Late Recurrence of Giant-Cell Tumor of Bone: 
Pharmacoangiographic Evaluation

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Abstract. Late recurrence (more than five years) of benign giant-cell tumor of bone is uncommon. Two patients were evaluated by angiography, including injection of vasoactive drugs, because of osteolytic lesions developing six and seven years after primary operation for benign giant-cell tumor. Angiography established a probable recurrence in both cases. Angiography also permitted accurate evaluation of tumor extension, facilitating pre-operative planning. Giant-cell tumors are predominantly hypervascular lesions. Angiographic evaluation is therefore recommended when a recurrent lesion is suspected.

Key words: Giant-cell tumor of bone — Giant-cell tumor recurrence — Angiography — Pharmacoangiography — Bone neoplasm.

Angiography in primary giant-cell tumors of bone commonly demonstrates hypervascular lesions and extra-osseous tumor extension is readily appreciated [12, 18]. Since giant-cell tumors are prone to recur, angiography is often used in evaluating recurrent lesions. We are not aware of any report of the use of angiography for this specific purpose alone, although, judging from the literature, this practice is common [18]. It has been suggested that recurrent giant-cell tumors may have a different angiographic appearance as compared with the primary lesion, demonstrating reduced vascular supply [8, 11], but, as a rule, recurrent giant-cell tumors are hypervascular lesions [18].

Recurrence of a giant-cell tumor usually occurs within the first two years of operation. Local recurrence after five years or more is distinctly uncommon [1, 2, 7, 14-16]. We have observed two patients with recurrence of benign giant-cell tumor of bone more than five years after the primary operation. In assessing these lesions, angiography with vasoactive drug enhancement (pharmacoangiography) played an important part, and we report here our experience.

Material and Methods
Two female patients, aged 25 and 48 years, operated for primary giant-cell tumor of bone in the knee region seven and six years earlier, developed signs of recurrent lesions (Table 1). The original operation in case 1 was curettage and bone packing, in case 2 curettage and bone cementation [17]. Pathologic-anatomic diagnosis in both original tumors was benign giant-cell tumor. Both patients had been well after the first operation but had experienced slight knee discomfort during the last months, which increased with exercise. Clinical examination of both patients demonstrated only slight local tenderness.

Radiographic examination in both cases included plain films in frontal, lateral, and oblique projections, in one case supplemented with tomography and bone scan. Angiography was carried out in at least two projections, using a catheter placed in the femoral artery via the contralateral femoral artery. In each angiographic series 25 ml of contrast medium was injected at a rate of 8 ml/s. When the best projection had been found, another series was obtained following the injection of 10 µg of angiotensin (Hypertensin N, Ciba, Switzerland), using a slower rate of filming [6]. Previous pre- and postoperative plain films and angiographic studies were available for re-evaluation, and these were compared with the present findings.

Table 1. Clinical data of two patients who developed a late giant-cell tumor recurrence

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age at primary operation (years)</th>
<th>Location</th>
<th>Type of primary operation</th>
<th>Time to recurrence (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>KK 18</td>
<td>Distal femur</td>
<td>Curettage and bone packing</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>AE 42</td>
<td>Proximal tibia</td>
<td>Curettage and acrylic cementation</td>
<td>6</td>
</tr>
</tbody>
</table>

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Fig. 1 A–E. Case 1. Giant-cell tumor in distal end of left femur. A Preoperative film shows irregular osteolytic area (arrows). B “Healed” stage three years after curettage and bone packing. C Four years later an ill-defined osteolytic area with blown-up cortex has appeared. Changes extend deep within the femoral condyle (arrows). D and E Angiography (subtraction, capillary phase, after 10 μg angiotensin). Frontal and lateral projections show large hypervascular lesion in medial femoral condyle. Contrast accumulation is irregular and faint areas are visible deep within the bone (arrows). The findings of recurrent tumor were corroborated at operation.