Case Report **IJCR (2022) 6:262**

International Journal of Case Reports (ISSN:2572-8776)

A rare case of cholecystitis and intra-hepatic collections associated with *Methicillin-Resistant Staphylococcus Aureus bacteraemia*

Jacqueline Kim Nguyen[1], BBMED, MD; Reuben J. Chen[1], MBBS, MSC; Henry To[1, 2], PhD, FRACS

[1]Department of General Surgery, Werribee Mercy Hospital, Melbourne, Victoria, Australia; [2] University of Melbourne, Department of Medicine Dentistry and Health Science, Parkville, Victoria Australia

ABSTRACT

Methicillin-Resistant Staphylococcus Aureus (MRSA) bacteraemia is associated with high morbidity and mortality. Early identification of a source of infection is critical for appropriate management. MRSA infection can affect any organ system, however infection of the biliary tract is a rare phenomenon. We report on a 67-year-old male who presented with atypical cholecystitis, intra-hepatic collections and MRSA bacteraemia. The patient was managed on a long course of antibiotics following cholecystectomy and surgical drainage of the collections. Our case highlights the importance of considering biliary sepsis as a potential source for MRSA bacteraemia, in order to expedite source control and prevent intra-hepatic abscess formation.

Keywords: cholecystitis and intra-hepatic collections; *Methicillin-Resistant Staphylococcus Aureus bacteraemia*

***Correspondence to Author:**
Jacqueline Kim Nguyen
St Vincent's Hospital Melbourne
41 Victoria Parade, Fitzroy, Victoria, Australia 3065

How to cite this article:
Jacqueline Kim Nguyen, Reuben J. Chen, Henry To. A rare case of cholecystitis and intra-hepatic collections associated with Methicillin-Resistant Staphylococcus Aureus bacteraemia . International Journal of Case Reports, 2022, 6:262.

eSciPub LLC, Houston, TX USA.
Website: http://escipub.com/

Introduction

Methicillin-Resistant *Staphylococcus Aureus* [MRSA] infection is a significant clinical condition and public health issue. MRSA bacteraemia has high morbidity and estimated mortality rates between 15-60%. Commonly implicated metastatic foci of infection include bone, joints, skin and cardiac valves.[1] *Staphylococcal* infection of the biliary tract is rare, only accounting for 0.8-5.6% of organisms cultured from cholecystectomy.[2] Most cases of acute cholecystitis are sterile and due to obstruction of the cystic duct from a calculi.[3] If non-sterile, the organisms often responsible for biliary tract infection include *Escherichia Coli, Klebsiella*, *Enterococcus* and anaerobes. [4] There are very few reported cases of MRSA cholecystitis in the literature, and concomitant intra-hepatic abscesses have not been previously described.

Case Report

A 67-year-old male presented with a 1-day history of epigastric pain and fever. Relevant past medical history was significant for hypertension and dyslipidaemia. He was a non-smoker. On presentation, he was haemo-dynamically stable but febrile with temperature 39˚C.Abdominal examination was unremarkable without a positive Murphy's sign. His white cell count was elevated [11.3 x 10^9/L] and C-reactive protein [CRP], liver function tests and lipase were unremarkable. A Computed Tomography [CT] scan of the abdomen and pelvis demonstrated a mildly thickened hepatic flexure, suggestive of colitis. An incidental 11mm gallstone was also seen. [Figure 1] The scan was otherwise unremarkable. The patient was commenced on empiric intravenous ceftriaxone and metronidazole for presumed colitis.

