally low-density collection (Figure 2). The appendiceal tip was inseparable from the collection. Considering these findings, the patient was scheduled for an exploratory laparotomy two weeks later. During the operation, the appendix was found to be tethered to the anterior abdominal wall, necessitating extensive lysis of dense adhesions, followed by appendectomy. The patient was then admitted to the hospital for post-surgical observation. On pathology tissue exam, the appendiceal serosal surface was partially smooth to shaggy, and tan-red at the tip. No exudate was identified. The distal tip was disrupted with an embedded metallic foreign body, a silver-colored coil 0.3 cm long x 0.4 cm diameter. The lumen of the appendix was patent and contained semisolid fecal matter (Figure 3). Tissue culture grew numerous gut flora including *Escherichia coli*, *Streptococcus anginosus*, *Klebsiella oxytoca*, *Actinomyces odontolyticus*, *Bacteroides thetaiotaomicron*, *Bacteroides fragilis*, *Fusobacterium nucleatum*, and *Gemella morbillorum*. The patient received a course of intravenous (IV) ceftriaxone and was discharged after 4 days to complete a course of oral amoxicillin-clavulanate.

A month later the patient presented to the emergency department for right lower quadrant pain and underwent an additional CT of the abdomen and pelvis demonstrating an enlarging abscess measuring 2.2 x 1.9 x 1.9 cm (Figure 4). A week later interventional radiology performed CT-guided percutaneous abscess drainage. After a month of failed conservative management, the patient successfully underwent right hernia mesh explantation with additional lysis of adhesions. Following the mesh explantation the patient's right lower quadrant symptoms resolved.

DISCUSSION

Etiology & Demographics

In this case with surgical findings of appendix perforation involving inguinal hernia mesh, there are several possible sequences of events. It is possible that the tacks from the hernia

mesh migrated from the abdominal wall sometime after surgery, embedded in the appendix, eventually leading to perforation and infection. Alternatively, the appendix may have become entrapped at the time of the hernia repair surgery, developing complications many years later.

The literature on hernia mesh-related appendiceal complications is sparse. A total of 6 cases of appendiceal pathologies related to hernia repair mesh were found in our literature search. In one case the patient underwent open right inguinal hernia repair 8 years prior to the acute presentation. He had a recurrence of the hernia 2 years after the initial surgery and underwent a transabdominal preperitoneal (TAPP) hernia repair [2]. He presented with a 1 day history of migratory right iliac fossa pain, anorexia, and nausea. He underwent exploratory laparoscopy, and the inflamed appendix was found to be adherent to the TAPP mesh. Appendectomy was completed, and the mesh was left in place without complication in the 2-month follow up period. No radiological studies were discussed or presented. There was a similar case where adhesions formed between hernia mesh and appendix, subsequently presenting with acute appendicitis and had a nearly identical course of treatment [3].

Another case report described a patient that had an acute perforated appendix 8 years after TAPP hernia repair treated with appendectomy [4]. This patient then developed an abscess involving the repair mesh which, and like our case, did not resolve with CT guided drainage and antibiotic therapy. Ultimately, this patient also found symptomatic relief only after mesh explantation.

In another case report, the patient with chronic right lower quadrant pain presented 3 years after TAPP hernia repair [5]. This patient only had pain with exercise. There were no notable findings on ultrasound or magnetic resonance imaging. At surgery, the appendix was found to be attached to the repair mesh by dense adhesions with no evidence of infection present. Appendectomy was performed, the repair mesh was left in situ without subsequent infection, and the patient's symptoms resolved.

Another case described a ruptured appendicitis involving a migrated pelvic mesh in a 53-year-old nulligravid woman with a complicated gynecologic history [6]. The patient had a past surgical history of supracervical hysterectomy complicated by apical prolapse status post sacrocervicopexy with polypropylene mesh after several other failed procedures. After 12 months of chronic pain with failed conservative management diagnostic laparoscopy found the appendix to be tethered to the repair mesh. Appendectomy was performed, the mesh was left in situ and at two months post operation the patient reported a total resolution of symptoms.

Finally, there was a case of migrated herniorrhaphy repair mesh plug which became incorporated into the appendix and small bowel in a 50-year-old male [7]. The tip of the appendix

perforated into an abscess cavity involving the mesh plug, appendiceal tip, and small bowel resulting in appendectomy and small bowel resection. Final pathology showed acute and chronic periappendicitis, fibrosis, and foreign body granulomatous inflammation surrounding the repair mesh. A coronal CT image and a laparoscopic surgical image were presented. The mesh was clearly displaced, no longer affixed to the anterior abdominal wall.

