CASE REPORT

When the unusual strikes: an uncommon occurrence of pyogenic liver abscess induced by *Parvimonas micra*

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SUMMARY

Liver abscesses is one of the common infections affecting the immunosuppressed patients, with *Klebsiella pneumonia* or Escherichia coli being the most likely organisms found. We present a case of liver abscess with a rare organism, *Parvimonas micra* which is typically found in the oral cavity. Four-phase computed tomography of the liver showed multiloculated rim enhancing hypodense lesions, typical of an abscess and patient was treated successfully with intravenous metronidazole, without needing surgical drainage. Early identification of pathogen and the administration of the correct antibiotics proved beneficial to ensure effectiveness of therapy and reducing morbidities.

INTRODUCTION

Parvimonas micra (P. micra), an anaerobic gram-positive coccus is a commonly known commensal of oral pathogen, and it is rarely encountered outside of the oral cavity. However, when a person is infected with *P. micra* in other organs such as the spine, joints and the heart, it has shown to have a more detrimental effect.[1] This case highlights the significance of a prompt diagnosis and the use of appropriate diagnostic methods to further aid the management of such infrequent occurrences.

CASE PRESENTATION

We report a case study involving a 53-year-old Malay man with multiple medical comorbidities including hypertension, hyperlipidaemia, benign prostatic hyperplasia (BPH), gout and chronic kidney disease stage IV. His initial presentation was with a 3-day history of intermittent fever associated with chills and rigors. It was complicated with bouts of vomiting which resolved after 1 day, but he continued to have reduced oral intake. He was otherwise well and denied having any other health concerns. During his initial arrival at our emergency department, he presented with signs of dehydration, recording a blood pressure reading of 99/62 mmHg, coupled with a tachycardic pulse rate of 108 beats per minute. He was afebrile and maintained normal oxygen levels under room air. On clinical examination, he was lethargic and dehydrated with dry mucosa membrane. He was started on 1 L of intravenous drip of 0.9% sodium chloride for 1 hour. After receiving fluid resuscitation, his general condition improved, especially the blood pressure readings. Subsequently, he was admitted to the general medical ward for further management.

A complete blood count revealed an elevated lymphocyte count of 17.12 x 10^9/L with a predominant neutrophil count of 14.68 accounting for approximately 85%. Haemoglobin levels were measured at 11.7g/dL and a slightly low platelet count of 141 x 10^9/L. Screening of coronavirus disease 2019 (COVID-19) through a rapid antigen testing was negative. As for his biochemical parameters, there was evidence of mild hyponatremia with a reading of 132 mmol/L while potassium level was within the normal range. Due to his underlying chronic kidney disease, both his blood urea nitrogen and creatinine levels were elevated, measuring 16.2 mmol/L and 270 µmol/L respectively. At this point, procalcitonin result was unavailable, but his inflammatory marker c-reactive protein (CRP) was elevated at levels of 305 mg/L. Additionally, his liver enzymes were also significantly elevated of which alanine transaminases levels measured at 76 U/L (normal range 0-55), aspartate aminotransferase levels at 305 U/L (normal range 1-5) and alkaline phosphatase levels of 145U/L which falls in the normal range. Unfortunately, there were no baseline liver function test available for comparison. His subsequent serial blood investigation results will be shown in table below. Based on these clinical findings and laboratory investigation results, a preliminary diagnosis of occult sepsis and transaminitis due to underlying sepsis were made. An abdominal ultrasound abdomen was performed, which unveiled a mixture of heterogenous mixed cystic and solid lesions that could possibly represent abscesses. For further evaluation, a four-phase computed tomography (CT) of the liver was done which revealed multiloculated rim enhancing hypodense lesion with central fluid density occupying segments VI/VII of the liver, with measurements of approximately 6.8 cm x 8.4 cm x 6.8 cm (AP x W x CC). There were no filling defects seen and absence of arterial enhancement noted. Additionally, there was a partial loss of the liver margin at this region with adjacent fat streakiness. Rest of the liver was homogenous. These findings pointed towards the presence of partially liquefied liver abscesses. To further aid in our diagnosis, two sets of blood cultures were taken and sent for microbiological analysis.

