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BRODIE'S ABSCESS WITH TUBERCULOUS OSTEOMYELITIS OF THE FOOT

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Background: A 28-year-old lady of Asian origin presented with a painful left foot associated with swelling, purulent discharge and surrounding cellulitis. Her temperature was normal and blood results were within normal limits. Her past medical history included pulmonary tuberculosis. The patient had plain radiographs followed by a MRI scan of the left foot. She subsequently had a biopsy prior to surgical treatment.

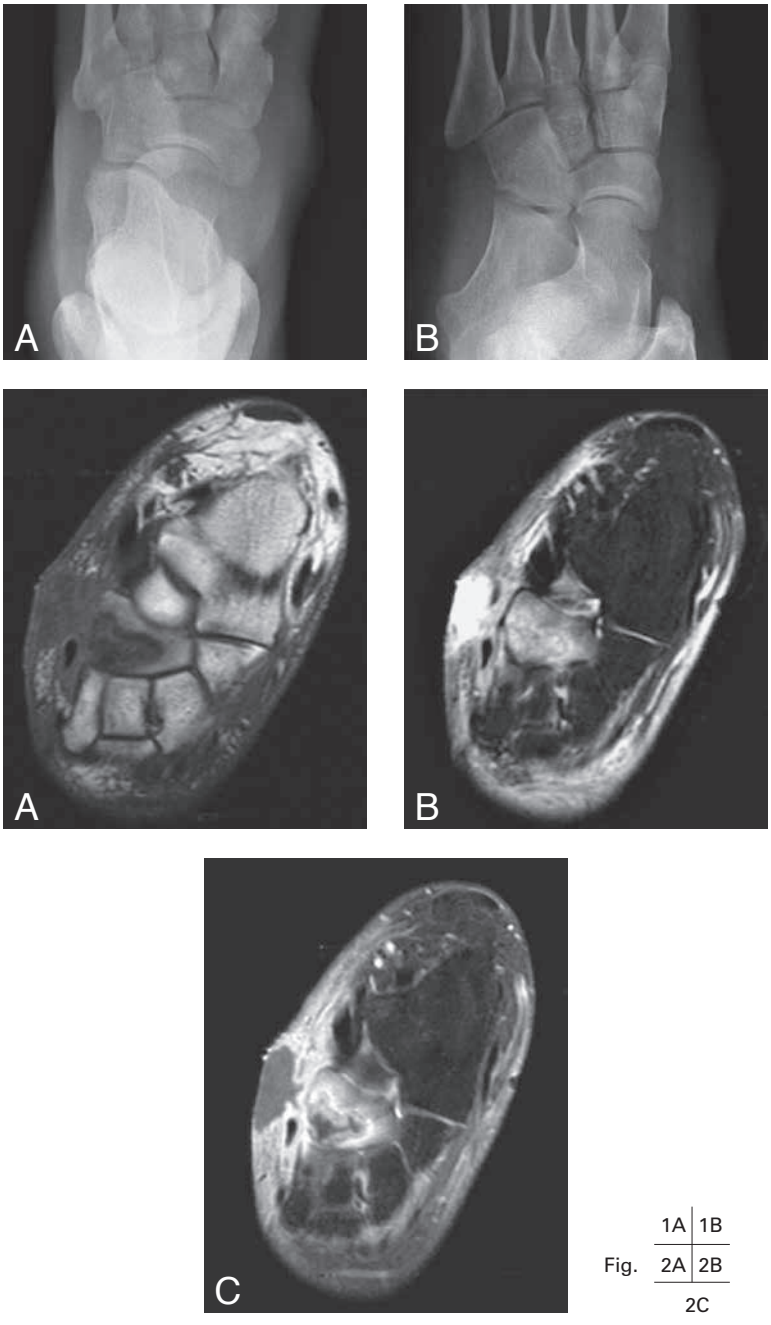

Fig. 1A | 1B
2A | 2B
2C

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Work-up

On plain radiograph of the left foot (Fig. 1), frontal (A) and oblique (B) projections, there is soft tissue swelling adjoining the navicular bone but no significant bony lesion nor destruction seen in the navicular.

