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Radiological study

Fig. 1. A “coned-down” film centered over the left 12th rib shows a large, dense, spheroid, bony mass approximately 5 cm in diameter in relation to the left 12th rib. Irregular mottling is observed at the periphery of the lesion and to a lesser extent throughout the remainder of the lesion.

Clinical information

This 43-year-old woman presented with the complaint of a painless, non-tender lump in her left chest wall. The lesion had been present for at least 6 months but the patient was unable to date it exactly. She denied any trauma to her chest wall or any unusual vigorous physical exercise.

Radiological study showed a dense, ovoid mass approximately 5 cm in diameter in relation to the 12th rib (Fig. 1). The mass was well defined but mottled and some irregularity could be noted at its margins. A radiological study of the chest had been reported as normal about 4 years previously.

An operative procedure was performed.
Diagnosis: Parosteal osteosarcoma left 12th rib

The differential diagnosis must include chondroma, chondrosarcoma, myositis ossificans, and other varieties of osteosarcoma, including tumours of soft tissue origin.

The lesion was resected together with the length of the 12th left rib, surrounding soft tissues in the 11th intercostal space and portions of the external oblique and quadratus lumborum muscles. The gross specimen was off-white in colour and hard in consistency, but with some difficulty much of it could be cut with a knife. The mass appeared to be intimately related to the 12th rib which can be seen toward one margin in a transverse section (Fig. 2). The relationship to the 12th rib is confirmed by specimen radiography (Fig. 3).

Histologically the tumour was composed largely of partly calcified osteoid trabeculae of irregular form and arrangement separated by a moderately cellular spindle cell stroma (Fig. 4). The new bone was of woven form and lacked osteoblastic rimming. The stromal cells showed only mild variation in nuclear size and shape and mitoses were not seen (Fig. 5). A few small foci of chondroid differentiation with only mild atypia were present. No histologically high grade areas were found. The tumour appeared to arise from the periosteal surface (Fig. 6). Although in areas lesional tissue extended back through the cortex, it was apparent that the epicentre of the tumour did not lie in the medulla, a feature supporting a periosteal origin and hence the diagnosis of parosteal osteosarcoma. The patient is alive without evidence of disease 24 months after surgery.

Discussion

The rib is an unusual site for parosteal osteosarcoma, a tumour which typically occurs in long tubular bones [2, 8]. It is important to be aware that this tumour may occur in bones other than long bones and has been described arising from the scapula [6], skull [7] and, as in the case presented, the rib, by Kawa et al. [5].

The definition of parosteal osteosarcoma has caused some controversy both with regard to histological grade and to extent of the tumour. Dahlin considers that high grade tumours do not belong in the category [3]. Other workers refer to parosteal osteosarcoma of Broders Grade III [2]. In doing so, however, they include tumours which lack the good prognosis which has come to be associated with parosteal osteosarcomas. Parosteal osteosarcoma (Broders grade III) lesions have a prognosis similar to that of conventional osteosarcomas. This issue also has therapeutic implications in that high grade tumours require consideration of treatment protocols, including adjuvant chemotherapy, as for conventional osteosarcomas.

Wold and his colleagues have attempted to deal with this problem by introducing the concept of dedifferentiation in parosteal osteosarcomas [9]. They include in this group the rare tumour that shows co-existent, low grade parosteal osteosarcoma and high grade osteosarcoma when first observed and the more frequent situation of the case presenting with a low grade parosteal osteosarcoma which transforms to a high grade tumour after one or more recurrences. Wold et al. [9] conclude that this latter group of patients has a prognosis similar to that of patients with conventional osteosarcoma. Bertoni et al., however, caution that further studies with longer follow-up are required to determine with greater certainty the prognosis of these high grade malignant lesions [1].

Similar difficulties exist with regard to medullary involvement. Although some workers claim that by definition tumours showing medullary involvement at presentation should be excluded from the group of parosteal osteosarcomas many authorities will accept limited medullary involvement at the time of initial diagnosis [4]. Although it would appear that primary intramedullary extension in tumours that are histologically of Broders Grade I does not affect the prognosis, evidence has been presented that the prognosis may be worse when this occurs in Broders Grade II lesions [2]. The question as to whether the prognostic implication of medullary involvement in a flat bone may differ from that in a large tubular bone with a thick cortex also requires further investigation. It is important therefore that both radiographically and pathologically evidence of medullary involvement be sought. While the well-defined dense mass noted in the conventional radiograph is fairly typical, the relationship of tumour to cortex, cortical destruction and medullary involvement may be difficult to demonstrate in plain radiographs, and computed tomography and magnetic resonance can be of special value in diagnosis and definition of this tumour.

In summary, a case of parosteal osteosarcoma of the rib is presented. The importance in recog-