



Case report

***Klebsiella pneumoniae* sacroiliac septic arthritis: First case report**Yong Chuan Chee^{a,*}, Chong Hong Lim^{b,1}^a Department of Internal Medicine, Hospital Sultanah Bahiyah, Alor Setar, Kedah, Malaysia^b Rheumatology Unit, Department of Internal Medicine, Hospital Sultanah Bahiyah, Alor Setar, Kedah, Malaysia

ARTICLE INFO

Article history:

Received 1 September 2018

Received in revised form 30 September 2018

Accepted 14 October 2018

Keywords:

Klebsiella Pneumoniae

Septic Arthritis

Infective Sacroiliitis

Diabetes

ABSTRACT

Infective sacroiliitis is a rare disease with misleading clinical signs that often delay diagnosis. We report a case of pyogenic sacroiliac joint septic arthritis caused by *Klebsiella pneumoniae* that has not been reported in the literature highlighting its importance especially among diabetics.

© 2018 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Infective sacroiliitis or septic arthritis of the sacroiliac joint is a relatively rare disorder, affecting between 1% and 2% of all patients with septic arthritis [1]. It remains a diagnostic challenge given its protean manifestations mimicking other musculoskeletal pathologies like degenerative spine disease and spondylodiscitis. Due to its clinical heterogeneity and lack of symptom specificity, the diagnosis is often delayed. Gram-positive cocci are the most frequently isolated pathogenic agent with predominance of staphylococci. When the infection is caused by a Gram-negative bacillus, *Salmonella* spp and *Pseudomonas aeruginosa* are most commonly encountered [1]. *Klebsiella pneumoniae* associated septic arthritis is rare and has only been reported in certain special settings including trauma, neonates, elderly, intravenous drug abuser and immune-compromised patients [2]. Pyogenic infection of the sacroiliac joint by *Klebsiella pneumoniae* however has not been reported in the literature. Herein, we describe the first case of *Klebsiella pneumoniae* bacteremia associated with septic arthritis of the sacroiliac joint in a diabetic patient highlighting the importance of recognizing pyogenic articular infection as a rare complication of *Klebsiella pneumoniae* bacteremia.

Case

A 62-year-old lady with history of long standing poorly controlled diabetes presented with fever and feeling unwell for 5 days duration. Upon arrival, she was noted to have high spiking fever and was biochemically in diabetic ketoacidosis. The vital signs were: body temperature of 38.5°C, pulse rate of 108/min, respiratory rate of 24/min, and blood pressure of 100/58 mmHg. She was resuscitated accordingly and initial blood culture grew gram-negative bacilli that were subsequently identified to be *Klebsiella pneumoniae*. Susceptibility testing revealed that *Klebsiella pneumoniae* was sensitive to gentamicin, augmentin, cefuroxime, piperacillin/tazobactam, cefepime and ciprofloxacin. Laboratory examination results were as follow: white blood cell count (WBC) $21 \times 10^3/\mu\text{L}$ with predominance of neutrophils (89%); creatinine 97 $\mu\text{mol/L}$ (estimated glomerular filtration rate, 54 mL/min); C-reactive protein > 156 mg/L (normal reference <6 mg/L). She made initial good recovery with intravenous antibiotics (IV Cefuroxime 750 mg TDS), adequate hydration and insulin infusion. The bacteremia was undetermined in etiology with repeated urine cultures remained sterile over the course of admission. However, during the second week of admission, she developed gradual dull aching pain over the right gluteal region that was aggravated by movement. The pain however worsened over the next one week and she was unable to ambulate by then due to intense pain upon weight bearing. A CT scan of the pelvis showed mild widening with marked erosion and sclerosis involving the articular surface of the right sacroiliac joint (Fig. 1). Attempts were made to obtain microbiological diagnosis from the affected joint via CT guided percutaneous joint aspiration. However, the procedure was encountered with technical difficulty and unfortunately the joint

Abbreviations: MRSA, methicillin resistant staphylococcus aureus; MSSA, methicillin sensitive staphylococcus aureus; CT, computed tomography; MRI, magnetic resonance imaging.

* Corresponding author at: Hospital Sultanah Bahiyah, KM 6, Jalan Langgar, Alor Setar, Kedah, Malaysia.

E-mail addresses: cheeyongchuan@gmail.com (Y.C. Chee), chong_hong@hotmail.com (C.H. Lim).

