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Leptospirosis – A Rare Cause of Acute Acalculous Cholecystitis: Successfully Treated with Antibiotics and Cholecystectomy

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Authors' contributions

This work was carried out in collaboration between all authors. Author HK is the main author. Author SCK reviewed background information, literature, made multiple edits and suggestions in the preparation of this report and is the corresponding author. Author JIP was involved in the medical management. Authors CRA and VMRA were the surgeons who operated on the patient. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Aim: Leptospirosis is a rare cause of Acute acalculous cholecystitis (AAC), reported as a presenting feature, hitherto. The present report suggests that it can complicate leptospirosis during its treatment and rapidly deteriorate warranting prompt surgical intervention. The aim of this case report is to consider leptospirosis in evaluation of acute febrile illness and be vigilant for the possibility of AAC.

Presentation of Case: We present a case of 30-year old male driver with Leptospirosis, complicated with AAC during the inpatient period of management. Diagnosis of Leptospirosis was made based on fulfilment of modified Faine's criteria & unequivocally positive IgM (ELISA) titers for Leptospirosis and was managed with antibiotics. During the inpatient period, however, the patient

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developed signs of AAC for which he underwent cholecystectomy during which gangrene of the gallbladder was noted. He showed complete recovery and was doing well during the three months of follow up.

Discussion: Leptospirosis is a rare cause of AAC and the latter has the propensity for progressing to gangrene and perforation and might go undiagnosed unless a high index of suspicion is shown. Hence, prompt and aggressive management with antibiotics and surgery when needed (as in our case) is imperative.

Conclusion: A high index of suspicion of leptospirosis in a patient with acute febrile illness, especially in tropics and constant vigil for the said complication, apart from personal hygiene and preventive public health measures will not only prevent such infections but also reduce associated morbidity and mortality.

Keywords: Leptospirosis; Weil's disease; acute acalculous cholecystitis; cholecystectomy.

1. INTRODUCTION

Leptospirosis is now a leading systemic zoonotic infection caused by Leptospira, a spirochete, in tropical countries and world over responsible for increasing morbidity and mortality and frequently simulate other causes of acute febrile syndrome.

Federico Costa et al. in their systematic review, noted that leptospirosis is the cause of 1.03 (95% CI 0.43–1.75) million cases worldwide each year. Thus, the number of estimated deaths attributable to leptospirosis approaches 58,900 (95% CI 23,800–95,900) [1]. The overall global annual incidence of endemic and epidemic human leptospirosis was estimated at 5 and 14 cases per 100,000 population, respectively [2]. The annual morbidity of leptospirosis was estimated to be high in countries of South and Southeast Asia with large populations, such as India (19.7 cases [95% CI 6.8–36.8] per 100,000 populations) [3].

Human infection occurs following exposure to infected animals, either directly or indirectly. Severity of leptospirosis can range from a subclinical, self-limiting infection to icterohemorrhagic leptospirosis (Weil's disease). It can have multi-system involvement & present with a myriad of symptoms and signs including AAC as one of the rare complications. With the advent of ultrasonography and computed tomography an early diagnosis of AAC and intervention could be possible, resulting in reduced mortality rates.

2. PRESENTATION OF CASE

A 31-year-old car driver, initially presented to a local hospital with low-grade fever, headache & severe myalgia. His routine bloodwork was normal except for leukocytosis. He was symptomatically treated with an advice to monitor temperature. He reported to our ER with severe myalgias, headache and fever two days later. Clinically, there were no abnormalities other than icterus and conjunctival suffusion. His repeat blood work-up revealed thrombocytopenia (Platelet count of 65,000/cm) & a total bilirubin of 2.1 mg/dL (Indirect bilirubin of 1.6 mg/dL). There was no hyperamylasemia or hypoalbuminemia. Serum creatinine, electrolyte panel and CPK were normal. Detailed history revealed that he had history of contact with sheep meat in a slaughterhouse. Due to history, presentation & a high index of suspicion, patient was admitted to the medical unit for further management and was started on Doxycycline and parenteral Ceftriaxone (1 gm x12 hrly). On the second day of admission, his platelets dropped even further to 31,000/cm with total bilirubin of 7.2 (Indirect 5.1). Abdominal sonography was not contributory, without any clinical features of cholecystitis. Diagnosis of leptospirosis was made as the patient's IgM for Leptospira (ELISA) was unequivocally positive and fulfilled the modified Faine's criteria for the diagnosis of Leptospirosis [Part A, B & C (total): 33]. Screening for other causes of acute febrile illness were all negative. We continued above treatment and patient showed rapid clinical improvement with liver function and platelet counts (1.9 lac) returning to near normal on day 5.