While waiting for definitive culture results, we initiated him with a broad-spectrum antibiotic i.e., piperacillin-tazobactam administered at a dose of 2.25 g four times daily (renal adjusted dose based on his creatinine clearance <30) which he completed over 13 days. Subsequently, results of peripheral cultures were available, revealing the presence of *P. micra* which is a gram-positive anaerobic organism. Sensitivity testing indicated susceptibility to metronidazole, ampicillin/sulbactam and penicillin. Following this, we

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Table I: Trends in inflammatory and biochemical parameters during the patient's hospitalisation

Parameters	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Haemoglobin (g/dL)	11.7	10.7	10.4	10.8	10.2	10.6	10.5
White cell counts (x109)	17.12	13.75	17.6	21.03	11.7	12.4	7.24
Platelet (x109)	141	104	118	371	251	429	352
Haematocrit (%)	35.9	33.1	32.3	33.1	32.4	32.6	32.6
Sodium (mmol/L)	132	137	132	134	136	138	140
Potassium (mmol/L)	3.9	3.3	4.2	4.9	5.4	4.5	4.4
Urea (mmol/L)	16.7	8.6	9.5	6.6	6.6	4.6	3.0
Creatinine (µmol/L)	270	152	174	153	159	156	149
Total protein (g/L)	67				60	65	
Albumin (g/L)	31				23	25	
AST (U/L)	81				21		
ALT (U/L)	76				33	22	15
ALP (U/L)	145				152	145	125
Bilirubin (µmol/L)	20.2				14.2	10.5	
INR							
Prothrombin time (s)							
Activated partial thrombin time							
C-Reactive Protein (mg/L)	305	387	149		125	52	21

**AST- Aspartate transaminase, ALT – Alanine transaminase, ALP – Alkaline phosphatase

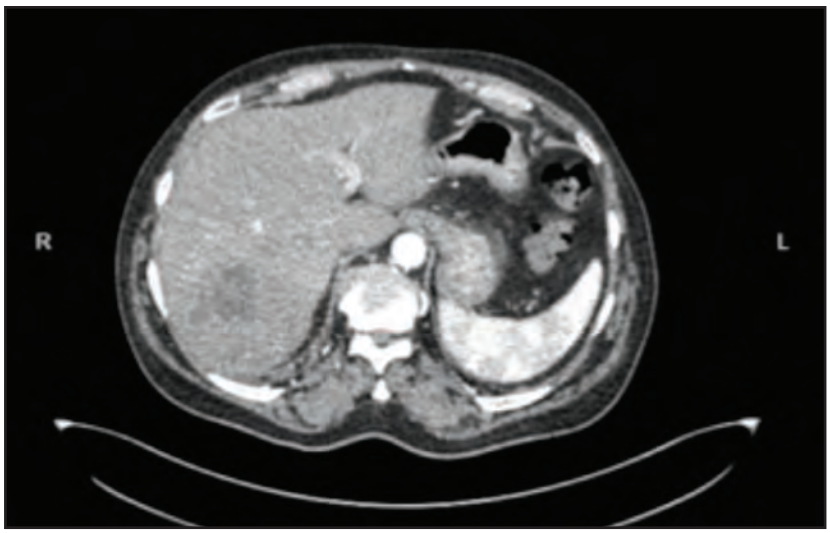

Fig. 1: Multiloculated rim enhancing hypodense lesion with central fluid density seen in four phase liver computed tomography.

changed his treatment to intravenous metronidazole 500 mg three times daily. Considering the common occurrence of *P. micra* in the oral cavity, we arranged an extensive dental assessment for this patient. The assessment did not reveal any possible potential of source of infection originating from the dental cavity. The only notable findings were a few loose teeth for which patient was scheduled for dental extraction. Patient was then discharged well after the completion of his intravenous antibiotics and was scheduled for regular follow up at our outpatient clinic. No other complications noted during his post discharge period, and he was recovering well.

