Pneumoperitoneum Due to Ruptured Gas Forming Candida Liver Abscess

Dear Sir/ Ma'am;

The presence of gas within the parenchyma of solid organs is most often due to infection with gas forming organisms, usually seen in immunocompromised patients, and most often caused by gas forming bacteria. Hepatic infections with Candida species are largely restricted to patients with severe immunosuppression.

We saw a 68 y old, diabetic, obese lady, with acute abdomen, septic shock, and renal shutdown. She had a body mass index of 41.2, poorly controlled diabetes mellitus, and also suffered from obesity-related obstructive airway disease. Computerized tomographic imaging showed a gas containing liver lesion with no fluid component and a minor pneumoperitoneum. She developed acute renal failure and signs of systemic sepsis. The patient did not respond to broad spectrum antibiotics, and per-cutaneous drainage was not possible. Surgical excision of the ruptured liver abscess was done and histology revealed liver abscess due to Candida with gas formation. At the time of surgery, a large liver lesion with crepitus was palpable in the left lobe of the liver. Post operatively there was a remarkable improvement in the patient's condition and an uneventful recovery ensued.

Emphysematous liver abscesses account for 6–24% of bacterial liver abscesses and are often seen in poorly controlled diabetes, making them susceptible to sepsis and rupture. The fatality rate is extremely high at 27%, necessitating prompt intensive care.[1]

Gas associated with infection is generally thought to consist of carbon dioxide and nitrogen secondary to the fermentation of glucose by some species of bacteria and fungi. The most common causative organism is *Klebsiella pneumoniae*, uncommon in the West, but common in southeast Asia.[2]

Candida is the commonest fungal affection of the liver, which are uncommon cause of hepatic abscesses in non-oncohematologic population. Liver infection due to Candida species is most often restricted to patients with immunosuppression[3] and bone marrow transplanta-tion.[4] Clinical features of hepatic involvement include fever, nausea, vomiting, abdominal pain, and tender hepatomegaly. Liver function tests are usually abnormal, with moderate transaminitis and a rise in alkaline phosphatase. Lima *et al.*[5] reported a 64-year-old female patient with no immunosuppression or diabetes mellitus with *Candida glabrata* liver abscess and fungemia complicating acute calculus cholecystitis. Candida liver abscesses and cholecystitis was also reported by Lai *et al.*; cured by percutaneous gallbladder drainage and amphotericin B therapy.[6] Friedman *et al.* described a patient with biliary stricture and early secondary biliary cirrhosis; who developed postsurgical fungemia and large hepatic abscesses due to *C. glabrata.*[7] Primary sclerosing cholangitis (PSC) and Crohn's disease with multiple fungal liver abscesses caused by *C. albicans* was reported by Melero *et al.*.[8] Kulaksiz *et al.* suggest that candida should be considered in the empirical treatment of patients with PSC as they found Candida in >8% samples of 148 consecutive endoscopic samples.[9]

Candida, like all yeast, is a facultative anaerobe, and under aerobic conditions, it produces carbon dioxide and water, while under anaerobic conditions, it converts sugars into ethanol and carbon dioxide.[10] As against gas producing bacteria, gas produced by fungal infections tends to be slow to form, and is, therefore, a rarer clinical entity.[11] This seems to be the first report of a candida liver abscess with gas in it, which was pre-operatively diagnosed and surgically treated.

Thus, in the setting of gas-forming infections or emphysematous infections within the abdominal cavity, candida infections should probably be considered. Gas production in tissues rarely becomes clinically apparent as the production of gas is a relatively very slow process as fungi tend to be slow fermenters. With wide-spread use of powerful antibiotics, with more people living longer and a large number of immunosuppressed population, candida infection may not remain as uncommon. Surgical excision along with medical therapy with anti-fungal may carry a better prognosis than outcomes of medical therapy alone.

GRANTS

None.

CONFLICTS OF INTEREST

None.

REFERENCES

1. Takano Yuichi, et al. Life-threatening emphysematous liver abscess associated with poorly controlled diabetes mellitus: a case report. *BMC Res Notes*. 6 Mar. 2017;10:117. https://doi.org/10.1186/s13104-017-2445-8.
2. Lee CJ, Han SY, Lee SW, et al. Clinical features of gas-forming liver abscesses: comparison between diabetic and nondiabetic patients. *Korean J Hepatol*. 2010 Jun;16:131–138.

https://doi.org/10.1016/j.jceh.2023.03.002

3. Yellapu R, Mittal V, Grewal P. Hepatobiliary and pancreatic: Candida liver abscesses associated with endocarditis. *J Gastroenterol Hepatol*. 2010;25, 1017-1017.
4. Fiore Marco, et al. Liver fungal infections: an overview of the etiology and epidemiology in patients affected or not affected by oncohematologic malignancies. *Infect Drug Resist*. 29 Jan. 2018;11:177–186. https://doi.org/10.2147/IDR.S152473.
5. Lima R, Shams W, Kalra S, Borthwick T. Candida glabrata liver abscess and fungemia complicating severe calculus cholecystitis in an immunocompetent nondiabetic host. *South Med J*. 2010 Mar;103:245–247.
6. Lai CH, Chen HP, Chen TL, Fung CP, Liu CY, Lee SD. Candidal liver abscesses and cholecystitis in a 37-year-old patient without underlying malignancy. *World J Gastroenterol*. 2005 Mar 21;11:1725–1727.
7. Friedman E, Blahut RJ, Bender MD. Hepatic abscesses and fungemia from Torulopsis glabrata. Successful treatment with percutaneous drainage and amphotericin B. *J Clin Gastroenterol*. 1987 Dec;9:711–715.
8. Melero JL, Bastida G, Yago M, Nevárez A, Nos P, Ponce J. Fungal liver abscesses in a patient with primary sclerosing cholangitis and Crohn's disease. *Gastroenterol Hepatol*. 2008 Nov;31:576–579.
9. Kulaksiz H, Rudolph G, Kloeters-Plachky P, Sauer P, Geiss H, Stiehl A. Biliary candida infections in primary sclerosing cholangitis. *J Hepatol*. 2006 Nov;45:711–716.
10. Maicas S. The Role of yeasts in fermentation Processes. *Microorganisms*. 2020 Jul 28;8:1142.
11. Milne LJR. Fungi. In: Collee J, Fraser AG, Marmion BP, eds. *Mackie and Mc Cartney Practical Medical Microbiology*. 14th ed. New York: Churchill Livingstone; 1996:702–703.

APPENDIX A: SUPPLEMENTARY DATA

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jceh.2023.03.002.

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