On day 6 during the observation period, he complained of severe right hypochondriac pain which prompted a repeat abdominal ultrasound which revealed a partially distended gallbladder with sludge (Fig. 1). Surgeon's consultation was sought and the patient was initially managed conservatively with intravenous antibiotics and nil-per-oral. However, in view of the increasing intensity of pain, he was taken up for open-cholecystectomy. Intraoperative findings showed gangrene of gallbladder wall. (Fig. 2).

Gross examination of the excised gall bladder showed no calculi. Histopathological examination revealed loss of mucosa, signs of tissue necrosis & suppurative inflammation, but microbiological results did not reveal any organisms.

He showed an uneventful recovery and was discharged home on seventh postoperative day. He was followed-up for 3 months after his discharge during which he was found to be doing well with complete clinical recovery.

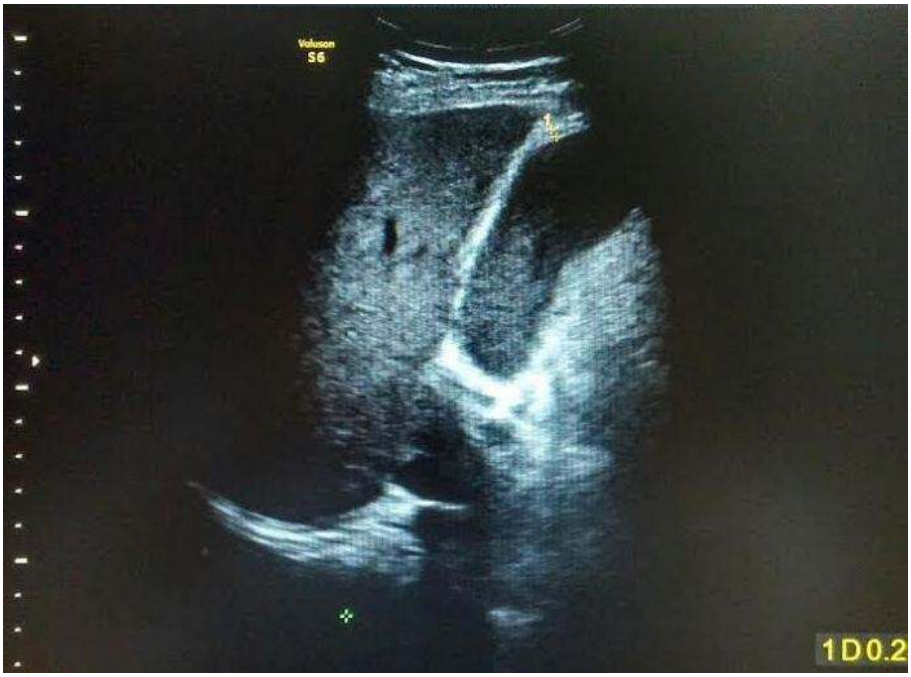

Fig. 1. Partially distended gall bladder with sludge in the lumen

Fig. 2. Intra-operative photograph showing gangrene of the gall bladder

3. DISCUSSION

Leptospirosis is a potentially fatal zoonosis with a wide range of domestic and wild animal reservoirs with humans serving as accidental hosts and human-to-human transmission is extremely rare [4]. It affects most mammals, but is not a common infection in humans, except in tropics.

Human infection may be acquired through indirect contact which is much more common and can be associated with occupational, recreational or avocational activities. But occupation is a significant risk factor for humans in tropical countries and most of them are preventable by awareness and proper use of apt protective equipment [4]. Leptospirosis can cause a wide array of clinical manifestations in humans and reflects the systemic nature of the disease by involving multiple organ systems. It can present with symptoms that vary from non-specific to a fatal disease, often masquerading as other acute febrile disorders [4,5].

