A rare case of *Fusobacterium necrophorum* liver abscesses

Faris Hannoodi,1,2 Hussam Sabbagh,1 Zain Kulaire1, Sarwan Kumar1,2
1Department of Internal Medicine, Crittenton Hospital, Rochester, MI; 2Wayne State University, Detroit, MI, USA

**Abstract**
Liver abscesses are an uncommon disease that can present with vague symptoms. *Fusobacterium necrophorum* causing liver abscesses is a rare condition and only a few cases have been reported. An 88-year-old female presented to her primary care physician with one week of fevers, night sweats, chills, fatigue and vague right upper quadrant abdominal pain. She denied nausea, vomiting, constipation, diarrhea and unintentional weight loss. The pain did not have any relation to food intake. A computed tomography (CT) scan of the abdomen was performed, showing two liver abscesses in the right lobe as well as extensive diverticulosis. Percutaneous drainage was performed and draining catheters were placed in the abscesses. Culture of the abscess fluid grew *Fusobacterium necrophorum*. She was treated with ceftriaxone and metronidazole. A repeat CT scan was performed for evaluation of abscess progression. It showed an increase in size of the second abscess, necessitating a second percutaneous drainage and a draining catheter to be inserted. The patient was treated with antibiotics for a total of 10 days in hospital. She was subsequently discharged with a PICC line for antibiotics at home and drains remained in place for abscess drainage. Follow up CT scan was performed, showing complete resolution of the abscesses.

**Introduction**
Liver abscesses are an uncommon disease that can present with vague symptoms. However, they are the most common cause of visceral abscesses with a median age of just under 60 years and preponderance towards the male sex.1-3 The mechanism by which these abscesses form seems to be by entry through the portal circulation or biliary tract, though hematogenous spread is also possible. The most commonly implicated organisms are *Klebsiella species*, *Escherichia coli* and the *Enterococcus species*. Risk factors associated with increased incidence of liver abscesses include diabetes mellitus, hepatobiliary and pancreatic disease, and liver transplantation.4-6 *Fusobacterium necrophorum* causing liver abscesses is a rare disease and only a few cases have been reported. We present a case of liver abscesses in an immunocompetent elderly female with past medical history of diverticulosis, COPD, hypertension, and hysterectomy.

**Case Report**
An 88-year-old female presented to her primary care physician with one week of fevers, night sweats, chills, fatigue and vague right upper quadrant abdominal pain. She denied nausea, vomiting, constipation, diarrhea and unintentional weight loss. The pain did not have any relation to food intake. A computed tomography (CT) scan of the abdomen was performed, showing two liver abscesses in the right lobe as well as extensive diverticulosis as seen in Figure 1. There was no evidence of any thrombosis on the CT scan. Percutaneous drainage was performed and a draining catheter was placed in the larger abscess as seen in Figure 2. Anaerobic culture of the abscess fluid grew *Fusobacterium necrophorum*. She was treated with ceftriaxone and metronidazole. A repeat CT scan was performed for evaluation of abscess progression. It showed an increase in size of the second abscess, necessitating a second percutaneous drainage and a draining catheter to be inserted. The patient was treated with antibiotics for a total of 10 days in hospital. She was subsequently discharged with a PICC line for antibiotics at home and drains remained in place for abscess drainage. Follow up CT scan was performed, showing complete resolution of the abscesses.

**Discussion**
*Fusobacterium necrophorum* is a non-motile Gram-negative anaerobic bacillus that is present in the oropharynx and gastrointestinal tract. It is well known for its association with Lemierre’s syndrome. The potential for *F. necrophorum* to cause intra-abdominal abscesses is still underreported. Rare cases of *F. necrophorum* hepatic abscess have been published. The source of infection described in reported cases include hematogenous spread from dental caries/peritonsillar abscess and those involving the GI tract resulting from inflammation of the bowel wall or from inflamed diverticuli via the portal circulation.7 In a published case review, 13 cases of liver abscess were due to *F. necrophorum*. Two of these cases had diverticular disease with the co-existence of diabetes mellitus - a known risk factor for liver abscess formation.8 Our patient had severe diverticular disease as per CT scan, which is likely the source of infection as no other sources could be identified.

The radiological features of a liver abscess are variable and can be wide ranging. Bacterial abscesses are generally multiple in nature and usually have hypodense or hypointense central lesions.9 Occasionally, they can be solid or contain gas.10 A typical feature would be the double target sign, which is seen to some extent in Figure 1. The differential radiologic diagnoses can include metastases from malignancies (specifically necrotic metastases), liver cysts, biliary cystadenoma, hepatic hemangioma and hepatic infarct. Metastatic lesions tend to lack the double target sign and do not contain gas, but may have calcification.
Cystic lesions in the liver tend to have a homogenous hypoattenuation and an indistinguishable wall that does not enhance with contrast. They may also have a septate appearance that is not seen in abscesses. Although hypoattenuating, hemangiomas on the other hand show hyperattenuation in the delayed phase, where contrast fills these vascular lesions. Hepatic infarction, in comparison, tends to be vaguely defined lesions that are usually peripheral and have a wedge appearance.