¹ These authors contributed equally to the manuscript.

<https://doi.org/10.1016/j.idcr.2018.e00459>

2214-2509/© 2018 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

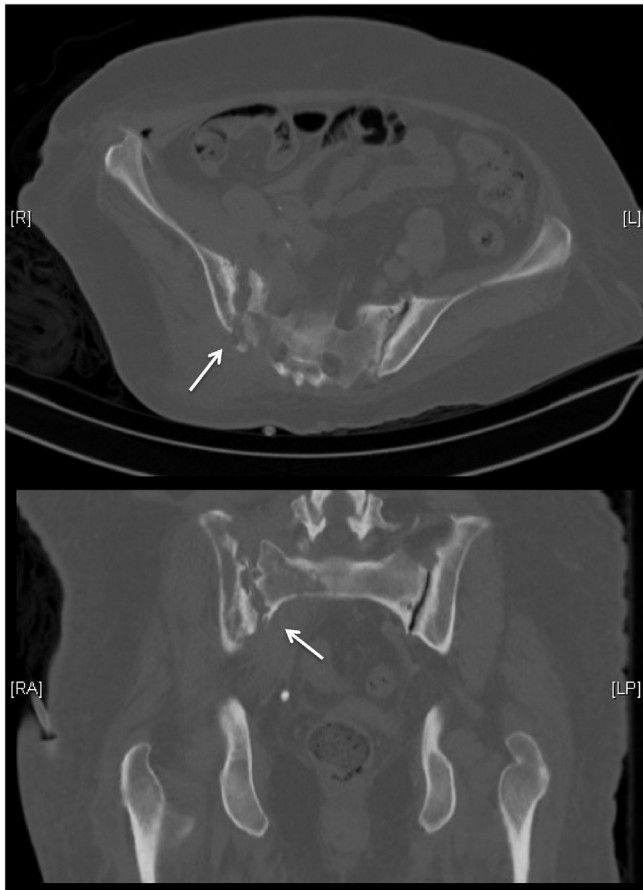


Fig. 1. Axial and coronal sections of contrast enhanced CT scan of the pelvis (bone window) showing erosion with sclerosis involving the articular surface of right sacroiliac joint (SIJ).

aspiration was dry. In the presence of *Klebsiella pneumoniae* bacteremia with imaging findings that were consistent with sacroiliac joint septic arthritis, she subsequently underwent extensive debridement and arthrotomy washout of the right sacroiliac joint with deployment of gentamicin bone cement. Intraoperative samples taken from adjacent tissue, curated bone and pus all grew *Klebsiella pneumoniae*. She further completed 8 weeks of intravenous antibiotics (IV Cefuroxime 750 mg TDS) and made uneventful recovery.

Discussion

Non-brucellar and non tuberculous infective sacroiliitis is a rare disease with misleading signs that can delay diagnosis. There are only about 350 reported cases collected from year 1878 to date with the largest retrospective study conducted in France in 2012 [1,3,4]. The French multicenter study showed that only 39 patients within 17 years were diagnosed in eight hospitals, indicating only about one in each hospital had been diagnosed with the disease every 4 years. The most common symptoms described by patients consist of lower back, lumbo-gluteal, abdominal, hip and/or posterior thigh pain. Risk factors of infective sacroiliitis include a previous history of joint, skin or urinary tract infection, endocarditis, pregnancy, post partum period and intravenous drug abuse. Acupuncture treatment for chronic back pain as the cause of infective sacroiliitis has also been reported in Taiwan [2].

In view of its non-specific and protean manifestation, the diagnosis of septic arthritis involving the sacroiliac joint is often

very much delayed. Hermet et al in his series of 39 adults reported lengthy time to diagnosis with a mean duration of 43.4 +/- 69.1 days (range (1). Upon other diagnoses that are commonly suggested include sciatica, spondylodiscitis, mechanical low back pain, septic arthritis of the hip and sigmoiditis. Similarly, a significant delay in reaching the diagnosis is also reported by Kucera et al where the patient with the longest delay to diagnosis (115 days) experienced the worst clinical outcome requiring sacroiliac arthrodesis owing to joint damage [5].

