CASE REPORT

Pyogenic liver abscess: uncommon presentation

Joana Sotto Mayor,¹ Maria Margarida Robalo,² Ana Paula Pacheco,¹ Sofia Esperança¹¹Department of Internal Medicine, Hospital de Braga, Braga, Portugal²Hospital de Braga, Braga, Portugal

Correspondence to

Dr Joana Sotto Mayor, s.mayor.joana@gmail.com

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SUMMARY

Pyogenic liver abscess is a rare entity, but it is fatal when untreated. With a peak incidence in the fifth decade of life, its early recognition and intervention are key to successful treatment and better prognosis of patients. In recent years, its approach has been enhanced by the use of percutaneous drainage, improved imaging techniques and a better microbiological characterisation, allowing for a more appropriate use of antibiotics. Clinical manifestations are variable and depend on the size of the abscess, the condition of the patient, associated diseases and possible complications. Among the most common symptoms that stand out are the pain in the upper quadrants of the abdomen, high fever, nausea and vomiting. The authors present the case of a patient who developed an atrial flutter as the initial presentation of a hepatic abscess that imagiologically mimicked a hepatic tumour.

BACKGROUND

This case is important to alert clinicians about the wide variety of symptoms that can arise in the same clinical entity.

CASE PRESENTATION

Female patient, 76 years, retired, independent for activities of daily life, with a personal history of hypertension (HT), obesity, dyslipidaemia, depression, with an episode of supraventricular tachycardia 3 years previously and a cholecystectomy 10 years ago. Medicated with losartan+hidroclorotiazida 50+12.5 mg, sertraline 50 mg once daily and alprazolam 0.25 mg once daily.

The patient came to the emergency room (ER) with a clinical picture with 15 days of evolution of asthenia and myalgias, associated with cough. On the day of admission to the ER, she started with episodes of palpitation and lipotimia, described as asthenia, hypersudoresis, paraesthesias and nausea without vomit. The patient denied dyspnoea, paroxysmal nocturnal dyspnoea, orthopnoea, thoracic pain or fever. The patient had no urinary or gastrointestinal symptoms.

On physical examination, she presented with HT 144/110 mm Hg, tachyarrhythmia with 140–160 bpm and no fever (36.4°C), and cardiopulmonary auscultation without abnormalities. The abdomen was soft, non-tender, non-distended and painless to superficial or deep palpation, and there was no guarding or signs of peritoneal irritation.

An ECG was made that showed atrial flutter with a frequency of 145 bpm; it was the reason why she started pharmacological cardioversion with amiodarone bolus, which had a positive effect. A thoracic X-ray showed no abnormalities and the analytic

study showed the following results: urea 68, creatinine 1.5, aspartate transaminase (AST) 125, alanine transaminase (ALT) 120, myoglobin 254, PCR 229, with 15 100 leucocytes, 92.2% of neutrophils and D-dimer >4390.

An angio-TC was made to screen for pulmonary embolism (PE). The report described 'No evidence of PE. (...) The cuts that show the upper abdomen reveal a nodular lesion in the liver right lobe, with a diameter of 5.5 cm, impossible to characterize without a more focused exam'.

During the ER observation period, the patient had an episode of fever and initiated irritative cough that, according to the clinical and imagiologic results, was diagnosed as a viral syndrome.

In the follow-up of the hepatic nodular lesion, an abdominal ultrasound was made that revealed the following. '(...) In the cranial plans of the right hepatic lobe, it is identified a nodular lesion with 5.5 cm of diameter, with an irregular shape, slightly hyper-echogenic, apparently solid, looking like a nonspecific lesion. New exam more specific to the liver such as hepatic magnetic resonance or focused CT should be performed to better characterize the nodule'.

The patient was transferred to the Service of Internal Medicine for cardiac frequency and rhythm control and further study of the hepatic lesion, whose imaging features were, until the completion of a more sensitive image examination, compatible with a malignant tumour of the liver.

As an inpatient, the cardiac frequency remained controlled with the amiodarone perfusion. However, the patient continued to show some fever spikes and a new analytic study after the first day of hospitalisation revealed: AST 119, ALT 132, ferritin 5928, PCR 306, leucocytes 25 400 with 90.4% of neutrophils.

INVESTIGATIONS

Although the imagiologic study did not show the possibility of a hepatic abscess, as the patient kept presenting with fever and elevation of inflammatory parameters, highly suggestive of acute infectious processes, the team chose to collect blood cultures and start broad-spectrum antibiotic therapy with meropenem and metronidazole, on imaging confirmation of the type of liver injury, for which an MRI of the upper abdomen was ordered. Still, to exclude a possible amoebic abscess, amoebiasis serology was requested.

