

Giant Cell Reaction of Small Bones

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A radiographically nonspecific lytic lesion in the middle phalanx of the index finger with microscopic evidence of a benign fibrous stroma with giant cells and osteoid was investigated in an 18-year-old man. Giant cell reaction is a rare, benign lesion of the small bones of the hands and feet. Trauma as the cause of a giant cell lesion poses an interesting question.

Giant cell reaction of the small bones of the hand is a rare lesion first described by Ackerman and Spjut¹ in 1962. They described the giant cell reaction as a benign fibrous tissue proliferation containing giant cells and osteoid.

A small number of cases have been reported,^{1,4,6,7,9} to which we add an additional case of this unusual condition. The previous reports show an approximate male-to-female ratio of 2:1 and an age range of six to 45 years (mean, 22 years). The majority of cases have occurred in the second and third decades of life. The small tubular bones of the hand are most commonly affected, although lesions involving the tubular bones of the feet have been reported recently.

CASE REPORT

An 18-year-old man had a six-month history of progressive swelling of the left middle finger. The area was initially painless but became increasingly

painful over several months, and the swelling increased. There was no history of trauma to the area.

The patient had a 1.5 × 1.0-cm tender mass over the palmar surface of the middle phalanx of the left middle finger. There was no evidence of infection. Serum calcium and phosphate levels were within normal limits. Roentgenograms demonstrated a well-circumscribed, lytic lesion at the base of the middle phalanx, with a periosteal rim on the volar surface (Fig. 1). The patient was treated with surgical curettage of the lesion and bone grafting to the area. At the time of surgery, there appeared to be no soft tissue involvement; the lesion was confined to bone. Intraoperative cultures failed to demonstrate any evidence of infection. At one-year follow-up examination, there was no evidence of recurring symptoms.

The specimen removed from the left middle phalanx consisted of a tan-white soft tissue mass. Microscopic examination showed the lesion to be composed of a fibrous stroma containing osteoclastlike giant cells and multiple foci of osteoid. The fibrous element consisted of benign, spindle-shaped fibroblasts with a small component of vascular structures. The osteoid was orderly without evidence of atypical osteoblastic activity. The histologic diagnosis was giant cell reaction of bone (Fig. 2).

DISCUSSION

This case represents one of a small number of lesions described as giant cell reaction of the small bones of the hand. The roentgenographic appearance of this lesion is of little value in differentiating it from other lytic bone lesions. On radiographic examination, aneurysmal bone cyst, infection, nonossifying fibroma enchondroma, and giant cell tumor of bone must be considered. This was true in this patient as well as in all of the other cases reported.

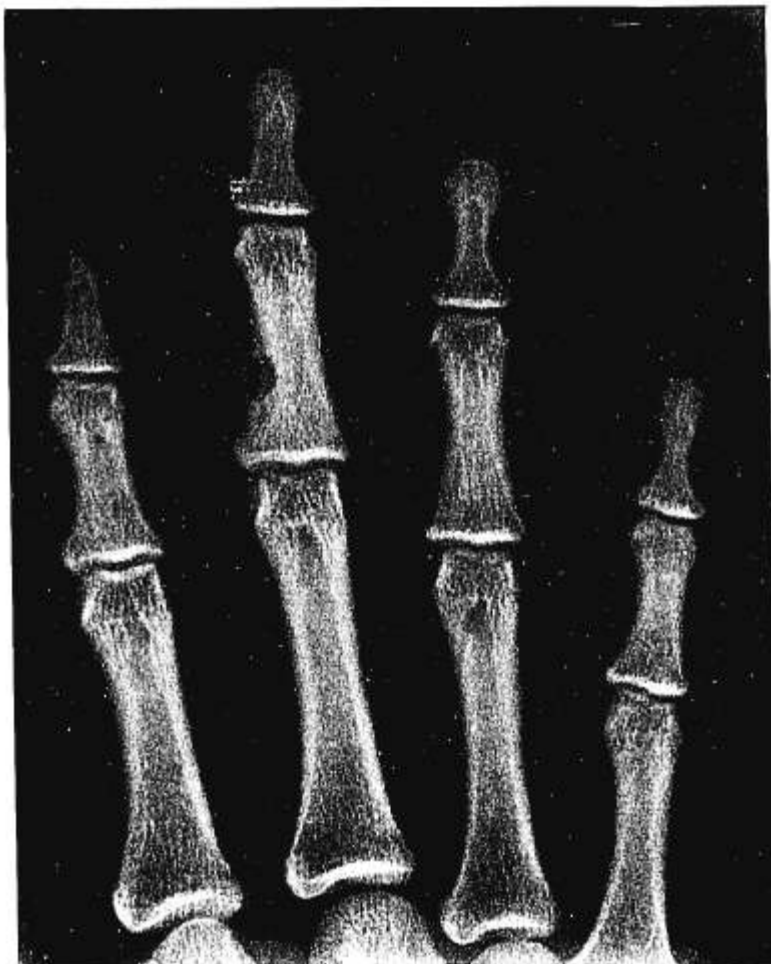
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FIG. 1. Radiograph showing circumscribed, lytic lesion in the middle phalanx of the long finger.



