

MELIOIDOSIS: A LOCALISED OSTEOMYELITIS IN A CAT

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SUMMARY

Melioidosis is a zoonotic disease as a result of infection by *Burkholderia pseudomallei*. It is of significant public health concern due to its ubiquitous nature with high morbidity and mortality in humans and animals. In cats, the disease is usually reported with abscess formation in lung, liver and spleen, however, isolated articular melioidosis is rare. A 1-year-old, a female Domestic Shorthair cat was presented to University Veterinary Hospital, Universiti Putra Malaysia (UVH-UPM) with swollen right elbow and non weight bearing lameness of the right forelimb. Physical examination revealed pyrexia, soft tissue swelling and pain upon palpation of the right elbow joint. Radiographs of the right forelimb revealed osteolysis at the distal third of the humerus and proximal radius and ulna, cortical thinning at the olecranon and soft tissue swelling around the elbow joint. Bacterial culture of the joint fluid revealed positive growth for *Burkholderia pseudomallei*. Unfortunately, the owner opted to euthanise the cat citing personal reasons. Upon necropsy, there was presence of multiple caseous nodules within the right elbow joint cavity only and none of the other limbs, lung, spleen and liver was affected. It is important for veterinarian to be aware of septic arthritis and osteomyelitis form of melioidosis.

Keywords: melioidosis, cat, osteomyelitis

INTRODUCTION

Melioidosis is a disease of both human and animal which is caused by *Burkholderia pseudomallei*. This organism is a motile, aerobic, non-spore forming gram negative bacillus which is ubiquitous in water and wet soil. Melioidosis is endemic in Southeast Asia, Northern Australia, Africa, India and China (White, 2003; Sprague and Neubauer, 2004). *B. pseudomallei* is not host specific, it can infect a wide range of species from mammal, avian to poikilotherms animals (Titball *et al.*, 2008). However, susceptibility to the infection varies between species, with caprine and ovine highly susceptible, and followed by porcine and bovine. In contrast, canine and feline are reported relatively resistant to the infection (O'Brien *et al.*, 2003). There are only few cases of melioidosis in cats (O'Brien *et al.*, 2003). However, the true prevalence of melioidosis in cats and dogs might be underestimated.

Clinical manifestations of melioidosis can be in the form of acute septicaemia, chronic pulmonary infection, and visceral and soft-tissue abscesses. Melioidosis in cats usually are reported in disseminated form with abscess formation in lung, liver and spleen; nevertheless isolated articular melioidosis is rare (O'Brien *et al.*, 2003). Articular melioidosis had been reported in human however there is no case report of musculoskeletal melioidosis in cat in Malaysia so far. In human, there are only 72 cases reported to have musculoskeletal melioidosis; the common sites of infection reported are shoulder, elbow, wrist, hip, knee, ankles and spine (Pui and Tan, 1995; Subhadrabandhu *et al.*, 1995; Hoque *et al.*, 1999 and Kosuwon *et al.*, 2003). Even though melioidosis is a zoonotic disease, direct transmission from animals to humans is rare, but it could still occur after in contact with

blood or body fluids of infected animals. Mortality rate in humans varies depend on site and which form of infection, with disseminated septicaemic infections reported to have higher mortality rate as a result of septic shock and multi-organ failure (Foong *et al.*, 2014).

CASE REPORT

A 1-year-old, semi-roamer Domestic Shorthair cat was presented to University Veterinary Hospital, Universiti Putra Malaysia (UVH-UPM) with swollen right elbow and non weight bearing lameness of the right forelimb. Owner noticed sudden onset of swelling 2 weeks before presentation and the swelling remained the same size. There is no history of trauma or wound on right forelimb. Anti-inflammatory (serratiopeptidase, Danzen, Takeda, Japan) and 12.5 mg/kg amoxicillin-clavulanic acid (Clavamox; Sandoz, Austria) were administered orally for 2 weeks with no clinical improvement. Follow up physical examination on the second visit revealed similar findings of pyrexia, soft tissue swelling and pain upon palpation of the right elbow joint (Figure 1).



Figure 1. Physical examination shown right elbow swollen.

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Radiographs of the right forelimb revealed osteolysis at the distal humerus and proximal radius and ulna, cortical thinning at olecranon and soft tissue swelling around the elbow joint. However, chest radiograph did not show any abnormality.

Arthrocentesis was performed and cytology revealed presence of inflammatory cells whereas bacterial culture of the joint fluid revealed positive growth for *Burkholderia pseudomallei* (Figure 2).



Figure 2. Positive growth of *Burkholderia pseudomallei* on blood agar.



