Giant cell tumor of the distal phalanx: A case report

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Abstract

This report describes a giant cell tumor of the distal phalanx of the fourth digit of the right hand in a 43-year-old man. With clinically 3 months of pain and soft tissue mass on enlarged tip of the digit, the conventional radiographs showed markedly expansile, geographic osteolytic lesion, breaking of the cortex of the distal phalanx. Ultrasound represented hypoechoic lesion with contiguous soft tissue nodule. The thinning and partial destruction of bony cortices with soft tissue extension of distal phalanx was demonstrated on CT scan. Microscopy showed a lesion composed of proliferation of polygonal mononucleated stromal cells and evenly distributed multinucleated, osteoclast-like giant cells. Some area comprised a characteristic of secondary fibrous histiocytoma. We describe the clinical, radiographic, and histologic features of this benign bone tumor in a very unusual location emphasizing the differential diagnosis with giant cell reparative granuloma; a more common bony reaction in the hand.

Introduction

Giant cell tumor (GCT) of bone is a benign, locally aggressive primary bone tumor. It was characterized by a mixed proliferation of polygonal, mononuclear, spindle-shaped stromal cell, and evenly distributed multinucleated osteoclast-like giant cells. In general, the tumor is a relatively common and accounting for 4 to 9.5 percent of primary bone tumors in Caucasian.¹⁻⁹ It is more common and accounting for 20 percent of primary bone tumors in Asian populations.⁶ Unlike the majority of bone tumors, GCT affects women more commonly than men. With approximately 80 percent occurring in patients between the age of 20 and 50 years, the peak prevalence is in the third decade of life.² The lesion is typically located at the metaphysis and epiphysis of long bones, most commonly located in the distal femur, proximal tibia, and distal radius on skeletally mature patients. The involvement of the bones of the hand is very rare, especially at the distal phalanx. It is accounting only 2 to 4 percent of these cases.²,⁶,⁷,⁻⁹ The purpose of this article is to present and review literatures about the clinical presentation, imaging features, microscopic pathology, and treatment of giant cell tumor of the distal phalanx.

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Clinical summary

A 43-year-old man was examined in the out-patient unit of Orthopaedic Surgery, Thammasat Chalermprakiat Hospital with a 3-month history of painful swelling at tip of his right ring finger. He had been directly hit at this area by a hammer one year ago. Physical examination revealed that the distal portion of his right ring finger was enlarged and erythema with a 0.7 cm in diameter of soft tissue mass at radial side of the nail plate (Fig. 1-2). Other organs were revealed within normal limit. Plain radiographs in both AP and lateral view showed a massive expansile geographic lytic lesion of entire distal phalanx with suggestive of a malignant or aggressive benign bone tumor. There was a destructive lesion of cortex at distal part and the tumor extended into the soft tissue with indistinct margins (Fig. 3-4). These radiographic findings
The chest radiograph had infiltration of right upper lobe without any definite mass, accompanying with history of pulmonary tuberculosis of his mother suggestive with old pulmonary tuberculosis. Laboratory test for serum calcium, phosphorus and alkaline phosphatase levels were 9.1 (8.5-10.1) mg/dl, 3.7 (2.5-4.9) mg/dl, and 101 (50-136) U/L respectively.

Incisional biopsy at the extended soft tissue was performed following other investigations. An ultrasonography of the ring finger revealed a hypoechoic expanding lesion, cortical bone disruption, and some internal hyperechoic trabeculae. The contiguity of small soft tissue nodule and broken cortex of distal phalanx was observed (Fig. 5-6). A computed tomography (CT) scan represented a large expanding lytic lesion involving entire distal phalanx causing thinning and partial destruction of bony cortices with soft tissue extension through bony defect, no matrix ossification and periosteal reaction seen. The distal interphalangeal joint of the ring finger was relatively spared without evidence of transarticular extension (Fig. 7-8). Microscopic findings of the specimens from the biopsy showed distribution of multinucleated osteoclast-like giant cells with surrounding mononuclear cells and stromal hemorrhage. Some area comprised a spindle-shape cell in storiform pattern (Fig. 9).
Fig. 9 Scattered multinucleated giant cells on vascular background from soft tissue extension at radial aspect of nail plate. (HE x 40)

Fig. 10 Mixture of multinucleated osteoclast-like giant cells and mononuclear cells. (HE x 100)

