Case report

A case of liver abscess and fusobacterium septicemia

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A 59-year-old female with past medical history of multiple sclerosis in remission and not requiring any immunosuppressive medications initially presented to a local emergency room with a 6 week history of fatigue, weight loss, and worsening abdominal pain. The pain was described as intermittent, dull in nature and mainly localizing to the right upper quadrant. On physical examination, she was non-toxic appearing but had localized tenderness to palpation over the right upper quadrant. Her white blood cell count was 25 K/μL (reference range 3.8–10.8 K/μL), and platelet count was 311 K/μL (reference range 150–450 K/μL). Her liver chemistries were significant for alkaline phosphatase of 264 U/L, aspartate aminotransferase of 41 U/L, alanine aminotransferase of 41 U/L, and total bilirubin of 0.8 mg/dL. An abdominal magnetic resonance imaging (MRI) re-demonstrated multiple liver lesions and portal vein thrombosis. Blood cultures were obtained and she was empirically started on intravenous ampicillin-sulbactam and intramuscular enoxaparin. On day two of admission, she underwent a repeat CT-guided liver biopsy, which demonstrated necrosis with acute inflammatory and fibrous reactive changes consistent with abscess. To the best of our knowledge,
cultures were either not obtained or did not grow any organisms from the liver biopsy. On day three of admission, *Fusobacterium* sp. was identified in one of two blood culture sets, and no further speciation or susceptibilities were performed. The patient received one week of intravenous ampicillin-sulbactam and one week of ertapenem prior to being transferred to our facility for further management of the liver abscesses.

Upon transfer, her white blood cell count had trended down to 9.35 K/μL. Repeat CT abdomen showed multiple persistent low density hepatic lesions, the largest measuring 4.9 × 3.3 × 5.9 cm as well as extension of the portal venous thrombosis (Fig. 1A–B). She subsequently underwent CT-guided drainage of the largest abscess with aspiration of 60 mL of purulent fluid. Histopathology demonstrated acute inflammatory cells and acellular debris consistent with abscess (Fig. 2). Aerobic cultures grew coagulase-negative *Staphylococcus*. No organisms were isolated from thioglycollate broth, although anaerobic cultures were not specifically obtained. Therefore a sample of the abscess material was sent to a reference laboratory (University of Washington) for broad-range bacterial 16S rRNA gene PCR and sequence analysis which confirmed presence of *Fusobacterium nucleatum*. The patient was treated with two months course of intravenous ceftriaxone and metronidazole in addition to intramuscular anticoagulation. Given her excellent clinical response, she was then transitioned to oral ampicillin-clavulanic acid to complete an additional two months course of antibacterial. At four months follow-up, repeat CT imaging showed near-complete...
resolution of the hepatic abscess with interval cavernous transformation of portal vein, a complication of long standing thrombosis (Fig. 3A–B). Based on her resolution of symptoms and favorable serum biomarkers, antibacterial were discontinued and she had no signs of relapse of disease at outpatient follow-up.

Discussion

Fusobacterium species are gram-negative anaerobic bacilli which are normally a constituent of the oropharynx, gastrointestinal tract, and female genital flora. Overall, Fusobacterium species are a rare cause of bacteremia accounting for < 1% of all bacteremia and < 10% of anaerobic bacteremia cases in adults [6]. Fusobacterium bacteremia generally affects males more than females [7–9] with the primary infection source typically being in the respiratory tract, abdomen, or pelvis [7,10,11]. Polymicrobial bacteremia is also common [7–11]. Although the majority of cases of Fusobacterium bacteremia are thought to be community-acquired, there have also been reports of nosocomial infections [8,12]. In contrast to Lemierre’s syndrome, in which F. necrophorum is the predominant species affecting young healthy individuals, the majority of intraabdominal and pelvic infections are caused by F. nucleatum affecting an older population with chronic medical conditions and/or malignancies [8,9,12], possibly due to tumor invasion of mucosal surfaces. Disseminated Fusobacterium infections involving the brain, liver, heart, and joints are very rare but have been reported [12]. With respect to hepatic abscesses associated with Fusobacterium species, oropharyngeal disease or intestinal sources of infections including diverticulitis have been postulated as the potential initial portal of entry [9].

Although our patient was noted to have diverticulosis on colonoscopy, no evidence of intestinal or oropharyngeal infections were identified. To the best of our knowledge, there have only been a handful of cases of Fusobacterium hepatic abscesses with associated septic pylephlebitis in the literature [3–5]. All three prior cases were also associated with F. nucleatum with the presentation of gastrointestinal and constitutional symptoms. One case was treated with six weeks of intravenous penicillin without anticoagulation [3], one case was treated with intravenous cefotaxime and metronidazole for three weeks followed by two weeks of oral metronidazole in conjunction with preventive anticoagulation over the initial three weeks [4], and one case was treated with two weeks of clindamycin without any anticoagulation [5]. All patients showed clinical recovery. However, repeat imaging in the two patients in which no anticoagulation was used showed persistent portal vein thrombosis and even atrophy of the liver in one case [3,5]. Overall, combinations of beta-lactams and/or metronidazole based on susceptibility results, with treatment duration of weeks to months depending on clinical and imaging findings, seem to be the most acceptable approach. Anticoagulation therapy along with antibacterial may also be considered as it may increase the chance of portal venous recanalization in some cases [5], although the definitive role of anticoagulation remains unclear. Finally, although mortality from most Fusobacterium sp. bacteremia is considered to be unusual, the mortality rate with F. nucleatum bacteremia can be as high as 10–30% [7,11]. As such, prompt recognition of this entity is crucial.

In conclusion, Fusobacterium species bacteremia 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. Patients with Fusobacterium species bacteremia may warrant further investigation for more invasive disease based on the clinical presentation. As head and neck symptoms would prompt investigation for Lemierre’s syndrome, abdominal symptoms and abnormal liver chemistries should prompt investigation for hepatic abscess and portal vein thrombosis in order to initiate appropriate treatment without delay. An investigation for underlying colonic mucosal injury or malignant processes should also be considered. However, the optimal treatment and duration of therapy, as well as the role of anticoagulation in these cases are still undefined.

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