Gas-forming Pyogenic Liver Abscess: A Case Report

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Gas-forming pyogenic liver abscess is considered to be a very severe form of pyogenic liver abscess and carries a high mortality. Klebsiella pneumoniae is the most common pathogen responsible for the disease. We present a case of gas-forming pyogenic liver abscess in a 53-year-old man with diabetic mellitus. The patient got improved with utilizing ultrasound guided percutaneous drainage, third generation cephalosporin and insulin control for hyperglycemia. He was discharged uneventfully after a 12-day hospitalization.

Key words: pyogenic liver abscess, diabetic mellitus, gas-forming organism

Introduction

Pyogenic liver abscess (PLA) is an uncommon disease with an annual incidence rate ranging from two to 45 cases per 100,000 hospital admissions worldwide\textsuperscript{(1)}.{\textsuperscript{1}}

Gas-forming PLA (GPLA) is even rarer which accounts for 7%-24% of all PLA\textsuperscript{(2)}.{\textsuperscript{2}} Patients with GPLA are often sicker and have higher mortality rates. Most reports on GPLA have come from the East where the organism most commonly associated with both PLA and GPLA is the Klebsiella spp\textsuperscript{(2)}.{\textsuperscript{2}}

Case Report

A 58-year-old male presented to the emergency department because of fever and right-upper abdominal pain for 3 days. The patient had type 2 diabetes mellitus with irregular control for years. Upon arrival, vital signs were normal except tachycardia (112 beats/min), physical examination revealed mild right-upper quadrant tenderness with normal bowel sounds. Blood test revealed an elevated white cell count (11.9×10\textsuperscript{9}/L), glucose (246 mg/dl), and AST (86 IU/L). An upright chest radiograph revealed gas pockets with air-fluid level in the right-upper abdomen (Fig. 1). A contrast-enhanced computed tomography (CT) scan of the abdomen confirmed the presence of a gas-forming liver abscess with air-fluid level (Fig. 2). The patient was treated by ultrasound guided percutaneous drainage, third generation cephalosporin and insulin control for hyperglycemia. Blood culture revealed Klebsiella pneumoniae. The patient was discharged uneventfully after a 12-day hospitalization. He was in good health on follow-up after 2 months.

Discussion

Gas-forming Pyogenic liver abscess is uncommon in western countries and most reports on GFPLA came from the East, for example
Fig. 1  Chest radiograph reveals gas pockets with air-fluid level in the right-upper abdomen (arrows)

Fig. 2  A contrast-enhanced CT scan of the abdomen reveals a huge gas-forming liver abscess (arrow)
Taiwan\(^2,3\). \textit{K. pneumoniae} has been emerging as the most common pathogen of PLA in the Asian population, especially GFPLA\(^4,6\). Fever and chills were less frequent in older adults than in younger adults. Atypical clinical features are a possible explanation for absence of fever and chill in older adults with this serious infection, and physicians need to be alert for early diagnosis\(^3\), especially emergency physicians. In older patients with PLA, a variety of microorganisms could be identified. In addition to \textit{K. pneumoniae}, other causative agents such as \textit{Escherichia coli} and polymicrobial with or without anaerobic bacteria were also more frequently found in older patients\(^4,5\).

Diabetes mellitus, biliary stones, malignancy, liver cirrhosis, and alcoholism were the risk factors for PLA in older adults\(^4\). Younger individuals were more likely to be male and have alcoholism and a cryptogenic etiology than older adults. On admission, older adults had significantly less right-upper abdominal tenderness than younger individuals\(^5\).

In Taiwan, \textit{K. pneumoniae} is most common pathogen cultured from abscesses in patients with diabetes mellitus, especially in gas-forming liver abscess. Two large case series studies from Taiwan which involved 28 and 83 patients with GPLA, respectively, showed significant differences between GPLA and non-GPLA\(^6,7\). These studies showed a statistically higher incidence of septic shock, bacteraemia and mortality in patients with GPLA compared to non-GPLA patients\(^6,7\).

Common presentations include fever and abdominal pain, but can be nonspecific, resulting in a delay of diagnosis\(^8\). Diagnosis can easily be made with radiological imaging. Radiographs may show pockets of gas within the liver parenchyma, but this has been reported to be visible in only up to 36\% of patients with GPLA\(^2\). The diagnostic tools for GPLA are sonography and CT scan which shows a low attenuation area with Hounsfield units similar to that of the lungs\(^6\).

The production of gas occurs as a result of mixed acid fermentation of glucose within the abscess. The mechanism involves fermentation by formic hydrogenlyase, an enzyme that is only produced in an acidic environment when the local pH reaches 6 or less as a result of acid accumulation. Formic acid accumulated within the abscess is converted to carbon dioxide and hydrogen gas by formic hydrogenlyase\(^2\). Poor microcirculation in the affected areas has also been postulated to contribute to gas accumulation. This may explain the reason for higher incidence of GPLA in patients with DM\(^7\).

GPLA continues to be a significant cause of morbidity and mortality, especially in older adults with diabetes mellitus. To reduce morbidity and mortality, adequate antibiotics, such as ceftriaxone with or without metronidazole and good control of blood glucose with early adequate drainage are mandatory. Surgery should not be delayed if medical treatment or percutaneous drainage fails.

**References**

產氣細菌的化膿性肝膿腫：病例報告

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產氣細菌的化膿性肝膿腫被認為是細菌性肝膿腫的一個非常嚴重的疾病，並具有死亡率很高。肺炎克雷伯菌是該疾病的最常見的細菌。我們報告一位58歲糖尿病患者診斷為產氣細菌的化膿性肝膿腫。該患者接受治療包含超音波引導下經皮穿刺引流術，第三代抗生素並控制高血糖。患者12天的住院治療後得到改善並平安出院。

關鍵詞：細菌性肝膿腫，糖尿病，產氣性細菌