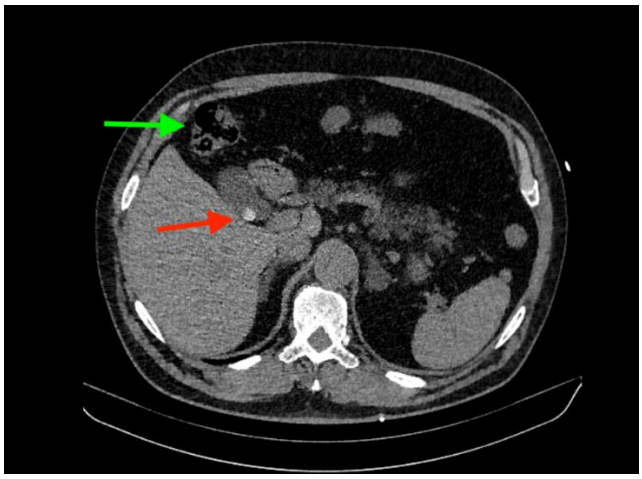

Figure 1. Coronal computed tomography image on admission, demonstrating a mildly thickened hepatic flexure [green arrow] with an incidental gallstone [red arrow] and no signs of cholecystitis or intra-hepatic abscesses

On day two of hospitalisation, blood cultures from admission grew methicillin-resistant *Staphylococcus Aureus* [MRSA]. He was commenced on intravenous vancomycin and underwent investigations for a potential source of infection. However, there was no evidence of infective endocarditis, skin or soft tissue, joint or spinal infection. As the patient continued to spike fevers, an interval CT was performed which demonstrated pericholecystic stranding concerning for gallbladder pathology. A subsequent biliary tract ultrasound demonstrated a thickened gallbladder wall and an impacted stone in the gallbladder neck. An atypical presentation of cholecystitis and MRSA bacteraemia was diagnosed. A laparoscopic cholecystectomy was performed on day six of admission. A necrotic gallbladder and an underlying four-cm intra-hepatic abscess – presumed to have progressed since the initial

imaging – was identified intra-operatively and drained. Repeat blood cultures were bland. On day five post-operatively, an interval CT scan was performed to investigate post-operative fever. This showed reoccurrence of an intra-hepatic collection measuring 30 x 17 x 15 mm [Figure 2, Figure 3]. The patient improved with a further 5-day course of intravenous vancomycin and was then downgraded to oral antibiotics and subsequently discharged home. At one-month follow-up, the patient was stable. An interval CT showed further reduction in size of the sub-hepatic collection.

Figure 2. Computed tomography of the coronal slice at day 5 post-operative, demonstrating a collection in segment 6 of the liver measuring 30 x 17 x 15 mm in size [green arrow]

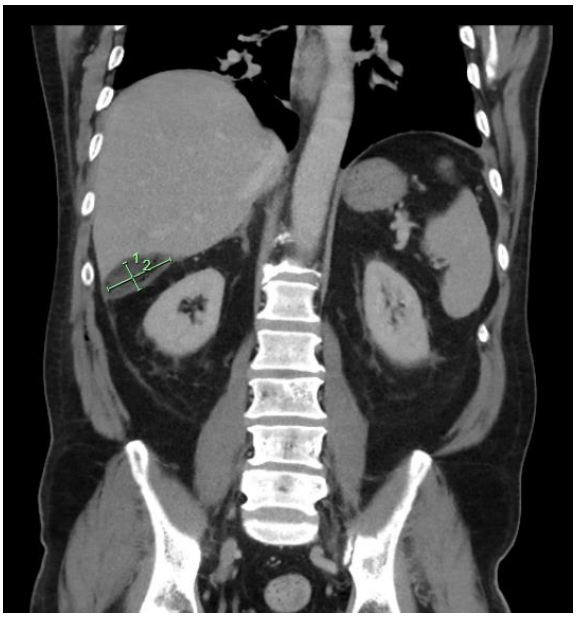

Figure 3. Computed tomography of the axial slice at day 5 post-operative, demonstrating a collection in segment 6 of the liver measuring 30 x 17 x 15 mm in size [green arrow]

