Q fever osteomyelitis in a child from the south coast of NSW.

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Introduction:
Q fever is a zoonosis caused by the intracellular bacterium Coxiella burnetii. It causes both acute and chronic disease. The two disease forms are distinguished on the basis of clinical expression, temporality of exposure and serological profile. The clinical expression of chronic Q fever is most commonly in the form of endocarditis. Other forms of chronic Q fever include: endovascular infection, osteoarticular infection and chronic hepatitis. Osteoarticular infection caused by C. burnetii is a rare disease. To our knowledge there have been 20 reported cases (2 tenosynovitis, 8 spondylodiscitis, 10 osteomyelitis) in the literature, 6 in children.

Case:
A 2 year old girl presented to local medical services with acute pain and swelling of her right elbow associated with fever. Intravenous antibiotics were commenced for presumptive acute pyogenic bacterial osteomyelitis. Fever settled, but there was disease progression in the elbow with swelling, pain and marked limitation of movement over a 6 week period. She was transferred to our hospital. Plain x-ray (figure 1) showed osteolysis and periosteal reaction in the proximal ulna. Magnetic resonance imaging (MRI) showed osteomyelitis primarily involving the olecranon process of the ulna and the proximal ulnar shaft with associated synovitis in the elbow (figure 2). Operative drainage and washout was performed and biopsies were taken which demonstrated extensive granuloma formation with necrosis, chronic inflammation and bone resorption (figure 3). Cultures for bacteria, mycobacteria and fungi were negative. Molecular testing for Mycobacterium tuberculosis, non-tuberculous mycobacteria, Bartonella species and fungi was negative. Serology for Bartonella henselae and Brucella species was negative. There was initial relief of symptoms post-operatively and empiric anti-staphylococcal antibiotics were continued, however over a 3 week period there was recollection of absent material and worsening of symptoms. Q fever serology was performed and demonstrated a phase 2 complement fixation titre of 512 to Coxiella burnetii (See table 1). DNA extraction and Q fever polymerase chain reaction (PCR) was positive on the bone specimen. An echocardiogram showed no valvular lesions or dysfunction. A bonescan showed no other sites of abnormal tracer uptake. The family live in a small town on the south coast of NSW and have two cats (both male). There was no history of farm animal exposure. Her parents have no significant occupational risk of Q fever exposure. The child had been empirically treated based upon the biopsy result with amoxicillin-clavulanic and azithromycin. Following the serology result treatment was changed to multi-drug therapy with rifampicin, ciprofloxacin and azithromycin. Trimethoprim-sulfamethoxazole was also given as a neutrophil stimulator. Multiple surgical debridements were performed with interval placement of gentamicin beads. The entire olecranon was removed. Follow-up plain X-ray at 4 months showed features of bone healing and significant remodelling of the olecranon (figure 4). Dramatic clinical improvement has been noted at 6 months. Q fever antibody titres remain elevated to date (table 1). Screening immune function tests are normal. Trimethoprim-sulfamethoxazole has been ceased.

|------------------------|------------|------------|-----------|-----------|
| Phase 2 lgG (IFA)      | Not detected | Not detected | Not detected | Equival 
| Phase 2 lgM (IFA)      | -          | -          | <12       | <12       |
| Phase 1 lgM (IFA)      | -          | 512        | 1024      | 1024      |
| Phase 1 Antibody (CFI) | -          | 512        | 1024      | 1024      |
| Phase 1 lgG (IFA)      | <12        | <12        |           |           |

Table 1: Serial Q fever serology testing - CFI = complement fixation test, IFA = immunofluorescence assay. Significantly raised Phase 1 total antibody by CFT is consistent with chronic infection.

Discussion:

- The small number of cases reported in the literature are characterised by insidious onset osteoarticular pain, granulomas on histological analysis of bone specimens and a chronic, relapsing course. The diagnosis has been made on the basis of serology and culture, and more recently PCR analysis of tissue specimens.
- The cases described in children have been most often multi-focal, have occurred without a previous diagnosis of acute Q fever, and all children have been apparently immunocompetent.
- There is no clear consensus as to the treatment of Q fever osteoarticular infection. The treatment of Q fever endocarditis is established and involves 18 months of doxycycline and hydroxychloroquine. It is likely that osteoarticular infection would require a similar length of treatment. Surgical debridement occurred in all of the cases reported in the literature and is likely to have therapeutic importance. Most of the adult cases received a tetracycline based regimen. 3 of the paediatric cases received doxycycline, usually as part of a multi-drug regimen. The use of tetracyclines in children under 8 years, however, is relatively contraindicated. Other agents with in vitro activity against C. burnetii used have included rifampicin, lincomycin, ciprofloxacin and trimethoprim-sulfamethoxazole. Length of treatment ranged from 6 months to 3 years. A single case report describes the use of interferon-gamma adjuvant therapy in addition to rifampicin and ciprofloxacin with no adverse effects.
- We plan to give 12 months of combination antimicrobial treatment with azithromycin, ciprofloxacin and rifampicin in the absence of any further complications.

References: