Management of Salmonella Septic Bursitis in Renal Transplant Recipient

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Abstract

Salmonella as a causative agent in septic bursitis is considered rare. We report a case of 56 years old male with history of renal transplantation and using mycophenolate mofetil, cyclosporine and methylprednisolone as maintenance, admitted due to 3-week-fever associated with tenderness and swelling on left shoulder. Upon investigation, a diagnosis of septic bursitis was established. *Salmonella enteritidis* as the definitive causative agent was revealed. He was treated with meropenem 1g IV three times daily and levofloxacin 500 mg IV once a day for 3 weeks, followed by oral ciprofloxacin 500 mg twice a day for 2 weeks and oral metronidazole 500 mg three times a day for 1 week with a total duration of 5 weeks of antibiotics. On the subsequent follow up there was no recurrence episode of fever and the swelling of the left shoulder subsided, no tenderness noted and the patient has no limitation of range of movement. Since immunocompromised state complicates the management, the duration of therapy may twice longer than the typical management of septic bursitis. *Salmonella* as etiologic agent should be considered as differential in immunocompromised patient with septic bursitis.

Keywords: Immunocompromised state, septic bursitis, deep bursae, *Salmonella*, duration of therapy.

Introduction

Bursae is an enclosed sac which contains a small amount of synovial fluid, lined with a cellular membrane similar to synovium.[1-3,7] Bursae may be divided based on its location into superficial and deep. Septic bursitis on deep bursae may occurred in patients with bacteremia and more common in the immunocompromised state.[2-8,16,20] The patient is in immunosuppressive therapy on mycophenolate mofetil and cyclosporine secondary to post renal transplantation.

Septic bursitis refers to inflammation of the bursae which is due to infection, typically resulting from bacterial inoculation either direct (e.g puncture wound), spread from nearby soft tissues (e.g, cellulitis), or hematogenous (e.g, bacterial endocarditis). Mycobacteria, fungi, or algae are less common as the causative agents.

The most common cause of septic bursitis both in immunocompetent or immunocompromised population mentioned in some references is *Staphylococcus aureus* (>80%) followed by *Streptococcus*.[2,6,12,16] *Salmonella* as an etiologic agent in septic bursitis is rare and reported in less than 1% as an infectious cause in bone and joint infection.[20] In this case report, we present a case of septic bursitis in immunocompromised patient with *Salmonella enteritidis* as the causative agent.

Case Report

A 56 years old male with a history of renal transplantation and using mycophenolate mofetil (2x250 mg), cyclosporine (2x25 mg), and methylprednisolone (2 mg, q48h) as maintenance, presented with a chief complaint of fever associated with left shoulder tenderness for 3 weeks prior to admission. Initially, he got recurrent fever for 1 week and more frequent at night. He was medicated himself with over the counter medicine, no consult to physician was done. Three weeks prior to admission, he began complaining of left shoulder stiffness and swelling. He was consult to a physician, upon ultrasound examination revealed fluid accumulation on his left shoulder. Fluid aspiration culture result shown *Salmonella spp*. Then, He was referred to Cipto Mangunkusumo General Hospital for further evaluation and management.

On physical examination, temperature of his body was 38.5 ^{0}C and other vital signs were normal. The patient was able to walk, but he had an obvious pain and fatigue. His left shoulder was swollen and fluctuation, limited of range of movement, no wound puncture or sign of skin infections either on the left shoulder or other parts of the body.

Upon admission, accumulation of fluid on subacromion subdeltoid bursa was found by ultrasound, fluid aspiration was yellow and cloudy fluid (Figure 1). Fluid analysis shown 208440 cells/µl with 94% neutrophils (Table 1 and Table 2). A culture of the bursa aspirate revealed *Salmonella enteritidis*. Then the patient was given meropenem 1g IV q8h and levofloxacin 500 mg IV once a day for three weeks. Mycophenolate mofetil and cyclosporine was continued.