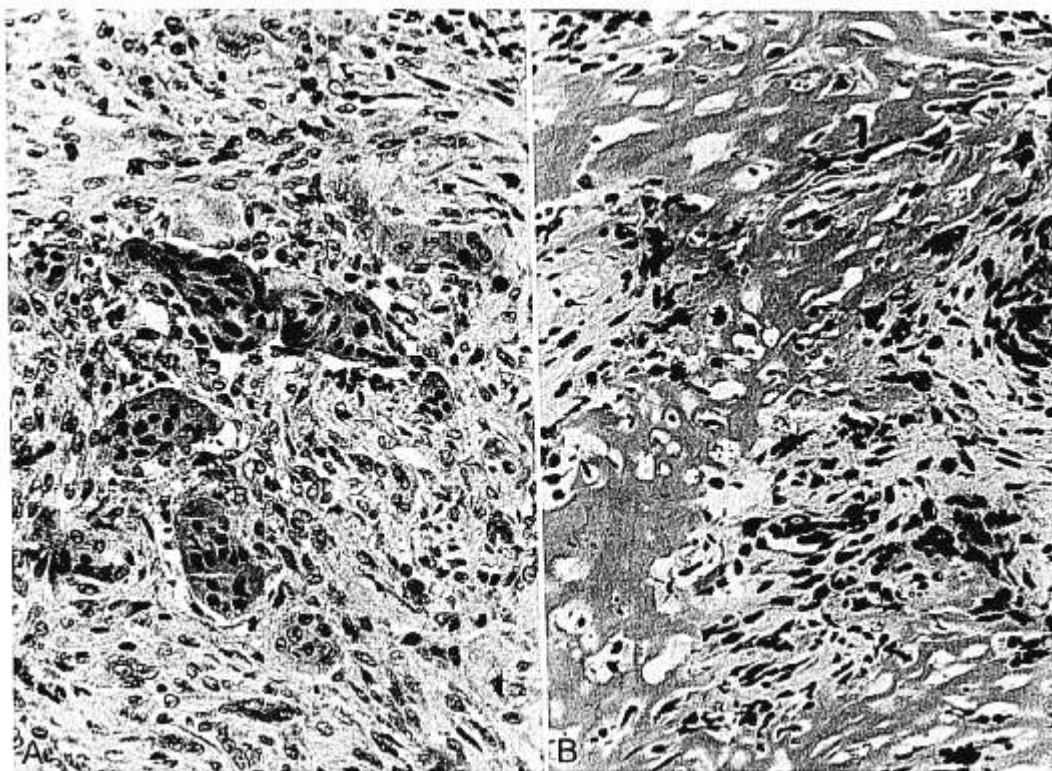
Microscopically, this tumorlike condition can be differentiated from giant cell tumor of bone by the presence of abundant osteoid and the prevalent fibrous background stroma. The stromal cells in giant cell tumors tend to be ovoid or plump spindle-shaped cells with nuclear characteristics similar to those of giant cells. In contrast, the stromal cells in giant cell reaction are dominated by spindly fibroblastic cells with an irregular distribution of multinucleated giant cells.

Localized villonodular synovitis (giant cell tumor of tendon sheath) frequently is seen in the region of small bones of the hand but usually is found adjacent to, or eroding into, bone.

On radiographs it is not seen as intrinsic bone lesions and lacks a periosteal rim.⁸

The microscopic features of a fibrous stroma with osteoid formation in a bone lesion occurring in a young adult should raise the suspicion of osteogenic sarcoma. However, the well-circumscribed, lytic lesion without evidence of prominent periosteal reaction is not the usual radiographic finding of a malignant lesion. The benign appearance of the fibrous stroma and the absence of atypical cells and mitosis should clearly differentiate osteosarcoma from giant cell reaction.

Prior to the review of Lorenzo and Dorfman,⁷ all of the reported patients did well after curettage and bone grafting.^{1,5,6,9} Lorenzo and



FIGS. 2A AND 2B. Histologic components of the lesion. (A) Giant cells within a fibrous stroma (original magnification, $\times 250$). (B) Abundant osteoid with surrounding fibrous stroma (original magnification, $\times 250$).