DISCUSSION

P. micra originally classified as Peptostreptococcus micros is an emerging gram-positive anaerobic pathogenic bacterium that is a part of the normal flora of the oral cavity and can be found in other various mucous membranes which include the gastrointestinal tract, genitourinary tract and skin. Although *P. micra* is frequently encountered within the human dental cavity, *P. micra* can also cause bloodstream and spinal infections, lung and/or liver abscesses and sepsis.[1,2] Individuals infected with *P. micra* usually exhibit a typical presentation of lower back pain, although in most cases, patients will not have these presentation. In this case study, the patient presented with non-specific constitutional symptoms such as fever, vomiting and reduced oral intake with a raised inflammatory marker.

Our patient was diagnosed with liver abscesses. Liver or hepatic abscesses can be divided into few different classes which include bacterial, amoebic and fungal, with the highest occurrence seen in bacterial cases (approximately 80% of the cases). *P. micra* usually manifest in immunocompromised populations and our patient has an underlying chronic kidney disease and hypertension.

Diagnosing *P. micra* can be a challenge and choosing the appropriate test is crucial to minimise patient's exposure to unnecessary radiation. The preferred initial test of choice is abdominal ultrasonography (US), showing the presence of hyper or hypoechoic lesions with occasional septations. To further aid in the diagnosis, a contrast-enhanced CT can be done. Rim enhancement and oedema, although atypical, are highly specific for infection. Whenever feasible, a CT guided needle aspiration should be done to precisely identify the causative organism, essential for both diagnostic and therapeutic purposes. Additionally, in recent times more advanced methods are available. A technetium scan offers 80% sensitivity (lower than CT), with gallium and indium exhibiting sensitivities of 50 to 80% and 90%, respectively.[3]

The presence of a substantial liver abscess in this case study, as evident from the liver's four-phase CT constitutes to a unique and distinctive presentation linked to *P. micra*.[4] Only a few cases of *P. micra* causing pyogenic liver abscess have been reported. Ha et.al reported two cases both occurring in South Korea involving solitary liver abscess, while Kim Ey et al reported a case of concurrent liver and brain abscesses.[5-6] There were also other several instances of P. micra triggering severe infections in other organs that have been reported; such as spondylodiscitis, epidural abscess and lung abscess.[7,8] In 2013, there is only one case report of hepatic abscess infected with *P. micra* reported, underscoring this rarity.[4]

First line of treatment for pyogenic liver abscess remained the administration of a broad-spectrum intravenous which then can be narrowed down based on culture sensitivity. Duration of treatment ranged between few weeks to 6 months.[9] Nevertheless, currently, there is not a single universally accepted standard antibiotic regimen for treating *P. micra* infections. However, it has been reported that *P. micra* typically responds to antibiotics such as penicillin, imipenem, clindamycin and metronidazole although metronidazole-resistant strains of P. micra have been reported.10 In the context of this case, metronidazole is prescribed only after obtaining the culture susceptibility results and patient responded well.

CONCLUSION

Irrespective of the causative microorganism, under-diagnosed or late initiation of treatment of hepatic abscesses might be fatal. Therefore, it is of utmost importance to initiate appropriate treatment promptly and to drain if large abscesses encountered. Responsiveness of treatment can be monitored through inflammatory markers and clinical features of sepsis. The best approach to P. micra infection involves treatment with metronidazole, clindamycin or penicillin guided by the individual's susceptibility test results. Given the rarity of this infection, exact timeline of antibiotics administration does not yet exist, and duration is solely based on clinical judgement of physicians.

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DECLARATIONS

There are no competing interest exists between the authors.

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