Atypical non-ossifying fibroma

Clinical History:

37-year-old man presented at the emergency department with a painful knee following a twisting injury.

Imaging Findings:

AP and lateral radiographs demonstrate a 35x90 mm lucent lesion at the metadiaphysis of the right femur. It is central, with ill-defined, non-sclerotic borders and cortical erosion. Medial periosteal reaction is noted.

CT without contrast confirms an intramedullary lesion. No chondroid matrix. Periosteal reaction appears solid.

Discussion:

Non-ossifying fibroma (NOF) is a benign [1] fibrous [2] lesion. It is histologically identical to fibrous cortical defect (FCD), but, by convention, is larger than 3 cm in its longest dimension [1]. It is rarely found in patients over 20 [3] and is twice as common in men [4]. NOF and FCD are extremely common: found in 33% of normal children and the most common benign skeletal lesions [1]. NOF is most often found near the knee: at the distal femur or proximal tibia [5]. It is thought to be a developmental defect [2] and originates at the metaphysis, growing into the diaphysis [3]. In 8% of cases, there are multiple lesions [6].

NOF is generally asymptomatic—an inconsequential finding found incidentally on imaging ordered for other reasons [4]. However, especially large lesions can cause chronic pain [1] and risk of pathologic fracture, particularly once they involve more than 50% of the bone's transverse diameter [4].

Radiographs are most often sufficient for diagnosis [6]. NOF classically appears as a well-circumscribed, eccentric radiolucency [7] in a metaphyseal or metadiaphyseal position around the knee [2]. When large, it can appear centrally [2]. It is usually ovular, with its long axis parallel to that of the bone, and it protrudes into the medullary cavity [6]. The appearance of its margins can vary, from indistinct to densely sclerotic, as can its number of loculi [4]. This is a result of its natural history: at first lytic, the lesion is eventually overcome by sclerosis, and then ossification from the diaphyseal side, followed by remodelling to normal bone [2, 3]. This sclerosis can be mistaken for fibrous dysplasia [8]. Periosteal reaction occurs only with a pathologic fracture involving the lesion [8]. Further imaging is not indicated unless surgery is required or the presentation is atypical, and, in these cases, CT is the preferred modality [6, 8]. CT allows for detailed assessment of size and volume [6] and can evaluate the integrity of the bony cortex [5].

NOF is slow-growing [8], and most will naturally heal over a period of 29-52 months from the end of adolescence [1]. No treatment is warranted [2]. In large defects, patients may be advised to avoid strenuous activity that may precipitate a fracture, which would then be treated with either reduction and immobilization or curettage and bone
graft [4].

NOF is a common, benign lesion that can be mistaken for something more serious, particularly when it presents atypically.

**Differential Diagnosis List:** Non-ossifying fibroma (confirmed by pathology), Fibrosarcoma, Non-ossifying fibroma, Simple bone cyst

**Final Diagnosis:** Non-ossifying fibroma (confirmed by pathology)

**References:**


Description: Lateral radiograph of right femur shows a central 35 x 90 mm lucency in the metadiaphysis. Origin: Department of Radiology, Greater Niagara General Hospital, Niagara Falls, Canada.
Description: AP radiograph of right femur shows a 35 x 90 mm lucency in the metadiaphysis. Origin: Department of Radiology, Greater Niagara General Hospital, Niagara Falls, Canada
Figure 2

Description: Axial CT without contrast (bone window) of femurs confirms intramedullary lesion in right femur. Medial periosteal reaction. Origin: Department of Radiology, Greater Niagara General Hospital, Niagara Falls, Canada
Description: Axial CT without contrast (soft tissue window) of femurs. Origin: Department of Radiology, Greater Niagara General Hospital, Niagara Falls, Canada
Description: Coronal CT without contrast (bone window) of femurs confirms intramedullary lesion in right femur. Medial periosteal reaction. 

Origin: Department of Radiology, Greater Niagara General Hospital, Niagara Falls, Canada
Description: Sagittal CT without contrast (bone window) of right femur. Origin: Department of Radiology, Greater Niagara General Hospital, Niagara Falls, Canada