On the second day of antibiotics, an MRI was made that showed the following: '(...) Lobulated lesion on the segment VIII of the liver, with central areas of liquefaction, measuring approximately 65 mm on the axial plan. It is a lesion

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predominantly hypovascular with central areas of necrosis and liquefaction. In view of the clinical presentation of fever, stands as first hypothesis and hepatic abscess' (figure 1). It is emphasised that since antibiotic therapy was started, the patient had no more episodes of fever, presenting always with haemodynamic stability.

Still on the second day of antibiotics, a Holter was performed, which revealed atrial flutter identified in the ER but now with normal cardiac frequency. On the fifth day of antibiotics, the analytic study showed a good response to the therapy prescribed, with a reduction of inflammatory markers and hepatic cytolysis: PCR 115 mg/L, leucocytes 16 200 with 76.8% of neutrophils, ferritin 1974 mg/dL, AST 27 U/L and ALT 36 U/L.

With the infectious process under control, the heart rhythm reverted to sinus with a controlled heart rate.

On the 12th day of antibiotic therapy with meropenem and metronidazole and new abdominal ultrasound was performed where it was described: 'In (segment VIII) the right lobe persists an area of mixed nature with liquid areas separated by septa with different thickness, measuring approximately 5.1 cm, but with lower internal liquefaction than in the previous study likely translating inflammatory collection in organization phase. It is clear the imaging improvement compared to the previous study'. On the same day, an amoebic origin to the abscess was excluded as the serological results for amoebiasis came negative. Still, the repetition of the analytical study confirmed the sustained response to therapy: urea 33 mg/L, creatinine 0.8 mg/L, AST 24 U/L, ALT 20 U/L, PCR 27.30, leucocytes 9100 with 67.1% of neutrophils. Blood cultures were positive for *Streptococcus intermedius*, sensitive to amoxicillin/clavulanic acid.

Collaboration was asked of general surgery, who considering the clinical and analytic improvement, the positive imagiological evolution and the hemodynamic maintenance of the patient, decided the patient should continue the study and treatment as an outpatient, for further realisation of a colonoscopy in search of a point of origin for the infection. The patient was discharged with amoxicillin/clavulanic acid treatment for 15 more days because of the positive blood cultures.

OUTCOME AND FOLLOW-UP

As an outpatient, a colonoscopy was performed that revealed that the primary source of infection was in fact diverticulitis of

the colon, which, by spreading contiguously and via haematogenous route, allowed for the formation of the liver abscess.

DISCUSSION

Pyogenic liver abscess (PLA) is an uncommon but potentially fatal entity.¹ Its incidence is about 1–45/100 000,¹ with peak incidence in the fifth decade of life, but growing in the older population² whose clinical presentation is atypical and more subtle.¹ The increasing incidence in older age groups is due to the improvement of antibiotics allowing a more aggressive treatment of intra-abdominal infections typical of the young, so that abscesses occur in association with common clinical conditions in older age,³ namely: hepatobiliary pathology (gallstones, strictures, congenital diseases and cancer);⁴ diverticular disease and malignant neoplasms of the colon, which are currently the most prevalent group.

Owing to its dual blood supply, the liver is an organ particularly vulnerable to the formation of PLA which may result from: (1) bacterial dissemination by hepatic artery (disseminated sepsis), (2) spread through the portal vein (gastrointestinal infection), (3) ascending cholangitis, (4) continuity from the peritoneal cavity or (5) by necrosis of infected tissue. As a result of its dominant vasculature, the right hepatic lobe is most affected (91% of cases).^{1 3}

About half of PLA are cryptogenic. These present particularities such as: a higher incidence of diabetes mellitus and monomicrobial *Klebsiella pneumoniae* infection. However, as noted by Jeong *et al*,⁵ the colonoscopy, even in the absence of suspected colic pathology, allowed rebranding of 21% of cryptogenic AHP originating in colon (secondary to colon carcinoma, adenomas large colonic ulcers, diverticulitis or inflammatory bowel disease).¹

The most common pathogens described in the literature are consistently *Escherichia coli*, *Enterococcus* and *Streptococcus*, being commonly polymicrobial in oncological patients with PLA. Infection with *K. pneumoniae* is the most prevalent in Asia, but it has been increasing in the occidental population.

