Fusobacterium nucleatum: A Rare Presentation of Hepatic Abscesses

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Fusobacterium nucleatum: A Rare Presentation of Hepatic Abscesses, Empyema, and Extensive Thrombosis

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Abstract

Introduction: Fusobacterium nucleatum is a facultative anaerobic gram-negative bacillus found in the oral cavity, gastrointestinal tract, and genitourinary tract. We describe a case of Fusobacterium liver abscess and empyema, resulting in extensive thrombophlebitis in the intraabdominal and extremity veins.

Case presentation: A 78-year-old female with past medical history significant for cibytopnea and tooth repair eight months prior to presentation presented with mild diarrhea and weakness. Imaging revealed multiple >10 cm hepatic abscesses, a small right pleural effusion, and a segmental pulmonary embolism, along with extensive intraabdominal and extremity DVTs. She underwent IR drainage of three abscesses as well as chest tube drainage of pleural effusion. Blood, abscesses, and pleural effusion culture grew Fusobacterium nucleatum. Plural effusion also grew Lactobacillles rhamnusos. She initially received metronidazole and was eventually switched to ampicillin/sublactam. Malignancy workup was negative and source was unclear.

Conclusion: The common sources of Fusobacterium nucleatum hepatic abscesses are periodontal flora, cryptogenic, and gastrointestinal tract. Treatment includes source control and antibiotics, ranging from 2 weeks to 6 months. This case illustrates the rare disease process of Fusobacterium hepatic abscess formation and the bacteria’s thrombogenic characteristics.

Introduction

• Fusobacterium are anaerobic gram-negative bacilli found primarily in the oropharyngeal region but has also been found in the gastrointestinal and genitourinary tract1,2,3.
• The bacteria are known classically for causing Lemierre's disease, which is described in young, immunocompetent, healthy individuals as an acute infection in the oropharynx, leading to thrombophlebitis of the internal jugular vein and subsequent septic emboli, typically to the pulmonary vasculature4.
• In rare cases, Fusobacterium can cause bacteremia3,5 with thromboembolism, such as to the liver, in older, immunocompromised individuals5,6.
• We present an uncommon case of Fusobacterium nucleatum causing bacteremia, without the classical presentation of Lemierre’s disease, leading to multi-loculated hepatic abscesses, empyema, and extensive thromboembolism resulting in renal and pulmonary embolism in an older individual.

Case Presentation

• A 78-year-old female with past medical history of asthma, hypertension, hypeyptenia (thrombocytopenic and leucopenia) of unknown cause and osteoarthritis presented with generalized weakness and watery diarrhea.
• Dental history: Eight months prior to presentation she had a broken tooth repaired.
• Social history: She is a widowed homemaker who has a 20-pack-year smoking history and quit 20 years prior to presentation. She does not use illicit substances.
• Vitalis: Hypotensive, tachycardic, febrile. Physical exam: Mild epigastric tenderness and bilateral lower extremity edema.
• Labs: Sodium 129, BUN 61, GFR 28, Creatinine 2.2 (baseline 0.9), WBC 9.6, hemoglobin 9.9, AST 329, ALT 318, Thb 2.0, CRP >200. C dff and HIV negative. Fecal occult blood was negative.
• CT abdomen revealed multiple >10 cm hepatic abscesses and right pleural effusion. Echo demonstrated EF >70%, G1DD, mild TR, trace AR, PA pressure 26 mmhg. Chest x-ray demonstrated large right sided pleural effusion.
• IR drainage of three abscesses. Blood and abscess culture grew Fusobacterium nucleatum. Pleural fluid demonstrated empyema positive for Lactobacillles rhamnusos and Fusobacterium nucleatum and negative for malignant cells. Chest tube was placed.

Discussion

• Fusobacterium is the causative organism in less than 0.4-1% of all bacteremia and less than 10% of anaerobic bacteremias in adult individuals10.
• Fusobacterium is the inciting organism in pyogenic liver abscesses in 3-4% of cases1,12.
• The incidence of pyogenic liver abscesses ranges from 1.1-3.0 per 100,000 individuals13,14, with a mortality rate of 6.3%-15.
• Source for Fusobacterium hepatic abscesses in descending frequency is periodontal disease15, cryptogenic, and gastrointestinal16.
• There is an increased incidence of cancer in patients who present with Fusobacterium infections17.
• Risk factors for Fusobacterium pyogenic liver abscess are male, immunodeficiency, malignancy, smoking history, alcohol use disorder, cirrhosis, diabetes, and/or renal failure18,19.
• Patients with hepatic abscesses will typically present with fever, nausea, vomiting, diarrhea, weight loss, and right upper quadrant abdominal pain19,22. Inflammatory markers are often elevated20. Patients may also have hypocalcemia21. Additionally, patients often experience elevated serum creatinine levels and liver enzymes in a non-specific pattern22.
• The gold standard for diagnosing hepatic abscess is CT or abdominal ultrasound18,23,24. Treatment consists of antibiotics and radiological intervention, either drainage or aspiration25. However, these interventions may be insufficient if patients have abscesses larger than 5 cm and surgical intervention may be required26.
• The most commonly used antimicrobial treatment regimens include metronidazole in combination with ceftriaxone, a quinolone, amoxicillin/clavulanic acid, ampicillin/sublactam, or amoxicillin/clavulanate17,26, but ultimately depends on if additional organisms are involved. Antibiotics are typically given for several weeks and repeat imaging is typically required prior to cessation.
• Infection with Fusobacterium is associated with vascular thrombosis in close proximity to the infection site27. Fusobacterium can causes acceleration of coagulation by the lipopolysaccharides or lipid A found in cell wall that activates Hageman factor and the production of exotoxin that promotes platelet aggregation28,29,30. The decision to anti-coagulate is based on general clinical experience31.
• Empyema can occur from paracardial lung infection, trauma, contiguously spread from a hepatic abscess, or as a result of thromboembolic pulmonary embolism32.

Conclusion

• Fusobacterium species bacteremias is a rare entity, but cases may be under-reported due to the limitations of isolation of the organism from anaerobic cultures and tissue samples.
• Fusobacterium is known to cause thrombosis and there are no clear recommendations on anticoagulation.
• Septic thromboembolism can develop into hepatic abscesses and pulmonary embolisms, potentially leading to empyema.
• A thorough workup for source control includes a Pancreas, CT sinus, and colonoscopy.
• There is an increased incidence of underlying malignancy in individuals with Fusobacterium bacteremia, thus, a thorough cancer workup is required.
• Finally, with appropriate treatment for Fusobacterium pyogenic liver abscesses, with a combination of prolonged antimicrobials and source control with drainage, patients can have positive outcomes.

Bibliography