In the cases reviewed, treatment duration ranged from 3-12 weeks. The two liver abscesses in which patients had an underlying diverticular disease were treated for 8 and 12 weeks respectively. The recommended course of treatment of pyogenic liver abscesses is 4-6 weeks; however, no randomized trials exist to describe optimal duration of therapy.

*F. necrophorum* isolates are usually sensitive to treatment with metronidazole, with 2% resistance to penicillin and 15% to erythromycin. The majority of the published cases combined metronidazole with another broad-spectrum antibiotic with Gram-negative coverage. These have included ciprofloxacin, ceftriaxone, ampicillin/clavulanic acid, tazobactam/piperacillin and meropenem.

Eight of 13 cases required drainage of the abscess in addition to the antibiotic therapy, though no mention was made regarding the reason to do so. All of the 13 cases reported achieved complete cure of the abscesses. Interestingly, some case reports describe a prolonged incubation period to obtain positive cultures. Some cases have reported positive cultures after 7-11 days. It is essential that both aerobic as well as anaerobic abscess fluid cultures are performed since *fusobacterium* is an anaerobe. This is the primary reason why the identification of this organism is missed. The importance of this is because these organisms are highly sensitive to metronidazole as stated above.

Conclusions

*Fusobacterium necrophorum* is a rare organism causing liver abscesses. It should, however, be considered in the differential diagnosis as it is highly sensitive to antibiotic treatment. The source of infection may not always be identified, but oropharyngeal and GI tract infections should be considered.

References

1. Kaplan GG, Gregson DB, Laupland KB. Population-based study of the epidemiology of and the risk factors for pyogenic liver abscess. Clin Gastroenterol Hepatol 2004;2:1032-8.
2. Mohsen AH, Green ST, Read RC, McKendrick MW. Liver abscess in adults: ten years experience in a UK centre. QJM 2002;95:797-802.
3. Chan KS, Chen C, Cheng K, et al. Pyogenic liver abscess: a retrospective analysis of 107 patients during a 3-year period. Jpn J Infect Dis 2005;58:366.
4. Rahimian J, Wilson T, Oram V, Holzman RS. Pyogenic liver abscess: recent trends in etiology and mortality. Clin Infect Dis 2004;39:1654-9.
5. Thomsen RW, Jepsen P, Sørensen HT. Diabetes mellitus and pyogenic liver abscess: risk and prognosis. Clin Infect Dis 2007;44:1194-201.
6. Chuang HC, Chen TL, Chiang DH, et al. Clinical and bacteriological characteristics of pyogenic liver abscess in non-diabetic patients. J Microbiol Immunol Infect 2009;42:385-92.
7. Riordan T. Human infection with *Fusobacterium necrophorum* (Necrobacillosis), with a focus on Lemierre’s syndrome. Clin Microbiol Rev 2007;20:622-59.
8. Nozawa Y, Yoshita S, Fukushima M, et al. A case of pyogenic liver abscess infected with *Fusobacterium necrophorum* depicted by microscopy and confirmed by tissue culture. Intern Med 2011;50:1815-9.
9. Jeffrey Jr RB, Tolentino CS, Chang FC, Federle MP. CT of small pyogenic hepatic abscesses: the cluster sign. Am J Roentgenol 1988;151:487-9.
10. Lee TY, Wan YL, Tsai CC. Gas-containing liver abscess: radiological findings and clinical significance. Abdomin Imaging 1994;19:47-52.
11. Kumar V, Abbas AK, Fausto N, et al. Robbins and Cotran pathologic basis of disease. Philadelphia, PA: W. B.
Saunders Co.; 2005.
12. Vogl TJ, Lencioni R, Hammerstingl RM, et al. Magnetic resonance imaging in liver disease, technical approach, diagnostic imaging of liver neoplasms, focus on a new superparamagnetic contrast agent. Stuttgart: Thieme; 2003.
13. Mortelé KJ, Ros PR. Cystic focal liver lesions in the adult: differential CT and MR imaging features 1. Radiographics. 2001;21:895-910.
14. Horton KM, Bluemke DA, Hruban RH, et al. CT and MR imaging of benign hepatic and biliary tumors. Radiographics 1999;19:431-51.
15. Holbert BL, Baron RL, Dodd 3rd GD. Hepatic infarction caused by arterial insufficiency: spectrum and evolution of CT findings. AJR. Am J Roentgenol 1996;166:815-20.
16. Chen YW, Chen YS, Lee SS, et al. A pilot study of oral fleroxacin once daily compared with conventional therapy in patients with pyogenic liver abcess. J Microbiol Immunol Infect 2002;35:179-83.
17. Brazier JS, Hall V, Yusuf E, Duerden BI. Fusobacterium necrophorum infections in England and Wales 1990-2000. J Med Microbiol 2002;51:269-72.
18. Buelow BD, Lambert JM, Gill RM. Fusobacterium liver abscess. Case Rep Gastroenterol 2013;7:482-6.