Secondary synovial chondromatosis in a bursa overlying an osteochondroma mimicking a peripheral chondrosarcoma—a case report

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A 47-year-old woman presented with pain in the left groin lasting 4 months, without any trauma. A solitary osteochondroma of the proximal left femur had been diagnosed radiographically 19 years earlier (Figure 1). A hard, tender mass could be palpated in the proximal medial part of the left thigh. The mass was fixed to the bone, but the overlying skin was mobile. No enlarged lymph nodes were palpable in the left groin. There was no neurovascular compromise of the left lower limb and the laboratory tests were unremarkable.

Plain radiographs of the left hip showed a changed appearance of the exostosis compared to 19 years earlier. There was an extensive ossified mass with multiple peripheral calcifications (Figure 2). A Technetium-99m HDP bone scan revealed increased uptake at the site of the osteochondroma. MRI showed continuity of the osteochondroma with the lesser trochanter; it was unclear whether there was a continuity between the exostosis and the overlying mass. It was difficult to assess the thickness of the cartilage cap. There was a clear demarcation between the cartilage and the adjacent soft tissues that were not involved (Figure 3). The differential diagnosis included peripheral chondrosarcoma and secondary synovial chondromatosis (SC). CT confirmed cortical and medullary continuity of the exostosis with the underlying bone,
Discussion

The clinical and radiographic features mimicked malignant degeneration of an osteochondroma with development of a peripheral chondrosarcoma. Bursa formation overlying an osteochondroma is a well-known phenomenon, especially in large osteochondromas or in places where there is fric-
tion between the osteochondroma and overlying tissue, such as the trochanteric or scapulothoracic area (Murphy et al. 1962, El-Khour and Bassett 1978, Borges et al. 1981, Griffiths et al. 1991).

Malignant transformation occurs in less than 1% of solitary osteochondromas (Garrison et al. 1982, Campanacci 1999). However, the arising of a secondary SC within a bursa overlying an osteochondroma may be still more uncommon; we have found reports of only 7 cases (El-Khour and Bassett 1978, Borges et al. 1981, Schofield et al. 1994, Wright et al. 1997, Peh et al. 1999). In the secondary SC, the loose bodies are within the joint and have the potential for slow growth by synovial metaplasia following proliferation of surrounding connective tissue (Milgram 1977, Villacin et al. 1979, Saotome et al. 1999). Exceptional cases with a transformation from SC to chondrosarcoma have been described (Kaiser et al. 1980, Perry et al. 1988, Bertoni et al. 1991, Kenan et al. 1993, Hermann et al. 1997, Wuisman et al. 1997, Wittkop et al. 2002, Ko et al. 2004).

Diagnosis based on clinical findings and imaging may be difficult because SC can mimic a peripheral chondrosarcoma in terms of symptoms and interpretation of radiographs and MRI (El-Khoury and Bassett 1978, Kenan et al. 1993, Schofield et al. 1994). The slow course, prolonged over a number of years, may be equally slow in low-grade chondrosarcoma. In our case, the presence of a pre-existing exostosis indicated the possibility of malignant degeneration in peripheral chondrosarcoma (Campanacci 1999). Radiographs are not specific, showing only a cartilaginous mineralization in the soft tissue mass in both entities (Sim et al. 1977). Bone scintigraphy is not very helpful either, demonstrating slightly increased uptake in both (Zwas et al. 1988). MRI is usually very reliable in anatomical delineation, and may satisfactorily show the clear margin between the calcified mass and the underlying cartilage cap. However, the images of the bursa with its nodules and fluid may mimic a thick cartilage cap as seen in peripheral chondrosarcoma, and so there are no specific MRI features to distinguish SC from chondrosarcoma (Wittkop et al. 2002). CT may be more helpful, showing the lobulated pattern of the calcified nodules lying separately from the exostosis (El-Khoury and Bassett 1978). Post-contrast axial CT scan may show a fluid-filled bursa containing numerous dense loose bodies (Schofield et al. 1994). Favoring SC, Peh et al. (1999) demonstrated very well how a shift of the cartilaginous nodules can be seen if the patient is examined in prone and supine position. Furthermore, CT can show the aspect of skeletal marginal/superficial erosions and suggest that this occurred due to compression from the outside. These aspects indicate the diagnosis of SC (Campanacci 1999, Wittkop et al. 2002).

Histological examination of biopsy material from a secondary SC may easily lead to overdiagnosis of chondrosarcoma, because of the borderline distinction between benign cartilaginous lesions and low-grade chondrosarcoma (Kaiser et al. 1980). The cytological aspects are often the same as those observed in a grade 1 chondrosarcoma (Villacin et

Figure 6. Low-power (A) and medium-power (B) photomicrographs showing the synovial chondromatosis. There is cartilaginous metaplasia within the synovial membrane. The cartilage shows evidence of proliferative activity, with large pleomorphic nuclei. These tend to be arranged in small bunches.
al. 1979, Borges et al. 1981, Campanacci 1999). In case of an abnormal appearance of a calcified mass overlying an osteochondroma, the diagnosis will most frequently be peripheral chondrosarcoma, but one should consider the possibility of a secondary SC in an overlying bursa. Careful interpretation of imaging techniques is necessary and should include a CT scan.

**Contributions of authors**

CE and PCJ: wrote the manuscript. MM, CE, and MDP: performed the surgery. PB: performed the diagnosis.

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