Revision of hernia repair following infected hernia repair mesh has been a challenging scenario for general and plastic surgeons [8]. Currently the favored technique is mesh explantation followed by abdominal wall reconstruction utilizing biologic or biosynthetic mesh. Another hernia repair method that was more popular in the past is the nylon darn technique. Utilizing monofilament sutures, the surgeon creates a tension free hernia repair by weaving a net-like lattice across the hernia. While no longer the gold standard for most primary hernia repairs, the nylon darn is still favored by some surgeons in the case of a contaminated surgical field, such as infected non-healing wounds or strangulated hernia repair requiring bowel resection [9, 10]. There are no reports of nylon darn technique being used in revision of infected hernia repair mesh, but it may be a worthwhile consideration.

As our case and the literature review demonstrate, appendiceal pathology involving surgical repair mesh is a rare but important entity to keep in mind. The spectrum of pathology spans from adhesions causing chronic pain to appendiceal perforation resulting in infectious symptoms. Management must be tailored accordingly.

Clinical & Imaging Findings

The clinical findings in this case were lower abdominal/inguinal pain and tenderness, right greater than left.

Surgical findings from the appendectomy included extensive dense adhesions with the appendix and small bowel firmly attached to the anterior abdominal wall. An area of walled-off fat necrosis was appreciated, and a section of mesh was excised.

Findings from the mesh explantation surgery included a large right groin mesh with obvious infection and surrounding fat necrosis. A 6 x 4 cm section of mesh was removed which included the portion with obvious infection leaving behind a well-incorporated section overlying the iliac artery and vein.

On pathology examination, the appendix measured 9.0 cm long x 0.9 cm diameter, and the serosal surface was partially smooth to shaggy and tan-red at the tip. The appendix had no exudate with the distal tip disrupted and displayed an embedded metallic foreign body. The foreign body was a 0.3 cm long x 0.4 cm diameter silver-colored coil. This description is consistent with the titanium tacks used in hernia mesh fixation. Sectioning of the appendix revealed semisolid fecal material with a tan and unremarkable mucosa (Figure 3).

CT of the abdomen and pelvis 3 years prior to acute presentation showed a non-inflamed appendix abutting the anterior abdominal wall and containing a metallic foreign object (Figure 1). CT of the abdomen and pelvis at acute presentation showed new inflammatory changes around the right internal inguinal ring with a 2.0 x 2.0 x 2.3 cm centrally low-density collection inseparable from the appendiceal tip (Figure 2). CT of the abdomen and pelvis post appendectomy, prior to hernia mesh explantation showed a recurrent 2.2 x 1.9 x 1.9 cm rim-enhancing collection in the anterior right lower quadrant immediately adjacent to the abdominal wall herniorrhaphy tacks (Figure 4).

Treatment & Prognosis

Initial appendectomy surgery did not result in complete resolution of the patient's infection. Only after a course of antibiotics, percutaneous abscess drainage, and hernia mesh explant did the patient fully recover with complete resolution of symptoms.

Differential Diagnosis

Mesh entrapment appendicitis, tip appendicitis, recurrent inguinal hernia.

TEACHING POINT

In cases where the appendix is inseparable from inguinal hernia repair hardware, entrapment of the appendix should be considered in the differential diagnosis. Entrapment of the appendix to implanted hardware can lead to appendiceal perforation and infectious colonization of the implanted hardware by gut flora, which may require hardware explantation to fully resolve the infection.

QUESTIONS

Question 1: What is the most common abdominal surgery in the world?

1. Cholecystectomy
2. Splenectomy
3. Hernia Repair
4. Appendectomy - (applies)
5. Colectomy

Explanation:

Appendectomy is the most common abdominal surgery in the world. [While appendicitis is the most common emergent indication for abdominal surgery worldwide...]

Question 2: Which of the following possible components of a hernia repair is most easily identifiable on CT?

1. Implantable Mesh Sheet
2. Suture Fixation
3. Titanium Fixation Tacks - (applies)
4. Polymer Fixation Tacks
5. Implantable Mesh Plug

Explanation:

Metallic objects are the most radiopaque making the titanium fixation tacks the most identifiable.

Question 3: What pathology must be ruled out in a patient with ongoing lower quadrant pain and a history of inguinal hernia repair before other less common etiologies would be considered?

1. Psoas abscess
2. Cystitis
3. Hepatitis
4. Appendicitis
5. Recurrent Inguinal hernia- (applies)

Explanation:

Given the patient's clinical picture and surgical history, recurrent inguinal hernia must be ruled out. [He underwent bilateral inguinal US one week after initial presentation which was negative for recurrence of the previously repaired hernia and no other pathologies were recognized.]

