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Case Report

Hepatic actinomycosis with intrauterine device (IUD)

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Abstract

We report a case of hepatic actinomycosis in a 41-year old woman with an intrauterine device (IUD) in place that presented with abdominal pain and fever. After evaluation with transvaginal and abdominal ultrasound as well as computed tomography (CT) scan, a hepatic abscess was identified by MRI and actinomycosis infection was confirmed by visualization of yellow sulfur granules on pathologic evaluation of abscess aspirate. The patient was treated with 14 days of doxycycline and amoxicillin and she improved clinically. Actinomycosis has been increasingly associated with prolonged IUD usage but has proven to be extremely difficult to diagnose because of its rare occurrence and nonspecific symptoms.

Key Words:

Actinomycosis; hepatic actinomycosis; intrauterine device

Introduction

Actinomycosis is a chronic granulomatous disease caused by Actinomyces, primarily Actinomyces israelii, an anaerobic, filamentous gram-positive rod [1,2]. Actinomyces israeli is a normal commensal organism found in the human mouth, gastrointestinal tract, and female reproductive tract [3]. However, in rare situations Actinomyces can invade breached mucosal barriers and become pathogenic resulting in necrosis, abscesses, or fistulas [4]. Common sites for actinomycosis infections are the cervicofacial area (50%), abdomen (20%), and thorax (15-20%) [2]. The infection primarily presents in middle-aged adults. Additionally, abdominal and pelvic actinomycosis has been increasingly associated with prolonged IUD usage [5-7]. In this case, we discuss a 41-year-old female who presented with a liver abscess and left adnexal mass as a result of actinomycosis infection associated with IUD usage. The study aims to raise awareness of the possibility of actinomycosis infection in the liver and direct providers on how to identify and care for these patients.

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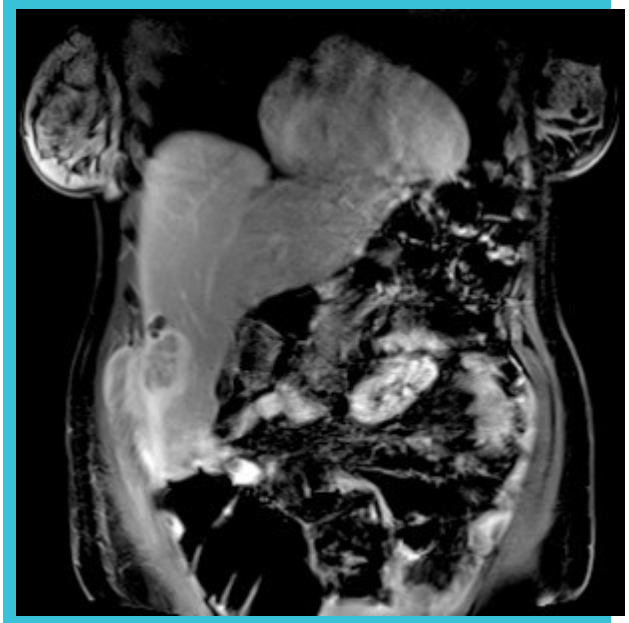
Case Presentation

A 41-year-old woman with history of pelvic inflammatory disease presented to the Michael E. DeBakey Veterans Affairs Medical Center Emergency Department in Houston, Texas with a 2-month history of worsening abdominal pain and fever. The patient had experienced exacerbating right upper quadrant pain since her IUD was exchanged 2 months prior and new onset left lower quadrant pain. She had been admitted to another institution where she was diagnosed with a liver hematoma, however her symptoms did not resolve. On physical exam, the patient exhibited rebound tenderness. Her gynecologic exam was normal with the exception of referred pain to the right lower quadrant. After the negative gynecologic exam, the etiology of the liver mass remained

unknown, as extension of pelvic inflammatory disorder to the liver is not associated with parenchymal lesions. Her complete blood count and basic metabolic panel were within normal limits. Hepatitis panels were not obtained.

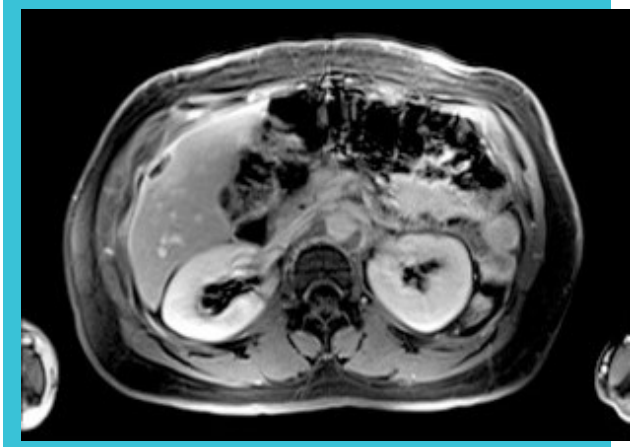
Figure 1.



