# Osteomyelitis of the Ilium as an Extrapulmonary Manifestation of *Rhodococcus equi* in a Chronically Infected Foal

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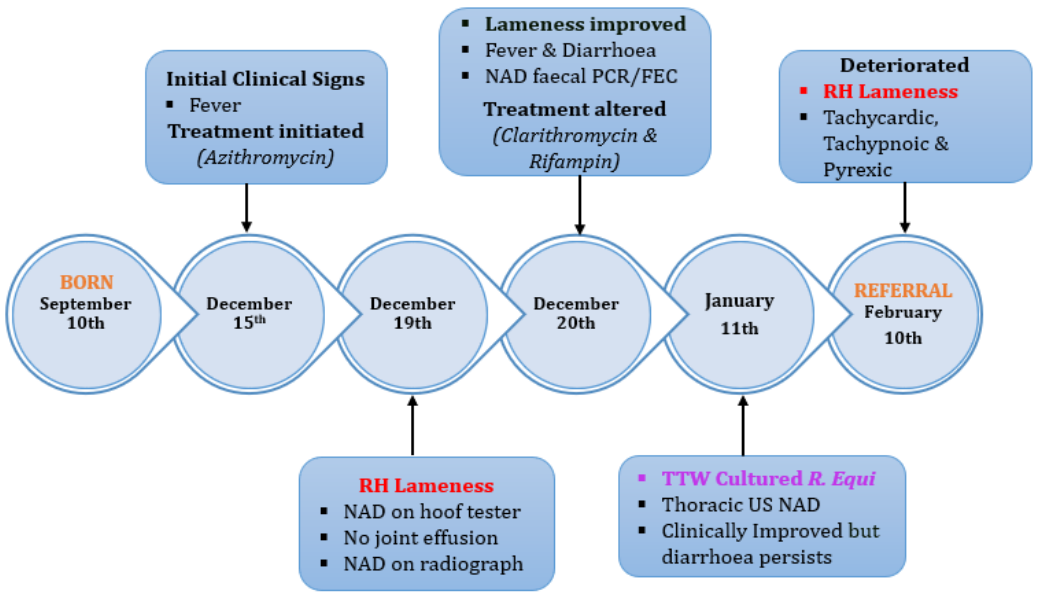
## HISTORY:

A 5-month-old foal presented to BVP for recurrent fevers and oscillating lameness following confirmed diagnosis and treatment of *R. equi* pneumonia.




## INITIAL CLINICAL FINDINGS:

The foal was bright, alert and responsive with normal vital parameters. Cardio-thoracic auscultation revealed no abnormalities. A mild right hind lameness could be seen at the walk, however, there was no heat, pain, or resentment to flexion tests. Blood work revealed moderate neutrophilia along with increased SAA (1034ug/mL) and fibrinogen (8.7g/L). Abdominocentesis and trans-tracheal wash were performed, and samples submitted for culture, sensitivity, and cytology. Samples were negative for *R. equi.*

## DIAGNOSTIC IMAGING:

**Ultrasonography:** Thoracic ultrasound revealed mild commit tails in the cranioventral lung, with the left more appreciable than the right. However, there was no consolidation, abscessation, or pleural effusion.

**Radiography:** Prior right hindlimb radiographs up to the stifle had shown no abnormalities. A standing radiograph of the right coxofemoral joint (CFJ) was taken to rule out any abnormalities at this location. This showed a lucency and mottling of the bone. The foal was anaesthetised to acquire more diagnostic images. On a ventrodorsal view, the lucency could be localized to the cranial acetabulum of the right ilium.