Question 4: Which of the following are differential diagnoses of appendicitis or appendiceal perforation in a patient with a history of inguinal hernia repair?

1. Appendicolith - (applies)
2. Entrapment under the mesh at the time of surgery - (applies)
3. Adhesion to the abdominal wall - (applies)
4. Migration of fixation tacks into the appendix - (applies)
5. Iatrogenic appendiceal injury with mesh fixation tack penetration - (applies)

Explanation:

In addition to the hernia repair related etiologies, common etiologies for appendicitis in this patient's demographic, such as appendicoliths, are still applicable [10,11]

Question 5: In addition to standard appendectomy, which of the following is most likely to be included in the plan for a patient with mesh entrapment appendiceal perforation with abscess?

1. Small Bowel resection
2. Cecectomy
3. Barium Contrast CT Abdomen/Pelvis
4. Mesh Explantation - (applies)
5. Neurectomy

Explanation:

Mesh explantation should be considered as once an infection occurs in a foreign body, such as the hernia repair mesh in this case, it can be difficult to clear the infection by antibiotics alone, and act as a nidus for re-infection. [The patient successfully underwent right hernia mesh explantation with additional lysis of adhesions.]

appendicitis. *Am J Emerg Med.* 1998; 16(1): 26-33. PMID: 9451309.

- [2] Ramasamy S, Bylapudi SK, Jameel MR, Raja M. Entrapped appendicitis in post TAPP mesh repair. *Ann R Coll Surg Engl.* 2021; 103(10): e317-e318. PMID: 34414784.
- [3] Jennings JM, Ng PCh. Laparoscopic appendectomy for suspected mesh-induced appendicitis after laparoscopic transabdominal preperitoneal polypropylene mesh inguinal herniorrhaphy. *J Minim Access Surg.* 2010; 6(1): 19-21. PMID: 20585490.
- [4] Gilbert Sebbag, Amnon Ovnat, Gad Shaked, et al. Severe Mesh Graft Infection Consecutive to a Perforated Acute Appendicitis 8 Years After Transabdominal Laparoscopic Right Inguinal Hernia Repair: A Review of the Literature. *Journal of Pelvic Medicine and Surgery.* 2005; 11: 275-277.
- [5] Rakic Mislav, Klicek Robert, Amic Fedor, et al. Chronic Abdominal Pain following the TAPP Hernioplasty, Caused by Appendix Attached to the Polypropylene Mesh. *Journal of Medical & Surgical Pathology.* 2018.
- [6] Vargas R, Keryan A, Minassian VA. Appendiceal adhesion to synthetic mesh after laparoscopic sacrocolpopexy: a case report. *Int Urogynecol J.* 2015; 26(1): 155-157. PMID: 25035065.
- [7] Monreal AJ, Profeta B, Bloom SW, Eubanks S. Perforated Appendicitis with Migrated Inguinal Mesh Involvement. *Am Surg.* 2022; 88(9): 2263-2264. PMID: 35695428.
- [8] Kao AM, Arnold MR, Augenstein VA, Heniford BT. Prevention and Treatment Strategies for Mesh Infection in Abdominal Wall Reconstruction. *Plast Reconstr Surg.* 2018; 142(3 Suppl): 149S-155S. PMID: 30138283.
- [9] Rongviriyapanich A. Reconstruction of a large abdominal wall defect without using mesh: A case report. *Int J Surg Case Rep.* 2020; 75: 517-520. PMID: 33076207.
- [10] Jha R, Shrestha S, Bhatta BR, Upadhyay RP, Prasad R. Straining induced spontaneous bowel transection in a patient with incarcerated inguinal hernia with cryptorchidism: A case report. *Int J Surg Case Rep.* 2025; 128: 111093. PMID: 40015228.
- [11] Dölling M, Rahimli M, Pachmann J, et al. Hidden Appendicoliths and Their Impact on the Severity and Treatment of Acute Appendicitis. *J Clin Med.* 2024; 13(14): 4166. PMID: 39064205.
- [12] Ranieri DM, Enzerra MD, Pickhardt PJ. Prevalence of Appendicoliths Detected at CT in Adults With Suspected Appendicitis. *AJR Am J Roentgenol.* 2021; 216(3): 677-682. PMID: 33474985.
- [13] Ranieri DM, Enzerra MD, Pickhardt PJ. Prevalence of Appendicoliths Detected at CT in Adults With Suspected Appendicitis. *AJR Am J Roentgenol.* 2021; 216(3): 677-682. PMID: 33474985.

