Volcanic knee

Chika E Uzoigwe, Rizwan Shahid, Rory G Middleton, Murtuza Faizi, Mohammad Maqsood, Abdul Baco

Lancet 2010; 377: 270

Department of Trauma and Orthopaedics, Leicester Royal Infirmary, Leicester, UK (R G Middleton MRCS, M Faizi MRCS)**; and Department of Trauma and Orthopaedics, Lincoln County Hospital, Lincoln, UK** (C E Uzgoiwe MRCS MRCP, R Shahid MRCS, Prof M Maqsood FRCS [Orth], A Baco FRCS [Orth])

Correspondence to:
Mr Chika E Uzoigwe, Kettering General Hospital, Rothwell Road, Kettering NN16 8YR, UK
chika@doctors.org.uk

See Online for webappendix

In December, 2009, a 24-year-old man presented to us with a painful, hot, right knee. He had had similar episodes for the past 10 years. He could not recall any precipitating factor. On previous occasions by the time he had sought medical attention, his symptoms had resolved. A self-limiting inflammatory arthropathy had been suspected, and he had never been aggressively investigated. He learnt to tolerate what he called his "volcano knee" because of its tendency to erupt, and then lie dormant for months or years. Our patient's temperature was 38·1°C and C-reactive protein was 189 mg/L. A plain radiograph showed a sclerotic-rimmed lesion in the distal femur (figure A). Frank pus was aspirated from the joint. He had an arthroscopic lavage of the knee, and intravenous antibiotics were started. Meticillin-sensitive *Staphylococcus aureus* was isolated from the knee aspirate and blood culture.

A CT scan showed a defect in the distal femur, communicating with the supra-patellar pouch. The defect contained a fleck of bone (figure B, see also webappendix) indicative of a Brodie's abscess with sequestrum. Gadolinium enhanced MRI showed that the abscess was active (see also webappendix). Radiologically, Brodie's abscesses resemble osteoid osteoma, non-ossifying fibroma, giant cell tumour, eosinophilic granuloma, chondroblastoma, unicameral bone cyst, or fibrous dysplasia. MRI can discriminate between Brodie's abscesses and malignant lesions. The centre of the abscess is high-signal on T2W images. A characteristic "penumbra" sign is seen in 75% of cases on T1W, where the low-signal central abscess is surrounded by a high-signal ring of granulation tissue, which is surrounded by the less intense oedematous bone. Gadolinium enhancement of the centre occurs if it contains granulation tissue,[1] but there is no enhancement with pus. In our patient, the lesion, which consisted of acute and chronic inflammatory tissue, was surgical debrided, and the necrotic foci removed. When last seen in August, 2010, on follow-up, he was asymptomatic with no recurrences.

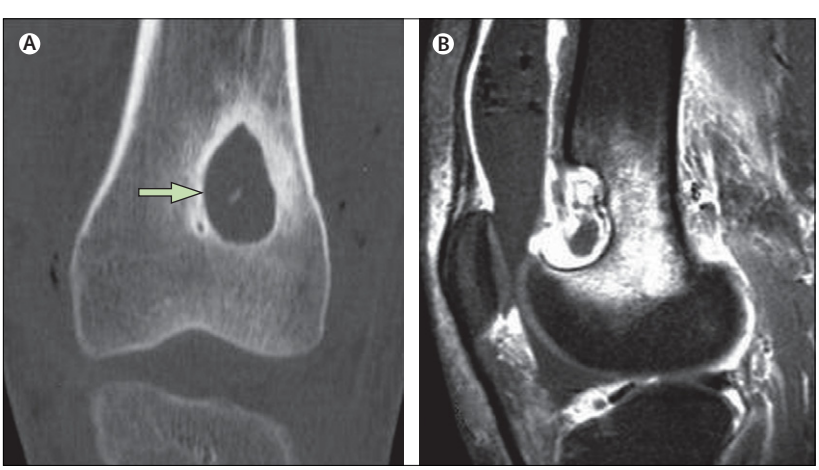

***Figure*: Brodie's abscess of the right knee**
(A) CT (coronal) of right knee, showing sclerotic lesion in distal femur (arrows). (B) Gadolinium enhanced MRI (sagittal) of the right distal femur.

Brodie's abscess was first described by Sir Benjamin Brodie in 1832, in his three-patient series of tibial abscesses.[2] It is an area of subacute or chronic osteomyelitis most commonly found in the proximal tibial metaphysis.[3] The sclerotic rim seen on plain radiographs represents where the infection has been encapsulated within the bone. *S aureus*[3] is the most common causative pathogen. 20% of lesions contain dead bone known as sequestra.[4] In his first patient, Brodie did an above-knee amputation. The patient did not survive. For his next two cases, he released the purulent collection and excavated necrotic tissue from the cavity. This was curative,[2] and Brodie's treatment has been retained to this day. Patients can be asymptomatic because the infection is contained within sclerotic bone. Symptoms occur if the dormant abscess reactivates or discharges into a joint. In our patient it seems that the intermittent attacks were due to activation of the quiescent abscess and resultant reactive knee effusions. Subsequent episodes led to progressive erosion and breach of the anterior femur, with drainage of the contents into the knee via the suprapatellar pouch, resulting in septic arthritis. There are few reliable markers of disease activity. In children an ESR greater than 40 mm/h may suggest aggressive disease with increased risk of recurrence, requiring more radical bone resection.[3] However, a rise in ESR is a feature of only 30% of cases. In adults definitive resolution can be achieved by effective resection of the abscess irrespective of the ESR.[5] The optimum treatment for Brodie's abscess is drainage with removal of contiguous infected or necrotic bone.[5] Peri-articular Brodie's abscess or osteomyelitis may mimic an inflammatory arthritis. This case highlights the importance of imaging peri-articular bone when inflammatory monoarthropathy is suspected. Failure to do so can lead to missed diagnoses or the inappropriate administration of disease-modifying anti-inflammatory medication.

Contributors
CEU, RS, MM, and AB looked after the patient. CEU, RS, MF, RGM, MM, and AB wrote the paper. Written consent to publish was obtained.

References

1 Kornaat PR, Camerlinck M, Vanhoenacker FM, De Praeter G, Kroon HM. Brodie's abscess revisited *JBR-BTR* 2010; **93**: 81–86.
2 Brodie BC. An account of some cases of chronic abscess of the tibia. *Med Chir Trans* 1832; **17**: 239–49.
3 Stephens MM, MacAuley P. Brodie's abscess: a long-term review. *Clin Orthop Relat Res* 1988; **234**: 211–16.
4 Miller WB Jr, Murphy WA, Gilula LA. Brodie abscess: reappraisal. *Radiology* 1979; **132**: 15–23.
5 Kanoun ML, Khorbi A, Khmiri C, et al. Diagnosis and treatment of Brodie's abcess in adults: about twenty cases. *Tunis Med* 2007; **85**: 857–61.