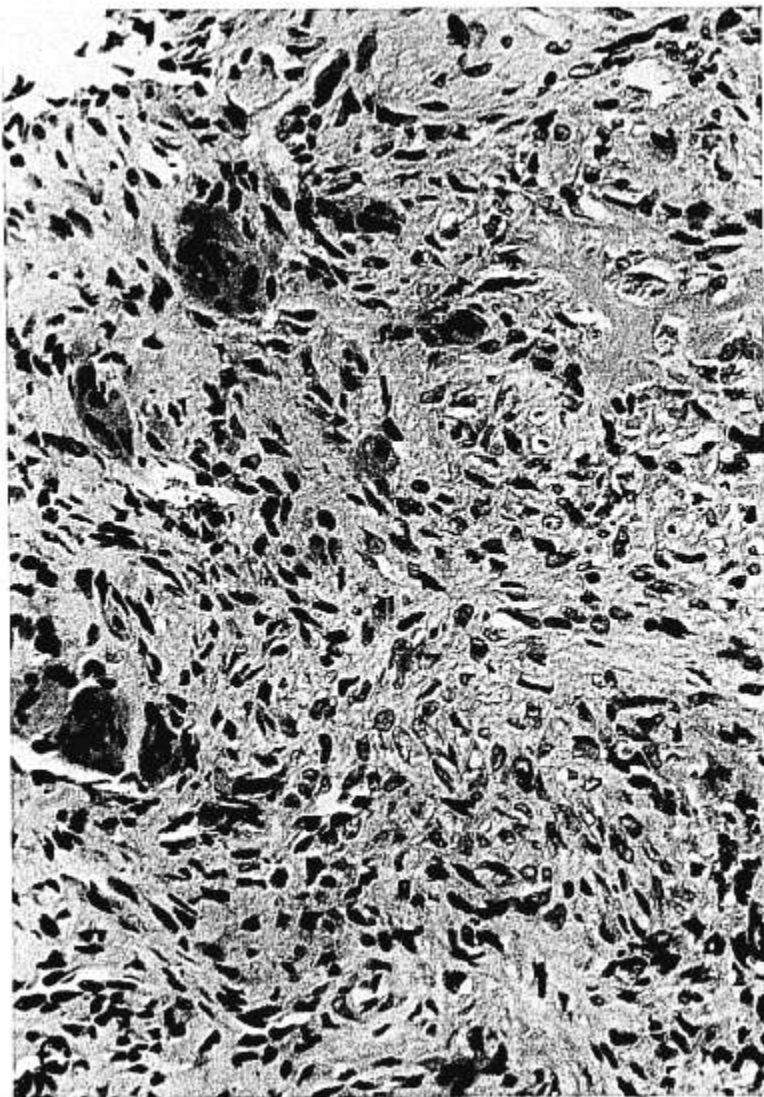
Dorfman, however, report a 50% recurrence rate occurring between six and 18 months after excision. Two of the four recurrences were treated by amputation. The aggressive nature of these four cases is in sharp contrast to the benign behavior exhibited by the tumor in the patient in this study and in all of the other previously reported cases.

With a single exception, none of the patients with lesions of the hand reported thus far, including the one reported here, relate any history of previous trauma to the affected area. Lorenzo and Dorfman⁷ reported a history of trauma in two of their eight cases, both occurring in patients with foot lesions. They postulated that giant cell reaction may represent a response to intraosseous hemorrhage.

Bertheussen *et al.*³ reported a history of mild trauma to the hand in a patient with a lesion

of the proximal phalanx. Two episodes of local recurrence and an initial diagnosis of giant cell tumor prompted amputation of the digit in this patient. Subsequently, they revised their diagnosis from giant cell tumor to giant cell reparative granuloma. The histologic features of the lesion from their patient coincide with those described in this case and in other reported lesions previously termed giant cell reactions. The synonymous use of these terms is emphasized by Caskey *et al.*⁴ in their report of the unusual occurrence of multifocal lesions in the bones of one hand. Although it is appreciated that giant cell reactions in bone can be seen following trauma, especially with concomitant vascular damage,² the conspicuous absence of previous trauma in the majority of reported cases does not offer strong support for this hypothesis.

FIG. 2C. Benign, spindle-shaped fibroblasts with giant cells and osteoid (original magnification, $\times 250$).



REFERENCES

1. Ackerman, L., and Spjut, H.: *Atlas of Tumor Pathology*, Washington, D.C., Armed Forces Institute of Pathology, 1962, p. 282.
2. Aegerter, E., and Kirkpatrick, J.: *Orthopedic Diseases*, Philadelphia, W. B. Saunders, 1968, p. 634.
3. Bertheussen, K., Holck, S., and Schiodt, T.: Giant cell lesion of bone of the hand with particular emphasis on giant cell reparative granuloma. *J. Hand Surg.* 8: 46, 1983.
4. Caskey, P. M., Wolf, M. D., and Fechner, R. E. Multicentric giant cell reparative granuloma of the small bones of the hand. *Clin. Orthop.* 193:199, 1985.
5. D'Alonzo, R., Pitcock, J., and Milford, L.: Giant cell reaction of bone. *J. Bone Joint Surg.* 54A:1267, 1972.
6. Jernstrom, P., and Stark, H.: Giant cell reaction of a metacarpal. *Am. J. Clin. Pathol.* 55:77, 1971.
7. Lorenzo, J., and Dorfman, H.: Giant cell reparative granuloma of short tubular bones of the hands and feet. *Am. J. Surg. Pathol.* 4:551, 1980.
8. Rao, S., and Vigorita, V.: Pigmented villonodular synovitis (Giant cell tumor of the tendon sheath and synovial membrane). *J. Bone Joint Surg.* 66A:76, 1984.
9. Schwinn, C.: Differential diagnosis of giant cell lesions of the bones. In Ackerman, L., and Spjut, H. (eds.): *Bone and Joint*, Baltimore, Williams and Wilkins, 1976, pp. 236-299.