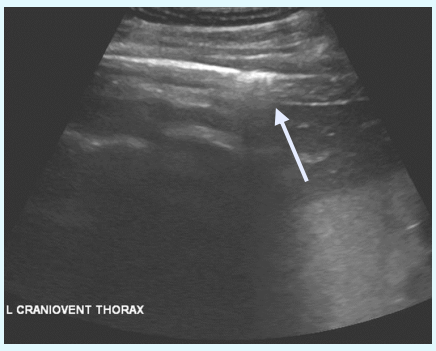



*Image: Left cranioventral thorax. Arrow highlights pleural roughening.*

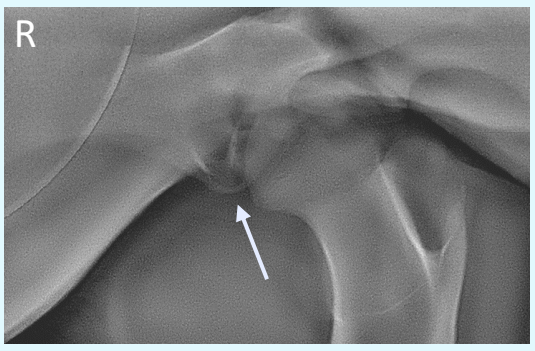
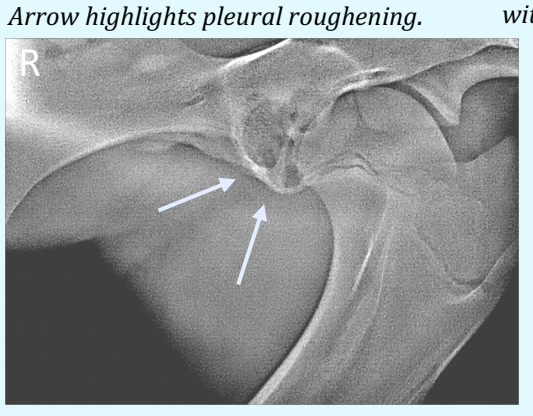
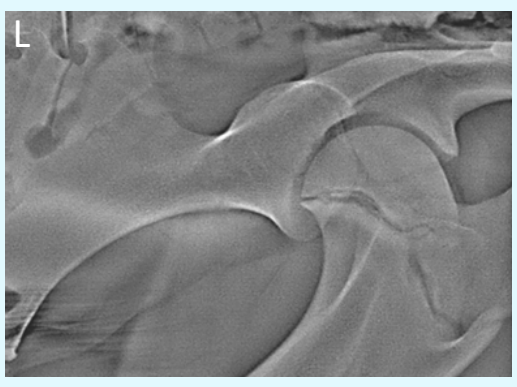



*Image: Standing VMDL-O of the right CFJ with a suspicious lucency (arrow).*




*Images: **Left and Right Hip Joints** (Ventro-dorsal projections of the CFJ's). Arrows highlighting the osteomyelitis in the right acetabulum taken in dorsal recumbency.*

## PRESUMPTIVE DIAGNOSIS:

Extrapulmonary *R. equi* – Ilial osteomyelitis +/- Coxofemoral joint sepsis

## TREATMENT OPTIONS:

A. Repeat medical management using clarithromycin and rifampin.
B. Surgical debridement of infected bone
C. Humane euthanasia (elected in this case)

## POST MORTEM:

Dissection of the right hindlimb revealed abscessation with copious purulent material originating from the ilium just cranial to the CFJ and infiltrating the surrounding musculature. The CFJ itself was not affected. The articular cartilage and joint fluid had a normal appearance. Note normal articular cartilage adjacent to necrotic subchondral bone (yellow arrow) ***(Fig A).*** There was a large 10x15mm cavitary lesion in the bone draining purulent material into the surrounding soft tissues ***(Fig B).***