Microscopic agglutination test (MAT) which is considered the 'the gold standard' test, is not readily available and does not permit early diagnosis. IgM ELISA is a commercially available rapid test which can be performed in suspected cases. Molecular tests, PCR-based are demonstrably useful for early diagnosis before antibody production has commenced but may not be widely available in developing countries [6].

In our case, the patient tested positive for Ig-M antibodies against Leptospira (ELISA) and fulfilled modified Faine's criteria for the diagnosis of leptospirosis. This criteria is a useful tool in diagnosing leptospirosis, especially in a resource poor setting [7]. Apart from various complications involving multiple organ systems, AAC is a rare, potentially fatal complication of leptospirosis reported as a presenting feature. It can occur despite early diagnosis and during the course of treatment, as in our patient. The most commonly found species of Leptospira in AAC is Leptospira interogans serotype autumnalis [8,9,10].

Leptospirosis is considered a disease of systemic vasculitis which can lead to intense injury of blood vessels in the muscularis and serosa of the gallbladder, similar to those induced experimentally by *in vivo* activation of factor XII dependent pathways. Possibly because of the intensity of vascular injury, AAC with minimal clinical manifestations may rapidly progress to gangrene with perforation, with attendant risk of high mortality [11]. In an experimental study on pathogenesis of AAC it was noted that ischemia-reperfusion plays a role in causing generation of free radicals and the activation of membrane-bound phospholipase A2 [12].

Early diagnosis of AAC must be made by a high index of awareness with suggestive history and correlation of imaging findings which aids in early intervention. The importance of making an early diagnosis and hence intervening early is the fact that the condition of AAC rapidly progresses to gangrene or perforation without immediate intervention, with a mortality of 9.6% when compared to overall mortality of acute cholecystitis [11].

Ultrasound of the gallbladder is the most accurate imaging modality for the early diagnosis of AAC in the critically ill patient [13]. It is now the initial, noninvasive, affordable investigation of choice and most accurate imaging modality for the early diagnosis of AAC, since the incidence of gangrene of gallbladder exceeds 50% and perforation in more than 20% [14].

Sonographic abnormalities associated with acute acalculous cholecystitis include gallbladder distention, sludge, wall thickening, pericholecystic fluid and sub serosal edema, with an overall sensitivity and specificity of 92% and 96% respectively [15].

Therapy for the patients with severe leptospirosis warranting hospitalization usually involves one of the penicillins or cephalosporins. Our patient was treated with ceftriaxone and doxycycline. Doxycycline (100 mg twice a day for 7 days) was shown to reduce the duration and severity of illness in anicteric leptospirosis by an average of 2 days [16]. Though some have treated leptospirosis and AAC with antibiotics and close observation, rather than performing cholecystectomy [9,17] due to complications such as gangrene and perforation, cholecystectomy is a better & definitive approach [8,11]. And, as evidenced in our case, patients can still proceed to develop the above-mentioned complications despite starting antibiotics very early during the illness.

4. CONCLUSION

Despite being a relatively common zoonosis in the tropics, leptospirosis and its complications

can still present in several ways that make the diagnosis difficult. Hence, high index of suspicion in a patient with non-specific clinical spectrum, with febrile illness, especially in tropics, is warranted to make an early diagnosis and prompt institution of specific treatment. It is much more important when the patient doesn't have any occupational risk in contracting leptospirosis, which may delay the diagnosis and treatment. Our patient contracted the disease inadvertently while handling the sheep meat at a slaughter-house for personal consumption. This emphasizes the importance of public health education on personal hygiene in such circumstances and screening of the animals and persons involved in such occupations by the health authorities.

ACC is not a mere coincidence in this disease and need not be a presenting feature. Despite early diagnosis and prompt treatment with antibiotics, consideration of cholecystitis and approaching it aggressively with open cholecystectomy, when clinical deterioration is anticipated, is recommended. This would lower the incidence of avoidable morbidity and mortality.

CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this paper and accompanying images.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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