Table 1. Laboratory examination result

Parameters	Result	Reference
Hb	9.1 g/dL	13–16 g/dL
Ht	26.5%	40–48%
MCV	71 fL	82–92 fL
MCH	24.4 pg	27–31 pg
WBC	4.85x10^3 /μL	5–10 x 10^3/μL
Platelets	129000	150000–400000
Diff count		
Eosinophil	1.4%	1–3%
Neutrophil	48.3%	52–76%
Lymphocyte	37.9%	20–40%
Monocyte	12.2%	2–8%
Ureum	47 mg/dL	<50 mg/dL
Creatinine	1.00 mg/dL	0.8–1.3 mg/dL
eGFR	83.8 mL/min/1.73 m^2	79–117 mL/min/1,73 m^2
Na	148 mEq/L	132–147 mEq/L
K	3.8 mEq/L	3.3–5.4 mEq/L
Procalcitonin	1.07 ng/mL	<0.05 ng/mL

Hb: Hemoglobin; Ht: Hematocrite; MCV: Mean Corpuscular Volume; MCH: Mean Corpuscular Hemoglobin; WBC: White Blood Cells; eGFR: Estimated Glomerular Filtration Rate; Na: Sodium; K: Potassium

Table 2. Bursal fluid analysis

Test	Reference	Result
Macroscopic		
Color	Colorless	Brown
Clarity	Clear	Cloudy
Viscosity		<4 cm
Mucin clot test	Negative	Poor
Microscopic		
Cell count		208440/μL
Diff. count		
PMN (segment)		196680 (94%)/μL
MN (lymphocyte)		11760.0 (0.05%)/μL
Crystals		No uric crystals found
Fluid Protein		8.0
Fluid Glucose		80
Fluid uric acid		6
Serum uric acid	3.5–7.2	4.0
Rheumatoid Factor		<11

PMN: Polymorphonuclear cells; MN: Mononuclear cells

During hospitalization, there was no recurrence episode of fever and swelling on the left shoulder. MRI (Magnetic Resonance Imaging) on left shoulder shown abscess formation with M. supraspinatus, tendon of M. biceps brachii and left subacromial bursa involvement. After 3 weeks of hospitalization, ultrasound examination revealed no fluid accumulation in subacromial subdeltoid bursae (Figure 2). Antibiotics shifted to oral ciprofloxacin 500 mg twice a day for 2 weeks and metronidazole 500 mg thrice a day for 1 week, hence discharged. Three weeks after discharged, there was no recurrence episode of fever and the swelling on the left shoulder subsided, no tenderness noted and the patient has no limitation of range of movement.

Figure 1. Ultrasound of the left shoulder, prior aspiration (left) and on aspiration (right)

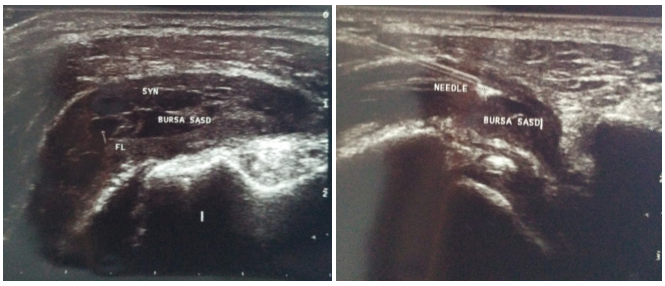


Figure 2. MRI of the left shoulder

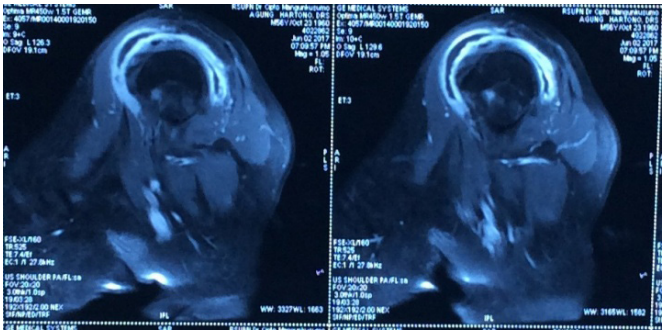
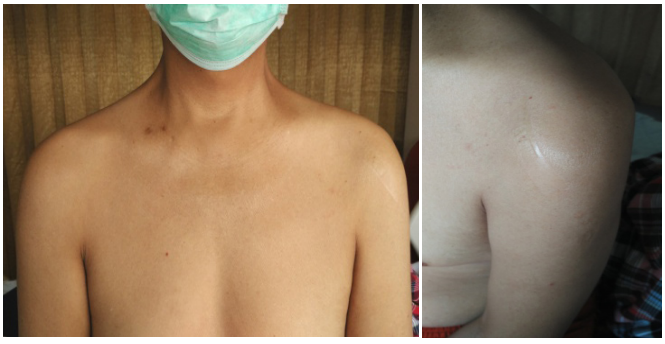


Figure 3. Photos taken after 3 weeks of antibiotic course. The left shoulder swelling subsided.



