Abdominal variant Lemierre's syndrome

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Introduction

Lemierre's syndrome is a rare condition with a prevalence of around 0.6–2.3 cases per million people and with the highest incidence in adults aged 14–24 years (Mohammed and Tims-Cook, 2019). Typically, Lemierre's syndrome starts with a bacterial oropharyngeal

Case report

A 47-year-old woman with no past medical history was admitted to the emergency department with severe epigastric abdominal pain. On admission, the patient was stable with a National Early Warning Score (NEWS) of 2, blood tests showing thrombocytopenia (haemoglobin 121 g/dl, platelets $50x10^9$/litre and white cell count $17.1x10^{12}$/litre), a raised C-reactive protein level 299 mg/litre and tests showing an impaired liver function (total protein level 56 g/litre, bilirubin level 45 mg/dl, alanine transaminase level 94 U/litre and alkaline phosphatase level 121 U/litre).

A venous blood gas was abnormal with a lactate level of 2.1 mmol/litre. A sepsis pathway was initiated and blood cultures were taken. The patient was admitted under the care of the surgical team after having a computed tomography scan of the thorax, abdomen and pelvis, suggesting a provisional diagnosis of hilar cholangiocarcinoma that needed to be further investigated with magnetic resonance imaging of the liver (Figure 1).

The contrast magnetic resonance image of the liver indicated that the lesion seen on the computed tomography scan was a portal vein thrombus that had propagated rapidly and increased in size since the computed tomography was performed the previous day (Figure 2). This report suggested conducting a magnetic resonance imaging scan with Primovist, a contrast agent that is given intravenously immediately before the scan, and is metabolised by hepatocytes, giving better liver visualisation compared to classical magnetic resonance imaging contrast.

The following day the patient was reviewed by the haematology department because of her thrombocytopenia. After the analysis of the patient's blood film, haematology felt that the patient had disseminated intravascular coagulation secondary to sepsis. Haematology recommended repeating the blood tests and starting a prophylactic dose of dalteparin if the patient's platelet count was above $30x10^9$/litre, a recommendation made following the calculation of the risk benefit ratio of prescribing medication to prevent the rapid growth of thrombi vs the high risk of prescribing anticoagulation medication to a patient with thrombocytopenia. The patient's platelet count came back at $36x10^9$/litre and so she was started on a prophylactic dose of dalteparin. Once the patient's platelet count was over $50x10^9$/litre, she was then given a treatment dose of dalteparin.

The blood cultures had grown *Fusobacterium necophorum,* which was sensitive to piperacillin with tazobactam and metronidazole, and the patient was diagnosed with Lemierre's syndrome. Microbiology advised conducting a computed tomography venogram of the neck to rule out further thrombi. When prescribing the antibiotics, the patient had a penicillin allergy notification. A full allergy history revealed she was not allergic to penicillin but had suffered a throat infection which was in keeping with the diagnosis of Lemierre's syndrome.

A subsequent magnetic resonance image of the liver with Primovist showed progressive intrahepatic change in keeping with multifocal hepatic abscesses and stable thrombi within the portal venous system (Figure 3). The patient was treated with antibiotics and closely monitored on the ward. She improved and was discharged 33 days later. The patient's bloods on discharge were haemoglobin 100 g/dl, platelets $668x10^9$/litre, white cell count $18.4x10^{12}$/litre, C-reactive protein 100 mg/litre, total protein 73 g/litre, alanine transaminase 36 U/litre, bilirubin 30 mg/dl and alkaline phosphatase 406 U/litre. The patient received 29 days of outpatient antibiotics guided by blood results, 7.2 g intravenous benzylpenicillin through a 24-hour pump and 400 mg of metronidazole orally three times a day. The patient was discharged on 12 500 units of dalteparin for 6 weeks.

