Q fever: A cause of recurrent soft tissue nodules and abscesses in a child

Q fever, a worldwide zoonosis caused by Coxiella burnetii, has a diverse clinical spectrum including asymptomatic infection, acute infection such as flu-like illness and pneumonitis, and chronic manifestations such as endocarditis and osteoarticular infection.[1] Increasingly recognised are unusual manifestations such as chronic Q fever osteomyelitis and skin disease.[2] This is the first paediatric report of Q fever causing chronic multifocal, recurrent subcutaneous nodules and abscesses.

Case report
A 3 year old boy from a cattle property in rural Queensland presented with 6 months of persistent swelling of his left ankle and a new larger swelling on his right wrist. Both lesions had purple discoloration of the overlying skin, and the wrist swelling had a central purulent area. The lesions were not painful, and he had no systemic symptoms. Oral antibiotics had minimal effect, and he developed a new subcutaneous swelling over his pre-sternal region.

Inflammatory markers and other blood tests were unremarkable. Ultrasound imaging demonstrated abscess formation, though culture of a swab of the wrist lesion was negative. However, PCR testing confirmed the presence of Q fever DNA and C. burnetii serology suggested chronic Q fever (Table 1). Histological examination of soft tissue biopsies revealed inflammatory changes with abscess formation, with focal granulomas in the chest biopsy. After 5 months of doxycycline and rifampicin, he developed 3 further lesions. Histological examination revealed florid necrotising granulomatous inflammation within the subcutis (Figure 2). Staining and culture for organisms was negative, but PCR testing identified C. burnetii.

The boy continued therapy with doxycycline and rifampicin for a further 9 months. Today he remains symptom-free 18 months after ceasing therapy. CFT and specific IgG antibodies have also fallen (Table 1).

The patient’s mother had received Q fever vaccine prior to moving to the family’s cattle property some years prior, while his father had been hospitalised with Q fever 8 years prior and had not received vaccination.

Figure 1: Soft tissue nodule of the right foot; this lesion developed after 5 months of antibiotic therapy

Figure 2: Histopathology of foot nodule, demonstrating necrotising granulomatous inflammation

Discussion
Q fever infection is frequently asymptomatic as a primary infection, especially in children, and hence the incidence of this disease is likely under-diagnosed and under-reported.

The increasingly recognised variability in clinical expression of Q fever may be determined by host factors such as specific immunoresponsiveness, extent of exposure, and bacterial virulence factors.[3]

Though infrequently reported, cutaneous signs such as transient rashes and skin lesions may occur in up to 20% of patients with acute Q fever.[4] Histological findings vary, but include granulomatous inflammation. Few bacteria are found in granulomas in the acute phase of Q fever, and PCR tests at this stage are frequently negative. Once the organism multiplies in the context of a dampened immune response PCR tests can confirm C. burnetii.[4]

The role of antibiotics in Q fever remains unclear. Q fever is a perplexing infection about which we still have much to learn. The role of antibiotics, particularly in chronic manifestations of the disease, remains uncertain. Newer treatment options such as immunomodulatory therapy hold promise, but further research needs to be done. Skin and soft tissue manifestations such as those seen in our described case are yet another example of the increasingly recognised variety of manifestations of which clinicians need to be aware.

Conclusion
Q fever is a perplexing infection about which we still have much to learn. The role of antibiotics, particularly in chronic manifestations of the disease, remains uncertain. Newer treatment options such as immunomodulatory therapy hold promise, but further research needs to be done. Skin and soft tissue manifestations such as those seen in our described case are yet another example of the increasingly recognised variety of manifestations of which clinicians need to be aware.

Acknowledgements
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Conflicts of interest: none identified.

References

Table 1: Q fever serology and PCR investigations

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* Confirmed by sequencing PCR product

Blood Q Fever PCR Not Detected
Wrist swab & foot PCR Detected

Histopathology of foot nodule, demonstrating necrotising granulomatous inflammation

Table 1: Q fever serology and PCR investigations