Staphylococcus aureus has been reported as the commonest causative organism in sacroiliac joint infection in keeping with other orthopaedic infections. Hermet and Wu et al in their series of patients identified *methicillin sensitive staphylococcus aureus* (MSSA) as the predominant causative agent accounting for 48% and 45% of cases respectively [1,6]. Among the gram-negative organisms, *Pseudomonas aeruginosa* is still the most common causative agent. Other gram-negative organisms that have been implicated include *E-coli*, *Salmonella* Spp and *Acinetobacter baumannii* [1,6]. Therefore, anti-staphylococcal agents such as cloxacillin is recommended as the initial drugs of choice for empirical therapy. Since gram-negative organisms are also occasionally implicated as the pathogenic organism in several series, clinicians should prescribe antimicrobials with coverage of gram negative pathogens in patients with poor response to initial empirical anti-staphylococcal therapy. Since 2007, MRSA has also emerged as a causative agent of infective sacroiliitis, including community acquired MRSA [6,7]. Among all isolated case reports and case series, *Klebsiella pneumoniae* however has not been reported as the pathogenic cause of pyogenic infection involving the sacroiliac joint.

Gram-negative bacteria related septic arthritis is only rarely reported in certain clinical circumstances including trauma, intravenous drug abuser, neonates, elderly and immune-compromised patients. *Klebsiella pneumoniae* is one of the most common pathogens in several clinical entities including severe community acquired pneumonia, lung abscess, liver abscess and necrotizing fasciitis. Numerous case series have attributed *Klebsiella pneumoniae* joint infections to underlying comorbid conditions like diabetes mellitus and liver cirrhosis [8–10]. Although the close relationship between *Klebsiella pneumoniae* and diabetes remains unclear, this association has been repeatedly demonstrated in various *Klebsiella pneumoniae* infections such as meningitis, liver abscess, urinary tract infections, and bacteremia. Our patient in this case study has underlying poorly controlled diabetes on insulin therapy also suggest that physicians should always consider *Klebsiella pneumoniae* as one of the possible pathogens causing septic arthritis, especially in patients with poorly controlled diabetes.

The definitive microbiological diagnosis may be based on blood cultures, joint fluid by CT-guided percutaneous puncture, or surgical investigations. Sacroiliac joint synovial fluid aspiration is technically difficult. In our patient, several attempts failed to obtain synovial fluid sample despite CT guidance. Dry tap of the joint fluid is not uncommon [6] and previous literature recommended injection of normal saline into the joint may increase microbiological yield in the event of dry tapping [11].

Magnetic resonance imaging is considered to be a reliable method for early diagnosis of infectious sacroiliitis [12]. The MRI findings of septic sacroiliitis include primarily unilateral, changes in both the bone and the surrounding soft tissues: fluid abundantly filling the joint space very early after the onset of the disease, and peri-articular oedema present in the adjacent bone. However, computed tomography has been shown to perform inferiorly to MRI caused by the obvious inability of CT to display changes related to factors like joint fluid, edema, and inflammatory infiltration of the imaged bone. Computed tomography focuses primarily on

morphological changes such as erosions, osteosclerosis, and the mass effect of fluid collection within the joint. As all these are features of chronic sacroiliitis, they cannot contribute to the establishment of an early diagnosis [5]. Wu et al in their series of patients reported that CT has low sensitivity in detecting pyogenic sacroiliitis, where only 40% of adult patients showed positive findings hence suggesting that CT is more suitable for detecting cortical bone destruction especially in elderly patients with inherent osteoporosis that are more prone to develop cortical bone destruction early in the course of pyogenic sacroiliitis [6]. CT scans can be normal in up to 22% if performed early in the course of the disease, although they may be used while performing procedures (i.e biopsy, arthrocentesis, drainage) [1,12]. Scintigraphic bone scan has also been proposed to be the primary method of evaluating pyoarthritis of the sacroiliac joints due to its ease of performance, low cost and low radiation exposure. Although bone scans are not specific, they may be useful in localizing the infection [13].

Surgery is indicated in cases of failure of conservative measures, abscess formation, bone destruction, septicemia or neurological deficit. Ahmed et al in their series of 22 patients who had received surgical treatment (either debridement only or debridement and arthrodesis) for sacroiliac joint infection reported good functional outcome in 40% while 20% had poor outcome. Complications include recurrent infection, delayed wound healing and chronic pain [14].