Coronal MRI demonstrating significant liver pathology consistent with abscess.

Subsequently, imaging was done to further investigate the etiology of the lesion. The patient underwent lower abdominal and transvaginal ultrasound which showed the IUD in place in the endometrial canal. Ultrasound also revealed a lesion on the right ovary that was suspicious for hemorrhagic cyst and a lesion on the left ovary that was suspicious for tubo-ovarian abscess. Abdominal ultrasound demonstrated mildly dilated intrahepatic ducts and a subcapsular ovoid heterogeneous solid lesion in the anterior right lobe that extended through the capsule. The patient was admitted for further work up and a computed tomography (CT) scan was performed. CT imaging showed a poorly defined lesion that caused distension of the capsule and oblique muscle invasion, an enlarged uterus, and a potential right hydrosalpinx. The images were concerning for possible Fitz-Hugh-Curtis syndrome given the patient's history of pelvic inflammatory disease and for potential spread of infection from the pelvis across the peritoneum to the anterior pericapsular region of the right lobe of the liver. After the CT, triple phase magnetic resonance imaging (MRI) was utilized to further characterize the lesion. MRI indicated significant liver pathology consistent with abscess (Figures 1,2).

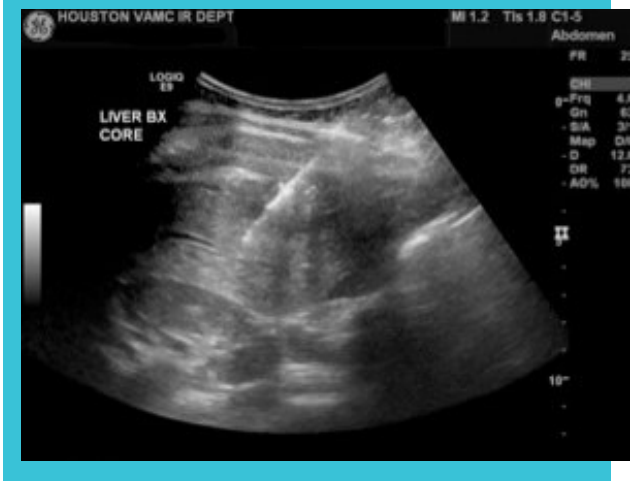
Figure 2.



Axial MRI demonstrating significant liver pathology consistent with abscess.

Interventional radiology (IR) was consulted for intervention. IR drained the abscess using ultrasound guidance (Figure 3) and sent the exudate for gram stain. Gram stain indicated the presence of filamentous, gram-positive rods (Figure 4). Further investigation with Papanicolaou stain revealed yellow sulfur granules consistent with Actinomyces israelii infection (Figures 5,6). Pathology attempted to perform polymerase chain reaction on the cellblock material but failed to demonstrate Actinomyces infection as the amount of material present was insufficient. The patient was started on oral doxycycline 100 mg every 12 hours for 14 days and oral amoxicillin 500 mg three times a day for 14 days. She discharged on hospital day 8. At clinic follow up five days after the abscess was drained, the patient's abdominal pain had improved and her cultures were significant only for Gardnerella vaginalis; cultures were negative for Actinomyces. The patient's IUD was also removed at this time.

Figure 3.

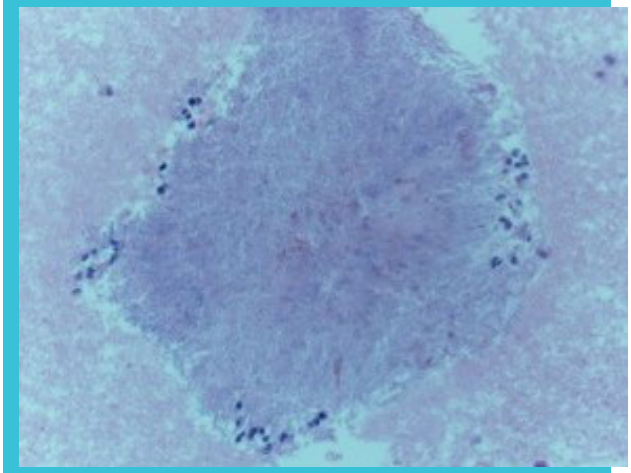


Interventional radiology performed ultrasound guided drainage of the hepatic abscess.