The clinical manifestations are variable and depend on the size of the abscess, the general health of the patient, associated comorbidities and complications. The clinical picture often includes pain in the upper abdominal quadrants, high fever,

Figure 1 Liver abscess.

nausea and vomiting. Loss of appetite, jaundice, ascites, pleural effusion and respiratory symptoms may also occur, though less frequently. Notice that the most common sign is defence to palpation of the right hypochondrium associated with hepatomegaly. Except for fever and nausea associated with a peak episode of syncope in ER, none of the most common symptoms in cases of PLA was manifested by the patient, with their symptoms respiratory focused.

As described by Oschner *et al*⁶ and Norman and Yoshikawa,⁷ this clinical entity does not have specific clinical characteristics, and hence the need for a high index of suspicion for an early diagnosis.⁴ Radiology plays a crucial role in recognition of suggestive imaging features of this lesion. Whereas the PLA may manifest as solitary or multiple, well-defined, round, oval or lobulated, there are ultrasound, tomodesitometric or MRI characteristics that can indict them. In the ultrasound, the appearance of PLA relates to its degree of maturation state. In the initial phase, the acute inflammatory changes translate into a solid hyperechogenic mass. Considering the ultrasound features of a nodular lesion in our patient, it is likely that they are indeed an early PLA. Since the mass becomes necrotic, it displays a progressively hypoechogenic appearance, with liquid content and finding themselves surrounded by oedema of the adjacent liver parenchyma. At this stage, the PLA is clinically evident and usually corresponds to its first imaging evaluation.¹ In a tomodesitometric study of the liver, the PLA may present as unilocular or multilocular lesions, with or without presence of gas within. In the MRI, PLA shows a hypointense signal on T1-weighted sequences. T2-weighted hyperintense lesions are often surrounded by a localised increase in signal intensity in the adjacent parenchyma resulting from surrounding oedema. After administration of gadolinium, the majority of PLA lesions show peripheral uptake.

Preferred treatment includes intravenous broad-spectrum antibiotics and, when appropriate, percutaneous drainage. The most commonly used antibiotics are fluoroquinolones or third-generation cephalosporin in combination with metronidazole. If it is not possible to isolate the agent to perform a cultural examination and antibiotics sensibility test, an antibiotics scheme should be started empirically. When possible, adjust the sensitivity of the isolated microorganism; it can be indeed curative if the abscess is smaller than 5 cm in diameter.⁴ Although empirical antibiotics schemes are none of the above, the literature shows good response rates. Percutaneous drainage in combination with systemic antibiotics is a safe and effective treatment and should be considered as first-line for PLA with abscesses 5–7.3 cm in diameter in patients with sustained fever for >24–48 h even under therapy or if there is a clinical or imaging suggestion of abscess perforation.^{2–4} The bigger the distance between the PLA liver capsules, the bigger the likelihood of successful percutaneous drainage.¹ For PLA with >7.3 cm of diameter, given the risk of being multiloculated and risk of spontaneous rupture, surgical drainage is the first option, also because performing surgical drainage after percutaneous one is associated with increased mortality rate.¹ It should be noted that the duration of antibiotic therapy is not standardised. Resolution of fever and leucocytosis are often used as indicators for stopping antibiotics. Some studies suggest that the use of the

level of C reactive protein may also be an effective indicator, but with the advantage of providing a safe reduction of the duration of antibiotics.¹

Without treatment, PLA has a mortality rate of 100%; when treated, these values are currently between 2.5% and 14%,¹ thus emphasising once again the importance of early diagnosis. It is noteworthy that about 40% of cases of PLA develop local or systemic complications, the most common being generalised sepsis and pleural effusion. Other complications include rupture of the liver abscess to the peritoneal cavity, thrombosis of the portal vein or hepatic veins, IVC occlusion of the pseudoaneurysm of the hepatic artery, haemobilia and, very rarely, the appearance of a fistula to the portal vein or suprahepatic veins.¹

It is important to note that looking at the patient's age and comorbidity, atrial flutter could also emerge as a separate entity, independent of the existence of the abscess.

Learning points

- ▶ The recognition of imaging features of pyogenic liver abscess allows for an early diagnosis and rapid institution of appropriate therapy, resulting in benefits in the prognosis and in reducing complications and mortality risk.
- ▶ Intra-abdominal sources of infection should be sought in the absence of an apparent infectious focus in particular on detection of a liver abscess.
- ▶ A colonoscopy allows one to identify intestinal aetiologies for PLA, used to be considered cryptogenic. That is the reason why Jeong *et al* recommend colonoscopy for all patients diagnosed with PLA without cause, or if they present with repeated PLA. Among the intestinal causes, the authors emphasise the importance of ruling out diverticulitis as a cause of PLA, because, despite being among the less frequent aetiologies, it continues to be responsible for some cases, such as in the clinical case exposed.

Competing interests None declared.

Patient consent Obtained.

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