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Chronic *Brucella* infection of the supra-patellar bursa with sinus formation

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Abstract

A case of supra-patellar bursitis with the formation of discharging sinus is described. *B abortus* was isolated from resected bursal tissue. While osteoarticular complications of brucellosis are common and a number of different clinical syndromes are now recognised, disease of the bursae is rare and as far as is known sinus formation has not been described before in this setting.

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Case report

A 39 year old man presented with a small infected skin lesion above the left knee, which was treated successfully with flucloxacillin. He presented four months later with a recurrence of the lesion and associated inguinal adenopathy and fever. A full blood count was normal and the monospot test was negative, but *Brucella* sp antibody serology titres were increased with a Coombs test result of 1/5120. A tentative diagnosis of *Brucella* infection was made, although the exact nature of the skin lesion remained unclear. There was no history of occupational exposure to farm animals, but the patient had occasionally consumed unpasteurised milk from neighbouring farms.

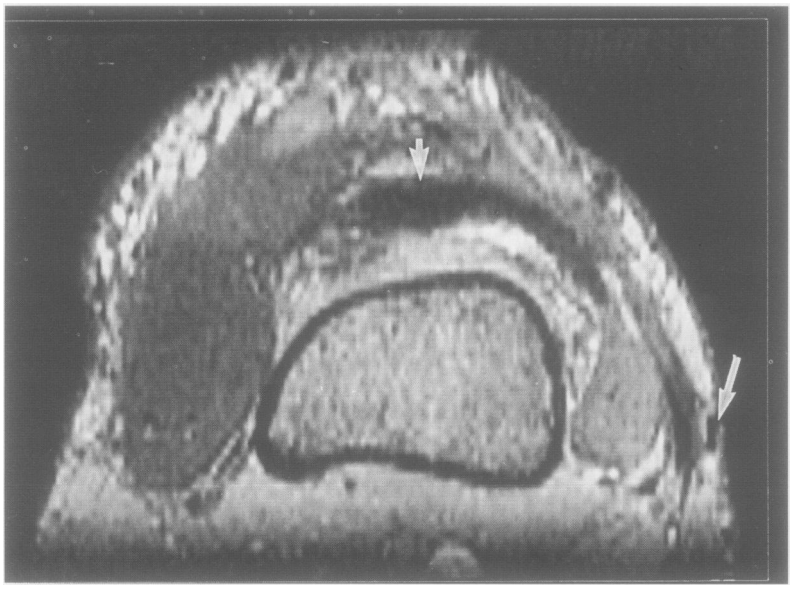

Figure 1 Axial magnetic resonance image scan of knee demonstrating fluid filled space (short arrow) anterior to lower end of the femur with lateral subcutaneous extension to the site of the discharging sinus (long arrow).

Three years later, he developed a discharging sinus which required surgical excision of a blind-ending subcutaneous tract above the left knee. There was no obvious infection in the knee joint. Histological examination of the resected material confirmed the presence of a sinus tract, lined by granulation tissue with adjacent chronic inflammation and necrosis. The features were felt to represent an inflamed bursa and the patient was discharged without additional treatment.

Seven years after initial presentation, a further purulent discharging sinus developed at the same site. Clinically, erythema, oedema, and tenderness were present in the area but, as on previous admission, there was no limitation of movement. Culture of the purulent exudate grew no organisms. Repeat *Brucella* serology using *B abortus* antigen (Murex Diagnostics, Hartford, England) produced a standard agglutination test of 1/1280 and a Coombs test result of 1/5120. Magnetic resonance imaging demonstrated a multioculated soft tissue swelling above and anterior to the knee (fig 1). Surgical exploration was undertaken with drainage of a multiloculated abscess and resection of large quantities of granulation tissue from the soft tissues around the knee. Histologically, the resection specimen consisted of chronically inflamed hyperplastic synovium with surface fibrinous exudate. No lymphoid aggregates were identified, but there were numerous, poorly formed necrotising granulomata in the surrounding connective tissue (fig 2). Ziehl-Neelsen and Gram stains were negative. Culture of resected material, after three weeks of incubation, grew *Brucella abortus* biotype 1. The patient was started on oral tetracycline 500 mg four times a day and has made a good recovery.