Discussion

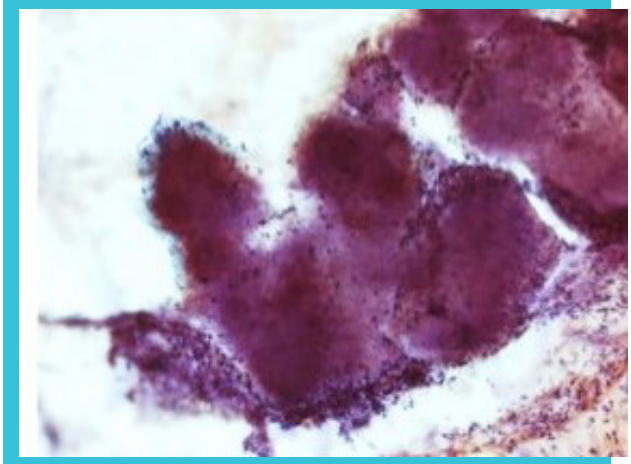
Actinomyces israeli is a normal commensal organism in the gastrointestinal tract; however, when the mucosa is damaged, Actinomyes can extend beyond its standard habitat and cause suppurative infection. The pathogenesis of intraabdominal actinomycosis is poorly understood. Proposed mechanisms include direct extension from the bowel and hematogenous seeding through the portal circulation [8]. Risk factors for development of abdominopelvic actinomycosis include factors that compromise the protective mucosal barrier such as surgery, trauma, neoplasm, inflammatory processes and foreign bodies such as intrauterine devices. Pelvic actinomycosis is highly correlated with IUD usage [8]. IUDs can become colonized with Actinomyces and in some instances colonization leads to infection. It is unclear why infection develops in some colonized women and not others. If a woman is colonized but asymptotic, for example Actinomyces organisms were detected on a pap smear, IUD removal is not recommended in order to prevent possible infection [10]. Actinomycosis has proven to be extremely difficult to diagnose because of its rare occurrence and nonspecific symptoms, including fever, abdominal pain, and weight loss [11]. In the developed world, abdominal mycosis is often conflated with Crohn's disease or carcinoma due to similarities between clinical presentation and radiologic findings [10,12]. There are some indicators that can help to differentiate actinomycosis from Crohn's disease such as the presence of Crohn's extra-intestinal findings such as ankylosing spondylitis, uveitis, and migrating polyarthritis, and failure of the patient to improve when treated with drugs typically used to treat Crohn's disease such as anti-inflammatory or immunosuppressive agents.

Figure 4.



Gram stain of aspirate demonstrating branching, filamentous gram positive rods.

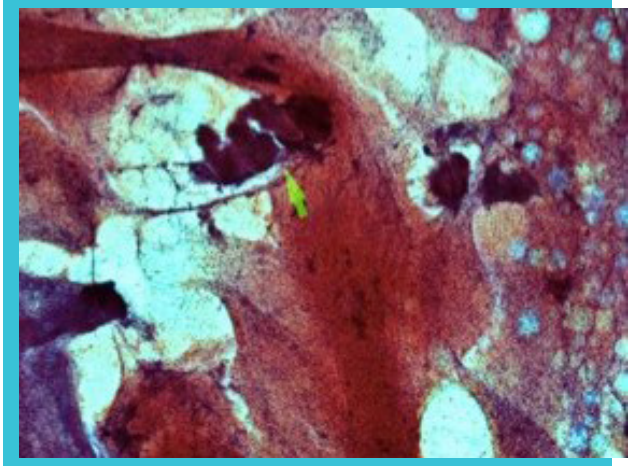
Figure 5.



Papanicolaou stain of aspirate with yellow sulfur granules consistent with actinomycosis species.

Additionally, actinomycosis can be differentiated from tuberculosis by the lack of multisystem involvement that is typically associated with tuberculosis. The low density images on computed tomography (CT) often lead hepatic actinomycosis to be misdiagnosed as liver cancer, metastatic malignancy to the liver, or liver abscess. The preferred treatment for hepatic actinomycosis is intravenous penicillin G (10-20 million units/ day provided every 4-6 hours) for 4-6 weeks, followed by amoxicillin for 6-12 months. Tetracycline, erythromycin, and clindamycin are alternatives available for patients who cannot tolerate penicillin [4-6,13]. Surgery is an option for patients with large or persistent abscesses and fistulas or widespread necrosis [6,14]. Actinomyces is a common organism in head and neck abscess formation but rare in the rest of the body. Abscess formation in the liver is readily diagnosable with fine needle aspiration; however, a high degree of clinical suspicion is necessary for appropriate and timely management. Clinicians should be aware that hepatic and abdominal actinomyces infection is a potential complication of IUD usage regardless of the amount of time that the IUD has been in place and it should be include on the differential diagnosis of hepatic and abdominal lesions of women with IUDs.

Figure 6.



Papanicolaou stain of aspirate with clearer features of actinomyces species.

Acknowledgement
None

Declaration of Interest
None

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