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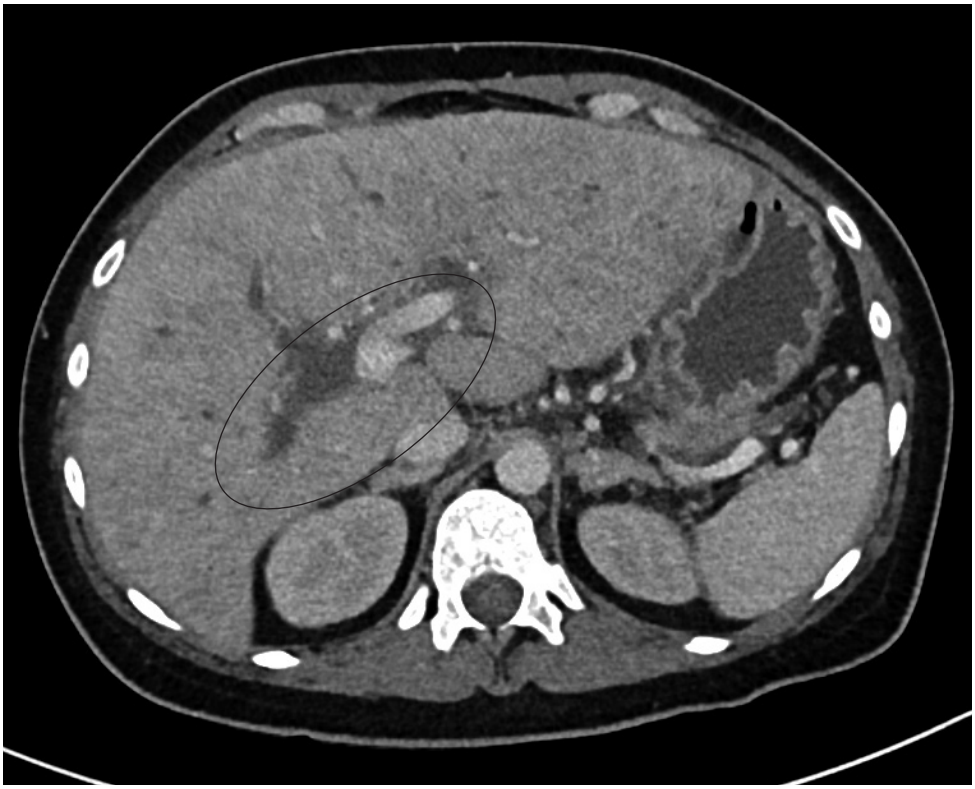

Figure 1. Portal venous phase computed tomography scan of the thorax, abdomen and pelvis taken on day one of admission. This showed an unusual appearance associated with the portal vein, consistent with a non-occlusive thrombosis. This can be seen within the right portal vein (seen as low density signifying a thrombus), but not the appropriately opacified left portal vein (higher density signifying the intravenous contrast), highlighted in the black circle.

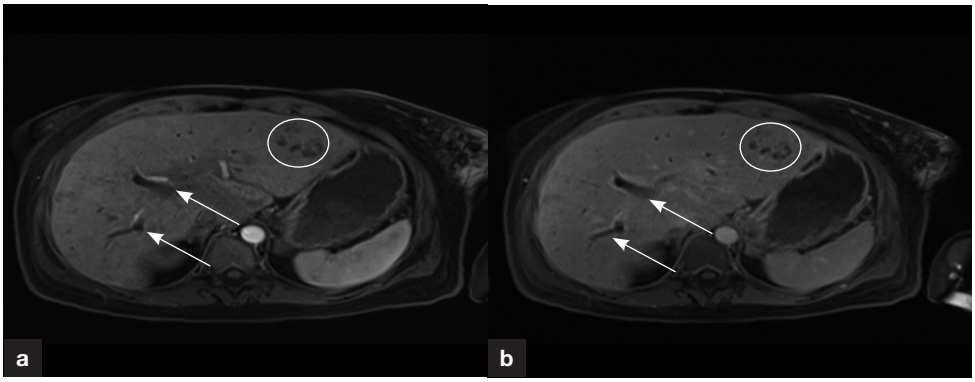

Figure 2. Magnetic resonance imaging of the liver on day 2 of admission. a. T1 post gadolinium arterial phase. b. T1 post gadolinium late phase. This demonstrates the extensive portal vein thrombus (white arrows), which at this point involved both the left and right main portal veins and had progressed compared to the computed tomography scan in Figure 1 (the left portal vein occlusion is new). This also shows multiple rounded, small low T1 signal lesions in the periphery of the liver (white circle).

infection which evolves rapidly through direct invasion of connective tissue, causing infective thrombophlebitis, classically of the internal jugular vein with haematogenous and/or lymphatic spread exacerbating the condition (Jolly et al, 2019). This is a life-threatening condition, which left untreated has a mortality rate of 90% (Louie, 2016). When diagnosed and effectively treated the mortality ranges between 4 and 18% (Mohammed and Tims-Cook, 2019). This condition is frequently misdiagnosed and often labelled the 'forgotten disease' (Hansen et al, 2016).