Discussion

Brucella infection is associated with arthritis in 10–25% of patients[1 2] and may precede, accompany, or follow systemic infection.[3] Four clinical patterns of joint disease are described, listed in order of frequency: (i) sacroiliitis; (ii) peripheral arthritis, usually monoarticular, affecting knee, hip, ankle and shoulder; (iii) mixed forms; (iv) and spondylitis, the most frequently destructive form.[4] Arthritis may be seen in association with acute, undulant, or chronic systemic disease.[5] Spondylitis is strongly associated with chronic disease and tends to occur in a more elderly population, while sacroiliitis and peripheral arthritis are more frequently acute or subacute

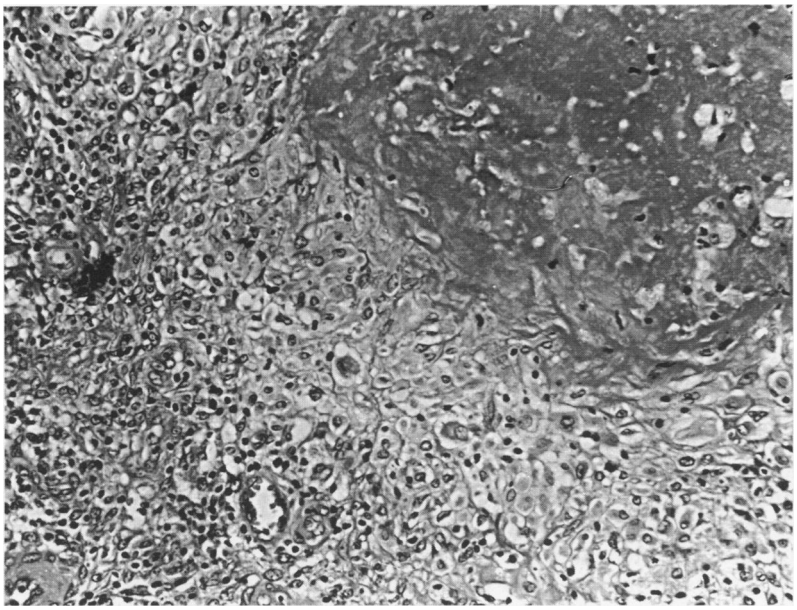

Figure 2 Section of resected bursa showing severe chronic inflammation and a large necrotising granuloma.

illnesses of children and young adults.[4 5] Brucella may, less frequently, affect other musculoskeletal sites, producing tendinitis, enthesopathies, and osteomyelitis.[5] Infection in the bursae has been described[6] but is unusual, and skin and soft tissue disease is rare.[7]

Where *Brucella* arthritis is the presenting feature and represents a localised form of the disease, constitutional symptoms may be absent.[2] 50% of cases, however, are associated with an acute *Brucella* syndrome and typified by fever, sweating, and fatigue.[2] Headache, anxiety, depression and insomnia are the most common systemic symptoms seen with chronic Brucella arthritis.[2]

Laboratory findings are variable, with a normal white cell count seen in 80%[2] although leucocytosis, leucopenia, relative lymphocytosis, anaemia, pancytopenia and thrombocytopenia have all been described.[8] The erythrocyte sedimentation rate is increased in 30%.[8]

Synovial fluid examination usually indicates a modest increase in white cell count with a predominance of mononuclear cells, an unusual finding in infective arthritis.[5] Protein is mildly increased and glucose concentrations are variable.[5]

Diagnosis of *Brucella* infection is made definitively by isolation of organisms from blood, tissue, or fluid specimens, although it should be noted that isolation of *B melitensis* from blood cultures is easier than isolation of *B abortus*.[9] The Castaneda method has traditionally been used for blood culture isolation and is considered by many to be the gold standard, although other media, including digest broth, are suitable.[10] Interestingly, newer automated or semi-automated methodology may increase the yield from blood cultures. Lysis-centrifugation has been reported as being more successful than the Castaneda method[11] and similarly continuous monitoring is promising.[12]

The isolation of *Brucella* spp, in particular *B abortus*, from synovial fluid is difficult (authors quoting success rates of 35–92%),[3 4] and depends to a large extent on a clinical suspicion and a high level of vigilance at bench level. This difficulty may be due to the relative paucity of organisms present in clinical specimens as it has been shown that apart from *B abortus* biotype 2 and *B suis* biotype 3 brucellae are not fastidious organisms.[10] Various media are suitable for *Brucella* isolation including chocolate agar, which was successful in this case.