Discussion

Bursitis is an inflammation or degeneration of the sac-like structures which form in utero to protect the soft tissues from underlying bony prominences.[9] Septic bursitis refers to inflammation of the bursae which is cause infection. Septic bursitis on deep bursae may have been occurred in patients with bacteremia which is more common in the immunocompromised state.[2-8,16,20] Direct inoculation to deep bursae (e.g, subacromial, iliopsoas, trochanter bursae) is rare although iatrogenic infections may occur through injection procedure to the bursa, intra articular injection, acupuncture.[16,17] If no direct inoculation or iatrogenic course found, hematogenous seeding and impaired response to infection as one of the predisposing factor must be considered.[16] In our report, the patient is taking immunosuppressive agent (i.e mycophenolate mofetil, cyclosporine and methylprednisolone).

The definitive pathogen in this case is *Salmonella enteritidis* inoculated from the infected bursa. *Salmonella* is

considered rare as a causative agent in both septic bursitis and septic arthritis.[4,5,18,20] Sky *et al*, in his report mentioned the *Salmonella* as etiologic agent in bone and joint infection in <1% of cases.[20] The peak incidence of nontyphoidal salmonella (NTS) is on rainy season in tropical climates, and during the warmer months in temperate climates, coinciding with the peak in foodborne outbreaks.[18] The mortality and morbidity is significant in immunocompromised populations. Transmission is most commonly associated with animal food products, especially egg, poultry, undercooked ground meat, dairy products, and fresh produce contaminated with animal waste.[18] More than 8% of this infection causes bacteremia.[13]

Diagnostic approach in septic bursitis includes history and physical examination. Ultrasound, CT scan, MRI, are tools which help in defining bursal effusion within deep bursae. Bursal fluid aspiration is indicated if effusions and septic bursitis are present or suspected. Laboratory analysis of bursal fluid consists determination of the nucleated cell count (white cell count), gram stain, and culture for bacteria.[7,16] Immunocompromised hosts may have more limited inflammatory response. A threshold for bursal leukocytosis of >2000/mm^3 [>2.0 x 10^9/L] was noted to have a sensitivity and specificity for septic bursitis of 94 % and 79 %, respectively, in a study of 36 patients with olecranon or prepatellar bursitis. The sensitivity of gram stain ranges from 15 − 100 %. Bursal fluid glucose utility is uncertain, the majority of patients with septic bursitis have a low glucose level defined as serum glucose ratio <50%.[16]

Overall, management of septic bursitis includes antibiotic therapy, drainage, and surgical intervention.[14] In our case, we administered antibiotic therapy and drainage. The differentiation of management in immunocompetent and immunocompromised host is the duration of antibiotic therapy. The immunosuppressive agents taken by the patient complicates the treatment. Duration of antibiotic therapy in septic bursitis is determined by the clinical response, microbiologic findings, and patient's general conditions. In general, antibiotic therapy is given in 2−3 weeks duration and more prolonged between 4 and 6 weeks in more serious infection in compromised host or even three times longer.[2,14-16,19] Hirsansuthikul *et al*, 2016 reported antibiotic duration for 5 weeks in management of septic bursitis in HIV patients.[3] Olut *et al*, 2012 in his case report giving antibiotics for 8 weeks in managing septic arthritis of hip caused *S.Typhi* in a multiple sclerosis patient who was under steroid therapy.[5] Both of the reports give an excellent follow up with no significant residual lesion.[3,5] In our report, we administered meropenem 3x1g IV, levofloxacin 1x500 mg IV as guided by the culture results for 3 weeks, followed by oral ciprofloxacin 2x500 mg for 2 weeks and oral metronidazol 3x500 mg for 1 week with a total duration of 5 weeks. On subsequent follow up, the patient reported no recurrence of fever, improvement on the left shoulder tenderness and range of movement, the swelling is subsided.

Conclusion

Septic bursitis is referred as a condition of infection in bursa which may occur from direct inoculation, iatrogenic cause from joint aspiration, or hematogenic seeding from bacteremia. Septic bursitis on deep bursae may have been occurred in patients with bacteremia which is more common in the immunocompromised state. *Salmonella* is considered rare as a causative agent in both septic bursitis and septic arthritis, more than 8% of this infection causes bacteremia. Bursal fluid analysis and culture may confirm the diagnosis. Immunocompromised state complicates the management of septic bursitis, hence the duration of therapy may twice longer than the typical duration in the immunocompetent host.

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