MRI scan of the left foot (Fig. 2, axial T1 sequence (A), a well circumscribed lesion within navicular bone having central intermediate signal intensity and low signal intensity margin is demonstrated. There is also a low signal intensity lesion in the adjoining subcutaneous tissue. On axial T2 sequence (B), a lesion in navicular with central high signal intensity merging into a high signal intensity margin and diffuse oedema in the bone is seen. There is also an intensely high signal intensity lesion in the soft tissue. Associated inflammatory changes in the tendon sheath and soft tissue is also noted. Axial T1 fat suppressed with contrast enhancement with IV gadolinium (C) shows rim enhancement of the lesion in the navicular. The margin of the lesion is thick but smooth enhancement is noted. Rim enhancement with central non-enhancing area is also noted in the soft tissue lesion.

Radiological diagnosis

The radiologic appearance is of a *Brodie's abscess, with osteomyelitis* and also with abscess formation in the adjacent soft tissues. Histological diagnosis confirmed the diagnosis of Brodie's abscess with tuberculous osteomyelitis.

Discussion

Tuberculosis (TB) is a chronic granulomatous disease. Extra-pulmonary tuberculosis is more commonly seen in the Asian community, accounting for 50% of all cases. Extra-pulmonary sites affected by TB include the abdomen, lymph glands, bones, joints and skin. Tuberculosis involving the skeletal system accounts for 1-3% of all tuberculosis cases .The spine is the commonest site affected with the foot bones involved in 8-10% of cases and it is usually hematogenous in origin.

The diagnosis is often delayed partly due to the non-specific symptoms mimicking common joint diseases, such as osteoarthritis and rheumatoid arthritis, as well as the difficulty in identifying the organism.

Plain radiographs are not very helpful in early stage tuberculous osteomyelitis. The radiological features of osseous tuberculosis are based on Phemister's triad and include marginal erosions, narrowing of the joint space and periarticular osteoporosis. Mittal et al. reported five distinct radiological patterns of bony lesions in TB. The patterns were rheumatoid (osteoporotic and loss of articular cartilage), subperiosteal scalloping, kissing lesions (symmetrical scalloped lesions developed on the adjacent articular surfaces), cystic lesions and spina ventosa (spindle shaped expansion with successive layers of periosteal new bone). MRI and CT scans are the most important non-invasive investigations for identifying osteomyelitis. MRI shows evidence of edema in the affected bone at its early pre-destructive stage as well as demonstrating non-specific findings, such as inflammation of the synovium, tendons and muscles around the affected area. Subsequently, abscess formation and sequestrum may be seen. CT scan shows features of osteomyelitis, such as areas of sequestration and cortical interruption and periosteal reaction. A biopsy may also be performed under CT guidance for histological diagnosis.

It is often difficult to differentiate tuberculous from pyogenic osteomyeltis on MRI scan. There is very little in literature on the use of MRI on this topic. A study looking at MRI features differentiating tuberculous spondylitis from pyogenic spondylitis reported that thick and irregular enhancement of the abscess wall with ill-defined paraspinal abnormal signals are suggestive of pyogenic spondylitis, in contrast to the thin and smooth enhancement of the abscess wall with well-defined paraspinal abnormal signals are suggestive of tuberculous spondylitis. It is thought that the radiological features of tuberculous spondylitis could be due to the relative late phase and chronic course of tuberculosis as well as the decreased proteolytic enzyme secretion by Mycobacterium Tuberculosis.

The MRI findings in our case were diagnostic of osteomyelitis but not helpful in determining tuberculous etiology. Biopsy was done to establish the diagnosis. The patient had surgical drainage and was treated with antituberculous drugs.

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