Because of the poor yield from culture of *B abortus*, which is almost invariably the pathogen in the United Kingdom, many rely on a combination of clinical presentation and serological tests to arrive at a diagnosis. The standard agglutination test is the most widely used serological procedure, with a titre of > 1/160 considered by many to be diagnostic in acute infection. However, these tests need to be interpreted with caution as no single titre may be taken to indicate active disease, especially in a rural population where a significant degree of exposure and subclinical infection occurs. In the Republic of Ireland, where brucellosis remains endemic in cattle, it has been shown that over 40% of blood donors in a rural community have standard agglutination titres of >1/80, whereas only 14% of blood donors from an urban community have similar titres (personal communication, Mr Liam English, Department of Microbiology, St James's Hospital, and unpublished data).

Histological changes associated with *Brucella* infection of synovial lined spaces are variable but are principally those of a chronic inflammation, with hyperplasia of lining cells. Lymphocytes, plasma cells, and histiocytes are the predominant cell types, with occasional giant cells and granuloma formation.[1] Granulomata may undergo central necrosis[1] but are sparse and therefore infrequently found.[4 6] Some authors feel that the non-specific histological picture means that synovial biopsy is not a diagnostically useful procedure in this setting.[2] However, the finding of granulomata significantly narrows the range of diagnostic possibilities and, if not pathognomonic of *Brucella* infection, may at least add further weight to an established clinical suspicion. As such, biopsy will continue to have a role, particularly where the diagnosis has proved difficult. Biopsy also provides material for immunocytochemical identification of *Brucella* organisms. Immunoperoxidase antibodies are commercially available (Wellcome) and are used extensively in the veterinary industry. However, the small numbers of organisms typically associated with human disease mean that the diagnostic yield will be low and in this case no organisms were identified using this method.

The high percentage of cases in which *Brucella* has not been cultured from synovial fluid has been used as an argument for the existence of a "reactive" *Brucella* arthritis as well as an "infective" form.[5] This suggestion is supported by the non-specific histological

picture, the non-destructive nature of many of these infections, and the resolution of cases without anti-microbial treatment.[5] Many authors have also documented the existence of immunological abnormalities in *Brucella* arthritis, including IgG agglutinating anti-*Brucella* antibodies in synovial fluid of such patients, and point to the similarity of the condition with other "reactive" arthritides such as those following *Shigella* and *Yersinia* infection.[4] However, isolation of organisms from the joint in such cases, improved by using appropriate media and conditions, immediately moves cases of otherwise typical "reactive" arthritis into the "infective" category. Further improvements in organism detection are likely to follow the application of molecular biological techniques to the field, such as PCR amplification of *Brucella* DNA.

The current case illustrates the lengthy delay in reaching a firm diagnosis in musculoskeletal brucellosis. The rarity of the condition, the "non-infectious" synovial fluid picture, and the difficulty in culturing the organism all militate against prompt diagnosis and treatment.[4] These factors were compounded in this case by the absence of any of the more traditional risk factors for the illness, such as farming or abattoir work (the patient had had a number of occupations, but was a courier at the time of initial presentation). The predominant bursal location of the inflammatory process without evidence of direct articular disease which allowed normal range of movement throughout the seven year history of the lesion was also perplexing. Bursal disease is uncommon, with the three cases described by Johnson and Weed representing the largest series to date. Bursitis and tendinitis were not separated as clinical syndromes in the series reported by Mousa *et al*,[7] but the combination represented only 1·2% of the 169 cases of osteoarticular brucellosis they described, and bursitis is not recorded in other large series.[2 3] The formation of a sinus tract in this setting has also not been described before.

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Cushing's syndrome associated with recurrent endometrioid adenocarcinoma of the ovary

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Abstract
Ectopic production of adrenocorticotrophic hormone (ACTH) by malignant neoplasms is a well recognised cause of Cushing's syndrome but is extremely rare in ovarian carcinoma. A patient who underwent surgery for ovarian carcinoma followed by a course of chemotherapy is reported. The tumour was a bilateral moderately differentiated endometrioid adenocarcinoma and contained numerous chromogranin immunoreactive endocrine cells as well as small foci of ACTH immunoreactivity. She subsequently presented with Cushing's syndrome in association with extensive pelvic recurrence of the tumour.

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Cushing's syndrome due to ectopic adrenocorticotrophic hormone (ACTH) production has been described in a wide range of ovarian tumours including sex cord stromal tumours,[1] carcinoid tumours,[1-3] and teratomas.[4] However, ovarian tumours of common epithelial type are an extremely uncommon cause of