Giant-Cell Tumour

This osseous tumour remains a mystery in many respects. In particular, it poses the problem of its barely predictable course, with the possibility of malignant transformation. Giant-cell tumours have long been known and were clearly defined by Jaffe et al. in 1940, who established a classification in three grades. Very many cases have been published since, in particular the series of Coley et al. in 1958 (108 cases), Goldenberg in 1970 (222 cases), Dahlin et al. in 1970 (195 cases) and Meary et al. in 1975 (85 cases). Localisation of this tumour in the hand is quite rare. Averill et al. (1980) collected 20 large series, making a total of 1288 tumours, of which 31 were situated in the hand (2%). They presented a personal series of 28 cases, the largest recently published. Gupta et al. (1980) mentioned 6 metacarpal lesions in the series of 108 giant-cell tumours of Reddy et al. (1974).

Clinical Features

Giant-cell tumours most often affect young adults (20–40 years), with a slight female predominance. They are very rare before the age of 15 years (Minguella 1982). The average age seems to be a little earlier in the hand than at other sites (Averill et al. 1980). The tumour is usually revealed by a localised, dull, persistent pain, which may be unleashed by exertion. Swelling is less often the primary feature, but is often present at the time of first examination. Averill et al. (1980) note that patients with this tumour in the hand sought advice on average markedly earlier than those with lesions elsewhere. The swelling is hard, of bony consistence and tender to pressure. It may be accompanied by a minor restriction of joint movement. Sometimes the presenting feature is a pathological fracture. Distribution of the tumour in the hand occurs essentially in the long bones: phalanges 50%, metacarpals 45%. Carpal lesions are very rare (Fitzpatrick and Bullough 1977). Averill et al. (1980) are impressed by the frequency of multifocal lesions in afflictions of the hand (18%) and advise a routine search for these by bone scintigraphy using technetium.

Radiology

Although no absolutely pathognomonic image exists (Goldenberg et al. 1970), several features are suggestive of giant cell tumour (Fig. 117). There is a lytic radiolucent image with sharp boundaries but without peripheral sclerosis. This is epiphyseal and expansive, extending in a bipolar fashion towards the metaphysis and the articular cartilage, expanding the diameter of the bone. The cortex is often thinned, even perforated or fractured. This is a tumour with little osteogenic capacity, and intratumoral calcification is rare. The classic image of “soap bubble” trabeculation should suggest recurrence. Owing to its rapid course, it is common to find at first consultation that the tumour has already extended over half the epiphyseal surface; this is particularly true for the hand where it usually occupies the entire epiphysis. Periosteal reaction is

Fig. 117. Giant-cell tumour at base of 1st phalanx of middle finger. (Courtesy of Professor Génin)
trivial or absent. In the carpus diagnosis is difficult, as there is merely a radiolucent image without increase in size of the bone.

Pathology
Macroscopically, the thinned periosteum covers a brown or dark-red friable tissue of vascular appearance, with yellowish-grey zones of necrosis. Histologically, there is a meshwork of round, oval or fusiform cells and giant-cells in a more or less loose intercellular stroma. Jaffe et al. (1940) drew up a classification in three grades for prognostic purposes. In grade I the stroma is very vascular and loose, there are few or no mitoses and numerous giant cells. Conversely, in grade III the stroma is cellular, with pleomorphic cells; there are many mitoses and the giant cells are smaller and less numerous. Grade II is intermediate between grades I and III. This classification is difficult to apply since numerous intermediate forms exist (I-II). In particular, there is no true correlation with the clinical course, and malignant change is possible in all three grades.

Aetiopathogenesis
A giant-cell tumour is an osseous tumour of non-neoplastic origin. Opinions differ as to its derivation, which seems to be from the connective tissue, but it is included in the section “Origin unknown” of the World Health Classification of 1972. It is, in principle, a benign tumour; malignancy is rare at the outset and is more likely to arise during recurrence. It was found in from 7% of cases (Goldenberg et al. 1970) to 19% (McGrath et al. 1972), according to the series. There may be local malignancy or metastases, usually pulmonary, but one should also note the possibility of benign pulmonary metastases (Meary et al. 1975).

Differential Diagnosis
The radiological image of a giant-cell tumour may look very much like that of a solitary chondroma, which occurs rather more frequently in the hand, and therefore will often be evoked first.

Treatment
Several methods of treatment have been suggested: curettage, curettage and packing with cancellous bone, simple resection, resection with bone grafting, amputation and radiotherapy. Though curettage has the advantage of being simple, it carries a high risk of recurrence, probably related to inadequate excision. The recurrence rate was 85% in the series of Goldenberg et al. (1970) after curettage, whose indications are therefore limited to small tumours with an intact cortex and a history of less than 3 months. Marcove et al. suggest supplementing curettage with cryotherapy, instilling liquid nitrogen into the residual cavity (Marcove et al. 1968), a technique that seems to give satisfactory results only after several years’ experience (Marcove et al. 1978) and carries the risks of transient necrosis and pathological fracture. It was used once in the hand for a recurrence in a phalanx; the tumour did not recur again, but there was a pathological fracture 2 months after cryotherapy. Curettage followed by bone grafting calls for rigorous technique. The curettage must be complete, freshening the walls of the cavity, which is filled by packing with cancellous and corticocancellous grafts. According to the series, this technique yields 30%-45% of recurrences, with one exception - the 13 lesions of the hand in the series of Averill et al. (1980), of which 11 recurred.

Resection consists of total ablation of the tumour with its walls, and in the hand this means resection of the entire skeletal segment. One must endeavour not to open the tumour during the excision. Whether or not followed by bone grafting, this treatment carries a much lower risk of recurrence than curettage (Meary et al. 1975, 1/20; Averill et al. 1980, 3/7). Though it may be very mutilating at other sites, reconstruction poses less of a problem in the hand. A bone graft may be used provided there is no cortical infraction, and several workers have grafted into the hand the phalanx of a toe or the corresponding metatarsal (Smith and Millender 1979; Minguella 1982). We should also note the giant-cell tumour of the lunate reported by Fitzpatrick and Bullough (1977), treated by resection of the proximal row of the carpus, the preoperative diagnosis having been Kienböck’s disease. The amputation of a digital ray or segment is reserved for forms manifestly malignant from the outset (Gupta et al. 1980) or for recurrences (see below). Radiotherapy has been abandoned by most authors and is never indicated in the hand, this tumour being hardly radiosensitive.

Development
Besides the possible local complications, such as infection and fracture, the most common complica-