In less than 10% of cases of Lemierre's syndrome, thrombophlebitis occurs outside of the internal jugular vein (Sharma et al, 2017). These atypical presentations can result

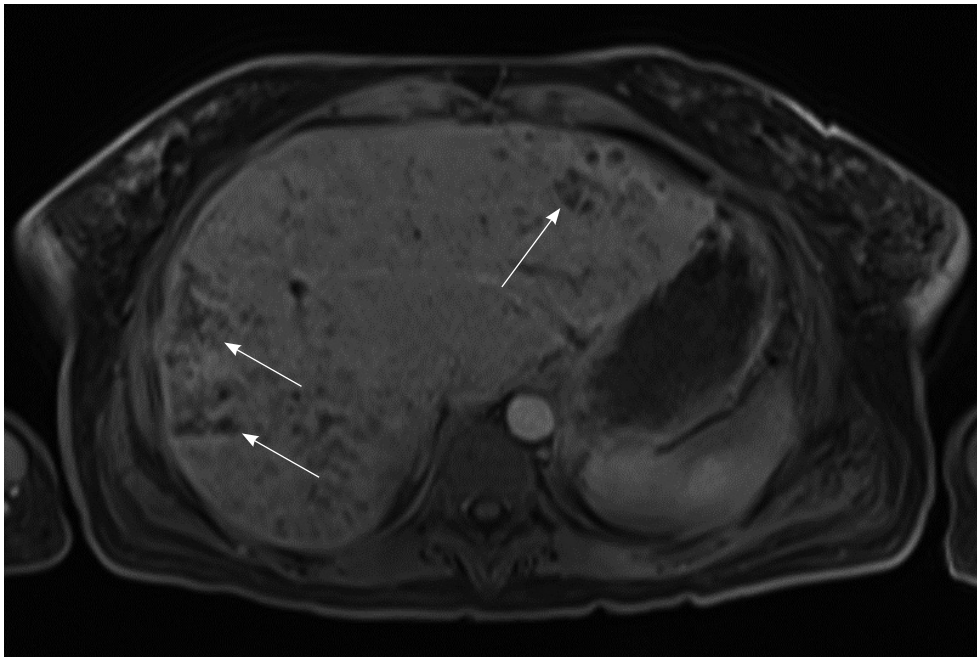

Figure 3. T1 post Primovist (late phase) showing further progression of the multifocal, small rounded low signal lesion in the periphery of the liver with no Primovist uptake (white arrows), indicating these are not hepatocellular.

in a delay in diagnosis and treatment, causing an increased risk of mortality. This article describes a case of a patient with abdominal variant Lemierre's syndrome.

Discussion

The infectious organism in Lemierre's syndrome is *Fusobacterium necrophorum,* a non-spore forming, obligate anaerobic, Gram-negative bacillus. Studies indicate that the virulence of *F. necophorum* is a result of lipopolysaccharide endotoxins and leukotoxin production, which activate and aggregate platelets in vivo (Kozicky et al, 2019). Untreated this can result in septic emboli, lung abscesses and empyema, osteomyelitis, meningitis, acute respiratory distress syndrome, CNS thrombus extension and death (Kozicky et al, 2019).

The main management for Lemierre's syndrome is antibiotic therapy (Jolly et al, 2019). Antibiotics should be tailored accordingly to culture and susceptibility data. Antibiotic therapy is required until there is a definite clinical response and/or until abscesses have resolved as demonstrated by a computed tomography scan.

The place of anticoagulation therapy in Lemierre's syndrome is controversial. A systematic review by Adedeji et al (2021) concluded that anticoagulation is both efficacious and safe. However, Gore's meta-analysis did not find any statistically significant effects in vessel recanalisation or mortality with anticoagulation therapy (Gore, 2020). Some studies suggest anticoagulation is only advisable when there is significant extension of the thrombus. For patients with thrombocytopenia, advice from the haematology department is required before starting anticoagulation therapy, and if used, this is generally once the patient's platelet count has increased.

The gastrointestinal variant of Lemierre's syndrome includes liver abscesses with suppurative portal vein thrombosis (pylephlebitis) and has only been reported in 15 case studies. Most patients with this syndrome are young and healthy without significant comorbidities (Tharu et al, 2020). Early diagnosis and prompt treatment are a requisite to prevent morbidity and mortality.

The reported incidence of Lemierre's syndrome has increased in the last few years, perhaps as a result of the discouraged prescription of antibiotics for upper respiratory tract infections, combined with increased detection rates through improved access to imaging (Hansen et al, 2016).

Learning points

- This case highlights the importance of vigilance for the presence of sepsis, especially in the COVID-19 era.
- Owing to the rarity of this disorder clinical trials are difficult to conduct, and recommendations are based on case reports and expert opinion.
- Given limited data on the benefit of anticoagulation therapy in this setting, it is essential to fully analyse the potential risks and benefits on a case-by-case basis before starting anticoagulation.
- Multidisciplinary teamwork is essential for prompt and effective treatment of patients.

A case study by Howley et al (2020) indicated that during the COVID-19 pandemic a patient delayed seeking healthcare, resulting in a widely disseminated *F. necophorum* infection. In this time of uncertainty, it is important to screen patients fully as they present. In this case delayed blood culture results could have proved fatal.

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