Figure 3. Post mortem lesion of right elbow showed multiple caseous nodules within joint cavity.

Antibiotic sensitivity tests revealed that the organism were susceptible to amoxicillin-clavulanic acid and enrofloxacin but resistant to clindamycin and cephalexin. Nevertheless, blood culture was negative for bacterial growth. Unfortunately, the owner opted to euthanise the cat citing personal reasons. Upon necropsy, there was presence of multiple caseous nodules within the right elbow joint cavity (Figure 3). Other limbs, lung, spleen and liver were normal as per examined grossly.

DISCUSSION

Routes of infection of melioidosis can be through inhalation, ingestion and wounds in contact with contaminated water or soil (Sprague and Neubauer, 2004). Vector-borne transmission via mosquito (*Aedes aegypti*) and rat flea (*Xenopsylla cheopsis*) has been reported

(Sprague and Neubauer, 2004). In this case, we speculated that the cat acquired the infection through a break in the skin of elbow in which the infection was only localised in the joint cavity as there is no evidence of infection in other parts of body. Although septic arthritis and osteomyelitis can be the primary manifestation of melioidosis, involvement of bone or joints often occurs following dissemination of the infection in other parts of body (Morse *et al.*, 2013).

There are no pathognomonic changes of clinical or imaging features of musculoskeletal melioidosis, therefore, the diagnosis should make by laboratory identification of organism (Pui and Tan, 1995). *B.pseudomallei* will grow on non-selective media with the appearance of small, smooth, metallic sheen colonies with strong soil smell after 24 - 48 h (Foong *et al.*, 2014). In Gram staining, it can appear as small bipolar rods, and presence of vacuoles in the center of the cell with the appearance of safety pins (Inglis *et al.*, 2005). Immunoassays have been developed for melioidosis. Nevertheless the major disadvantages of these diagnostic methods are cross reaction with *Burkholderia mallei*; therefore, it may reflex as previous exposure rather than active infection and this method is often expensive than bacterial culture (O'Brien *et al.*, 2003; Foong *et al.*, 2014).

Treatment for melioidosis can be costly, lengthy and response to treatment is often slow. In addition, melioidosis is difficult to treat with antibiotics because *B. pseudomallei* is intrinsically resistant to various kinds of antibiotic such as penicillins, first-generation cephalosporins, macrolides, rifamycins, colistin and the aminoglycosides (Woods, 2005; Pattamapaspong *et al.*, 2007). This organism is highly resistant to both aminoglycosides and macrolides probably due to the presence of a multidrug efflux pump system (Woods, 2005). However, it is normally susceptible to chloramphenicol, tetracycline, trimethoprim-sulfamethoxazole, ureidopenicillins, third-generation cephalosporins, carbapenems and amoxicillin-clavulanate (Pattamapaspong *et al.*, 2007). Various antibiotic regimens have been suggested but there is no one standard protocol as a treatment. The initial intensive treatment for severe case include intravenous antibiotic (ceftazidime or carbapenems) for 2 - 4 weeks. Then followed by 3 - 6 months of oral eradication therapy with combination of trimethoprim-sulphamethoxazole, doxycycline and amoxicillin-clavulanic acid (Popoff *et al.*, 1997; Woods, 2005; Tolaney and Lutwick, 2009; Morse *et al.*, 2013). Completion of full course of antibiotic is important as relapse will occur with inadequate therapy (Gauthier *et al.*, 2001). Sublethal concentrations of antibiotics not only keep the bacteria alive but can also cause morphological and physiological changes in the bacteria which might lead to antibiotic resistant (Lee *et al.*, 2007). Alternatively, extensive debridement of infected bone or surgical drainage can be carried out concurrently with an intensive antibiotic therapy. Combination of surgical debridement and antibiotics were reported to have better clinical improvement compare to treatment with antibiotic therapy alone (Popoff *et al.*, 1997; Pattamapaspong *et al.*, 2007; Morse *et al.*, 2013).

CONCLUSION

Melioidosis has a significant public health concern due to its ubiquitous nature with high morbidity and mortality in humans and animals. Septic arthritis and osteomyelitis are unusual but it is a well recognised manifestation of melioidosis especially in humans. It is therefore important to be aware of this condition so that proper treatment can be initiated.

ACKNOWLEDGEMENTS

The authors would like to thank all the staffs from University Veterinary Hospital, Universiti Putra Malaysia (UVH-UPM) and Bacteriology Laboratory, Veterinary Laboratory Diagnostics, Faculty of Veterinary Medicine, Universiti Putra Malaysia for their assistant.

CONFLICT OF INTEREST

No conflict of interest.

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