Conclusion

Our case contributes to the body of existing literature on the diagnosis, management and outcome of sacroiliac joint septic arthritis. It is a challenging diagnosis to be made and should be suspected in patients who present with confusing clinical symptoms like coxofemoral pain, pubalgia, abdominal pain and psoitis. This is the first reported case of pyogenic sacroiliac joint infection caused by *Klebsiella pneumoniae* in the literature highlighting the need for clinicians to be aware of *Klebsiella pneumoniae* as one possible etiology of septic arthritis of the sacroiliac joint especially among diabetics and health care associated infections.

Author disclosures

Chee Yong Chuan-Reports no disclosures; Lim Chong Hong-Reports no disclosures; No funding is involved in this study.

Appendix A

Name	Location	Role	Contribution
Chee Yong Chuan	Hospital Sultanah Bahiyah	Corresponding author	Designed and conceptualized study, analyzed the data, drafted manuscript for intellectual content
Lim Chong Hong	Hospital Sultanah Bahiyah	Author	Organizing and supervising the course of the project, critical review of the article

References

- [1] Hermet M., Minichiello E, Flipo RM, Dubost JJ, Allanore Y, Ziza JM, et al. Infectious sacroiliitis: a retrospective, multicentre study of 39 adults. *BMC Infect Dis* 2012;12:305.
- [2] Chi-Chou Tseng C-DW, Lin Wei-Ting, Chan Huan-Tee, Chen Po-Yih. Acute septic arthritis caused by *Klebsiella pneumoniae*. *Formos J Musculoskelet Disord* 2013;(4):51–2.
- [3] Vyskocil JJMM, Brennan TA, Wilson FM. Pyogenic infection of the sacroiliac joint. Case reports and review of the literature. *Medicine (Baltimore)* 1991;70:188–97.
- [4] Mancarella L, De Santis M, Magarelli N, Ierardi A, Bonomo L, Ferraccioli G. Septic sacroiliitis: an uncommon septic arthritis. *Clin Exp Rheumatol* 2009;27:1004–8.
- [5] Kucera T, Brtkova J, Sponer P, Ryskova L, Popper E, Frank M, et al. Pyogenic sacroiliitis: diagnosis, management and clinical outcome. *Skeletal Radiol* 2015;44(1):63–71.
- [6] Wu MS, Chang SS, Lee SH, Lee CC. Pyogenic sacroiliitis—a comparison between paediatric and adult patients. *Rheumatology (Oxford)* 2007;46(11):1684–7.
- [7] Taylor ZW, Ryan DD, Ross LA. Increased incidence of sacroiliac joint infection at a children's hospital. *J Pediatr Orthop* 2010;30(8):893–8.
- [8] Cunha BA, Ienopoli S, Hage JE. *Klebsiella pneumoniae* septic wrist arthritis successfully treated with ertapenem and levofloxacin. *J Chemother* 2011;23(6):376–7.
- [9] Lin CJ, Lin CY, Li WY, Hsiue HC, Huang YT, Ruan SY, et al. Repeated bacteremia with subsequent septic arthritis caused by *Klebsiella pneumoniae* capsular serotype K57 in a patient with diabetes. *Clin Infect Dis* 2009;49(8):1284–6.
- [10] Schelenz S, Bramham K, Goldsmith D. Septic arthritis due to extended spectrum beta lactamase producing *Klebsiella pneumoniae*. *Joint Bone Spine* 2007;74(3):275–8.
- [11] Delbarre F, Rondier J, Delrieu F, Evrard J, Cayla J, Menkes CJ, et al. Pyogenic infection of the sacro-iliac joint. Report of thirteen cases. *J Bone Joint Surg Am* 1975;57(6):819–25.
- [12] Bellussi A, Busi Rizzi E, Schinina V, De Santis A, Bibbolino C. STIR sequence in infectious sacroiliitis in three patients. *Clin Imaging* 2002;26(3):212–5.
- [13] Blum U, Buitrago-Tellez C, Munding A, Krause T, Laubenberger J, Vaith P, et al. Magnetic resonance imaging (MRI) for detection of active sacroiliitis—a prospective study comparing conventional radiography, scintigraphy, and contrast enhanced MRI. *J Rheumatol* 1996;23(12):2107–15.
- [14] Ahmed H, Siam AE, Gouda-Mohamed GM, Boehm H. Surgical treatment of sacroiliac joint infection. *J Orthop Traumatol* 2013;14(2):121–9.