Discussion

MRSA bacteraemia is a serious disease with high morbidity and mortality, especially when a source is not identified and managed. [1] Cholecystitis associated with MRSA bacteraemia is a rare and atypical presentation that should not be missed. There are very few reported cases in the literature, and concomitant

intra-hepatic collection has not been previously described. [2, 5-7] Of note, our patient did not have any known associated risk factors for MRSA infection such as prolonged hospitalization, recent antibiotic use, MRSA colonization, central venous access or long-term indwelling catheterization, nor was he immunocompromised with end-stage renal disease, acquired immunodeficiency syndrome, hepatitis C or diabetes mellitus.[1, 2, 5, 6] MRSA is not a typical enteric or biliary organism; however, it has been previously proposed that swallowing nasal colonised MRSA discharge can seed the biliary tract via the duodenum. [2] Consequently, the late diagnosis was partly contributed by the need to conduct a multitude of investigations to exclude more typical sources of MRSA.

The initial absence of overt symptoms and radiographic evidence of gallbladder pathology further delayed our diagnosis of cholecystitis. The early colitis seen at the hepatic flexure was likely reactive secondary to cholecystitis.[Figure 1] This is consistent with the literature which suggests the difficult diagnosis of MRSA cholecystitis stems from the lack of typical focal symptoms or signs. [3, 5] In the study by Martin et al, the absence of abdominal findings delayed surgical management until day eight of admission and subsequently resulted in a poor outcome. [7]

The complexity of MRSA infection necessitates early identification of potential complications. In the present case, the delays in diagnosis and definitive operative treatment resulted in disease progression and subsequent development of intra-hepatic collections. Abscess formation is a known complication of *S.aureus* infection due to the local host immune response triggered and the bacterial virulence factors contributing to the fibrin capsule of abscesses. [8] However, *S.aureus* is uncommonly implicated in liver abscesses – and has only been reported in less than 10% of cases. [9] This is the first reported case of MRSA cholecystitis with intra-hepatic abscess formation. As a result, our patient required intra-operative drainage of the abscess and had a prolonged admission for intravenous antibiotics post-operatively, despite initial source control with cholecystectomy.

Whilst an uncommon combination, biliary pathology must be considered as either a precipitant or potential sequalae when MRSA bacteraemia is detected. A discerning clinical examination and low threshold for repeat imaging should be considered when an instigating trigger is not identified. Delayed diagnosis and management can result in poor outcomes and rare but significant consequences such as intra-hepatic abscess formation.

References

[1]. Siddiqui AH, Koirala J. Methicillin Resistant Staphylococcus Aureus. StatPearls. Treasure Island [FL]2021.

[2]. Nepal SK, Giri S, Panday K. Successful treatment of methicillin-resistant Staphylococcus aureus bacteraemia and cholecystitis. BMJ Case Rep. 2012;2012.

[3]. Katabathina VS, Zafar AM, Suri R. Clinical Presentation, Imaging, and Management of Acute Cholecystitis. Tech Vasc Interv Radiol. 2015;18[4]:256-65.

[4]. Merchant SS, Falsey AR. Staphylococcus aureus cholecystitis: a report of three cases with review of the literature. Yale J Biol Med. 2002;75[5-6]:285-91.

[5]. Yu ATH, Cun T, Benamu E, Renault C. Persistent bacteraemia caused by Staphylococcus aureus in the gall bladder. BMJ Case Rep. 2017;2017.

[6]. Kim J, Gregson DB, Church DL. A case of acute cholecystitis caused by methicillin-resistant Staphylococcus aureus in an immunocompromised patient. Can J Infect Dis Med Microbiol. 2011;22[1]:e7-9.

[7]. Martin J, Miller D, Menard GE. Treatment considerations for recurrent MRSA bacteremia leading to cholecystitis. J Gen Intern Med. 2011;26[6]:669-72.

[8]. Kobayashi SD, Malachowa N, DeLeo FR. Pathogenesis of Staphylococcus aureus abscesses. Am J Pathol. 2015;185[6]:1518-27.

[9]. Nyabera A, Shaban L, Hijazin K, Tumarinson T. Community-Acquired Methicillin-Resistant Staphylococcus Aureus Hepatic Liver Abscess. Cureus. 2021;13[1]:e12560.