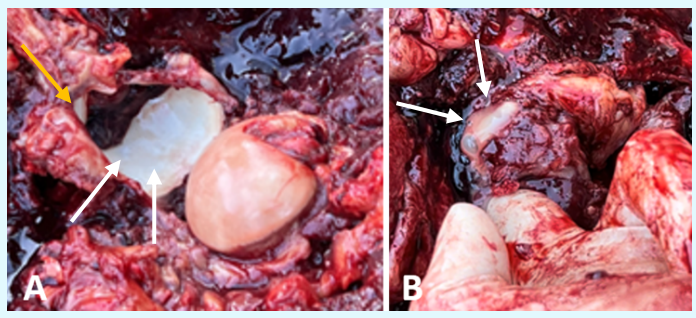
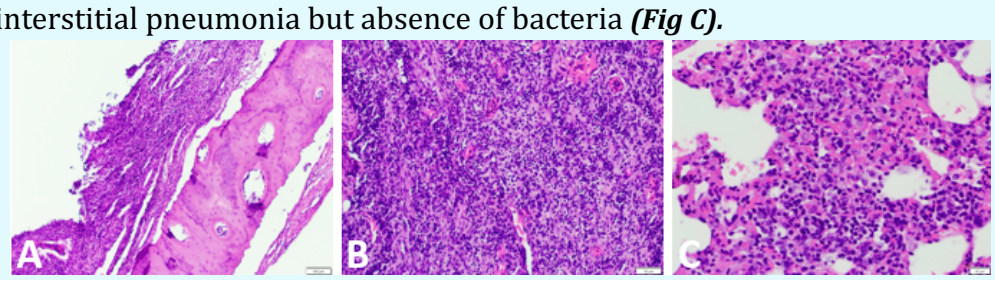



***Fig A:*** *Unaffected cartilage of the acetabulum (white arrows)*

***Fig B:*** *Cavitary lesion draining purulent material (arrows)*

## PATHOLOGY:

Histology of the affected bone ***(Fig A)*** identified severe, chronic suppurative inflammation involving the medullary tissue. The surrounding soft tissues ***(Fig B)*** had severe chronic suppurative cellulitis. Cytology identified suppurative inflammation with numerous gram-positive cocci consistent with *R. equi* which culture confirmed was the causative agent. Histopathology of a lung biopsy showed suppurative interstitial pneumonia but absence of bacteria ***(Fig C).***




## DISCUSSION:

Foals are often exposed to *R. equi* as neonates with infection resulting from inhalation of aerosolized bacteria (1). Clinical disease manifests as chronic suppurative bronchopneumonia with abscessation and develops in 20 to 30 % of foals (2). Although *R. equi* infections are common, effective prevention and treatment methods remain elusive. Prevention measures such as housing in a low-dust environment, prompt removal of manure, and administration of hyperimmune plasma, are time-consuming and costly. Treatment difficulties are well recognised due to increasing levels of antimicrobial resistance coupled with the bacteria's ability to invade and replicate within macrophages of the lungs (1). Clarithromycin together with rifampin is recommended due to good tissue and macrophage penetration, low MIC and the benefit of reduced resistance from using a combinatory treatment (4).

While frequent subclinical infection became apparent when ultrasonographic screening was adopted for early diagnosis, antimicrobial treatment is likely best reserved for foals with both ultrasonographic and clinical signs of disease (5). The response to treatment is good for those foals with uncomplicated pneumonia (>90%) (1). However, those with anti-microbial resistant infections (2) or extrapulmonary disorders (EPD) (3), both of which are increasingly reported (6), have a poorer prognosis. EPD, including septic arthritis and osteomyelitis, may be seen without concurrent *R. equi* pneumonia, as demonstrated in this case. Given the poor prognosis for foals with EPD, prompt diagnosis and treatment are essential. Thus, indicators of EPD including marked leukocytosis and neutrophilia (3), lameness, diarrhoea, and uveitis should be investigated without delay. Orthopaedic infections are associated with a grave prognosis for an athletic career and survival rates are significantly lower in foals with EPD (43% versus 82% without EPD) even with aggressive intervention. (4)

## CLINICAL RELEVANCE:

Although expensive and unavailable in the field, CT would be an ideal diagnostic modality in cases of suspected osteomyelitis associated with the axial skeleton and upper limb in foals. However, due to their size, diagnosis via radiography may be achieved. Despite standard combined therapy being adequate to treat the pulmonary disease in this case, the foal developed an EPD that was unresponsive to treatment. Sensitivity testing of the ilial sample obtained at necropsy may have revealed if antimicrobial resistance had contributed to the persistence of infection.

As this case demonstrates, any unexplained lameness from a foal with a history of Rhodococcosis should be strongly suspected of being an EPD associated with *R.equi.*

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