REFERENCES

- [1] Rao PM, Rhea JT, Novelline RA, McCabe CJ. The computed tomography appearance of recurrent and chronic

FIGURES

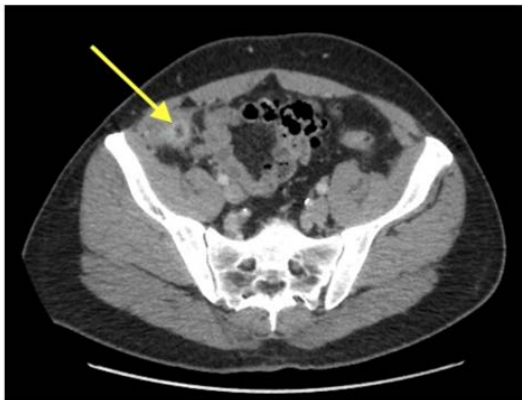


1A. Axial CT



1B. Sagittal CT

Figure 1: 51-year-old male with hernia mesh entrapment of appendix, 3 years prior to acute presentation. FINDINGS: A CT of the abdomen and pelvis from several years prior to presentation with right lower quadrant pain showed the appendix abutting the anterior abdominal wall with an embedded metallic foreign body, but no acute inflammatory changes (yellow arrows). TECHNIQUE: CT Renal Stone Study of the Abdomen and Pelvis without oral or IV contrast. Axial and Sagittal views.



2A. Axial CT



2B. Coronal CT



2C. Sagittal CT

Figure 2: 51-year-old male with entrapment appendicitis at the time of acute presentation. FINDINGS: Inflammatory changes near the right deep inguinal ring with a 2.0 x 2.0 x 2.3 cm centrally low-density collection. The appendiceal tip is indistinguishable from the collection (yellow arrows). TECHNIQUE: CT Abdomen Pelvis with IV Contrast. Axial, Coronal, and Sagittal views.

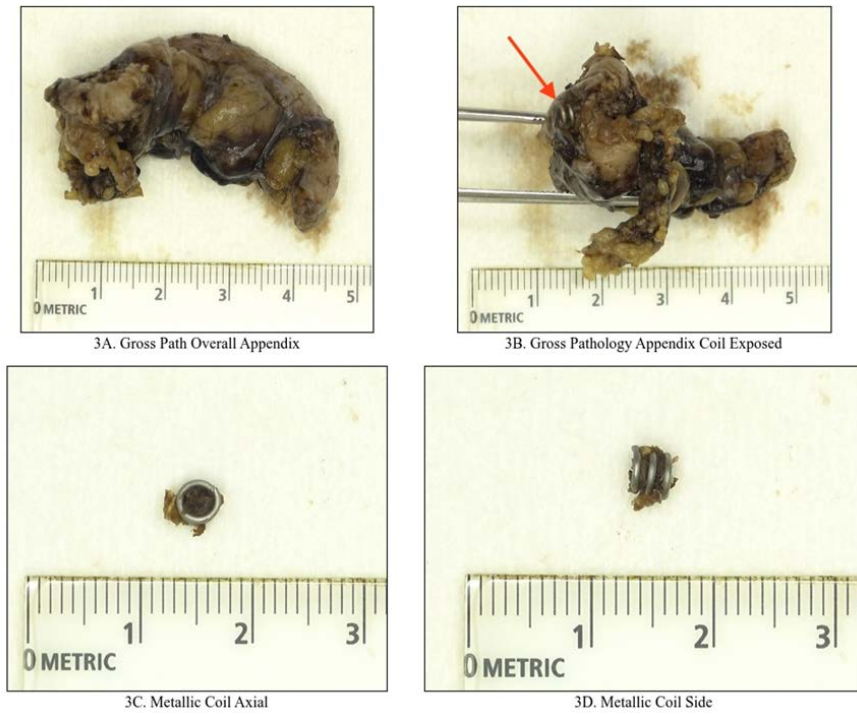


Figure 3: Gross pathology findings. FINDINGS: The appendiceal serosa was partially smooth to shaggy, tan-red at the tip. The appendix had no exudate with the distal tip disrupted and displayed an embedded metallic foreign body (red arrow.) The foreign body was a 0.3 cm long x 0.4 cm diameter silver-colored coil. TECHNIQUE: Gross pathology dissection photographs.

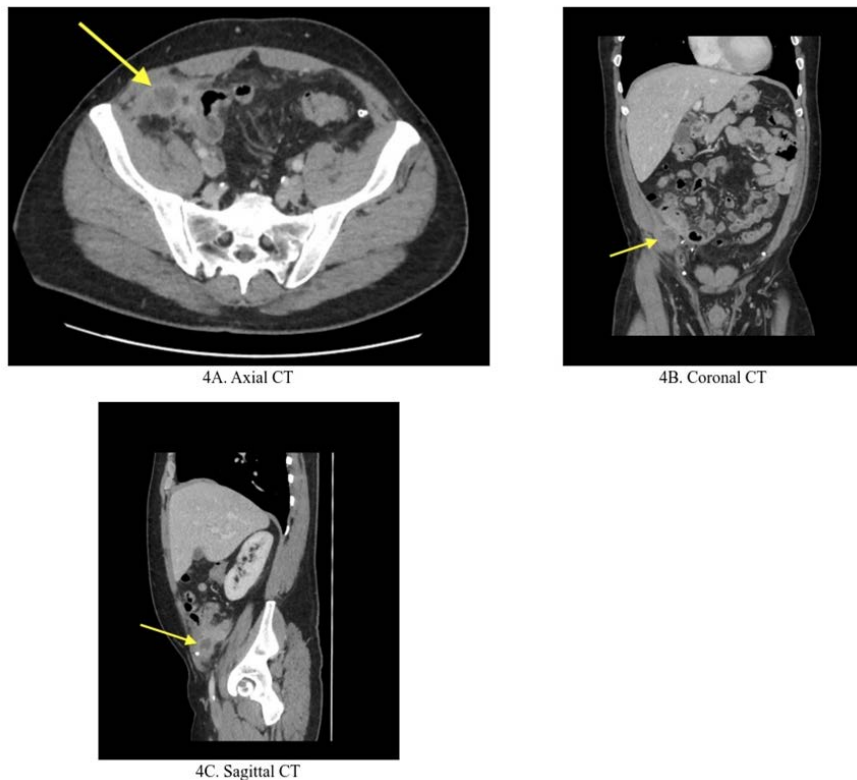


Figure 4: CT performed 4 weeks after appendectomy. FINDINGS: Inflammatory changes of the deep ring of the right inguinal canal with recurrent 2.2 x 1.9 x 1.9 cm centrally low-density collection (yellow arrows). These findings prompted CT guided percutaneous abscess drainage followed by a second surgery to explant the hernia mesh. TECHNIQUE: CT Abdomen Pelvis with IV contrast. Axial, Coronal, and Sagittal views.

Summary table

Etiology	Appendiceal Entrapment
Incidence	Unknown
Gender Ratio	Unknown
Age Predilection	Unknown
Risk Factors	History of Inguinal Hernia Repair
Treatment	Appendectomy, Mesh Explantation, percutaneous abscess drainage, antibiotic therapy
Prognosis	Full recovery, return to normal activities.
Findings on Imaging	Appendiceal perforation with abscess in proximity to the right deep inguinal ring, foreign body in appendix.

Differential table

Diagnosis	US	CT	MRI
Recurrent Inguinal Hernia	Mobile fat containing sack with Valsalva maneuver at the inguinal canal	Fat containing structure protruding through the inguinal canal	Fat containing structure protruding through the inguinal canal
Mesh Entrapment Appendicitis	Vermiform appendix inseparable from surgical material with wall thickening, fluid distension, possibly with surrounding free fluid or fluid collection	Vermiform appendix inseparable from surgical material with wall thickening, fluid distension, possibly with surrounding free fluid or fluid collection	Vermiform appendix inseparable from surgical material with wall thickening, fluid distension, possibly with surrounding free fluid or fluid collection
Tip Appendicitis	Enlargement of the tip of the appendix with wall thickening, fluid distension, surrounding fluid, and increased echogenicity of the fat planes and fluids.	Enlargement of the tip of the appendix with wall thickening, fluid distension, fat stranding, and periappendiceal inflammatory change.	Enlargement of the tip of the appendix with wall thickening, fluid distension, surrounding fluid, and periappendiceal inflammatory change.

KEYWORDS

Hernia; mesh; appendix; appendicitis; appendiceal entrapment; appendiceal perforation; abscess; abdominal; RLQ; Right Lower Quadrant; CT; Computed Tomography

ABBREVIATIONS

CT = COMPUTED TOMOGRAPHY

Online access

This publication is online available at:

www.radiologycases.com/index.php/radiologycases/article/view/6031

Peer discussion

Discuss this manuscript in our protected discussion forum at:

www.radiopolis.com/forums/JRCR

Interactivity

This publication is available as an interactive article with scroll, window/level, magnify and more features.

Available online at www.RadiologyCases.com

Published by EduRad



www.EduRad.org