The surgery by disarticulation of distal interphalangeal joint was performed three weeks after biopsy. Gross intraoperative findings revealed a more enlarged soft tissue mass at the tip of finger than previously last 3 weeks with representing the aggressive feature of this tumor. The cortex was markedly thinning with destruction at radial site of the distal part. The marrow was entirely replaced by tumor tissue, characteristically soft friable gray color, extended to the articular cartilage and also connected to the soft tissue mass through the broken cortex. Microscopic examination revealed sheet of round to oval polygonal or elongated mononuclear cells mixed with scattered multinucleated osteoclast-like giant cells which may contain up to 60 nuclei. The nuclei of both mononuclear and multinucleated cells appeared similar, having round to oval shape and open chromatin pattern with one or two nuclei. No atypical cell was seen. The cytoplasm was ill-defined. Mitotic figures were up to five per ten high power fields. Atypical mitosis was absent (Fig. 10). Focal areas of mononuclear cells with spindle shaped, arranged in storiform growth pattern reminiscing benign fibrous histiocytoma was identified (Fig. 11). These findings confirmed the diagnosis of giant cell tumor of distal phalanx of ring finger. One month postoperative follow-up revealed good surgical wound without clinically local recurrence of tumor.

Discussion

Giant cell tumors (GCT) of small tubular bones of hand are not common.\textsuperscript{2,5} The clinical features and radiographic appearance are non-specific. The differential diagnosis is usually based on its location and radiographic features. Lesions demonstrate geographic bone lysis, with narrow zone of transition, mostly without sclerotic rim.\textsuperscript{12} The expansile remodeling, cortical thinning and
penetration often associate with soft tissue mass. These similar appearances include the lesions of giant cell reparative granuloma, nonossifying fibroma, hyperparathyroidism (Brown tumor), aneurysmal bone cyst, and chondroblastoma. The chondroblastic pattern of chondroblastoma is the marker to distinguish from others. Serum level of calcium, phosphorus, and parathyroid hormone has been used to diagnose of hyperparathyroidism. The non-solid appearance by ultrasonography and CT scan can markedly represent aneurysmal bone cyst, but the solid variant of aneurysmal bone cyst is more difficult to rule out. There is no difference between solid variant of aneurysmal bone cyst and giant cell reparative granuloma, but the term "solid variant" is used in the lesion of axial skeleton. Nonossifying fibroma usually occurs in the long bone of lower extremities.

Giant cell reparative granuloma (GCRG) is rather a reactive process, not true neoplasm, mostly occurs in the mandible and maxilla. The involvement of GCRG in small bone of hands and feet is the second most common. The age groups are 2nd and 3rd decade of life, which younger than GCT. Even clinical and radiographic features of GCRG and GCT are not dissimilar, the histological findings are distinguishable and seem to be the main means of differentiating GCRG from GCT.

This case presented with painful swelling of the tip of ring finger of right hand for 3 months. The clinical and radiographic appearances suggestively showed aggressive lesions, invading bony cortex and to the adjacent soft tissue. According to clinical and radiographic grading systems by Campanacci10 and Enneking,11 we could classify this lesion as a stage 3 benign bone tumor. The ultrasonographic findings revealed a solid mass in the phalanx contiguous with the outside soft tissue. As this case, CT scan allowed more reliable staging with identifying bony defect and soft tissue extension.

Microscopic features represented a characteristic of GCT of bone rather than GCRG. The dense homogeneous evenly distribution of multinucleated osteoclast–like giant cell, surrounding with similarly mononuclear stromal cells could differentiate GCT from cluster of multinucleated giant cell with storiform-pattern spindle-shaped cells of GCRG. Some area of specimens that comprised more spindle-shaped cells with hemorrhage could be defined as a secondary fibrous histiocytoma differentiation. The mitoses in this GCT were usually not found in GCRG. The absent of atypical cells represented non-malignancy and suggested the diagnosis of an aggressive benign giant cell tumor of distal phalanx. With high recurrent rate after curettage of GCT from previous reports,16 accompanying with aggressive clinical (recurrent of more enlarged mass in three weeks) and imaging appearances especially the intraoperative contour of bony cortex, the resection of entire distal phalanx was obtained.

The giant cell tumor of distal phalanx is very uncommon. Even clinical and imaging appearances are non-specific, the characterizations of microscopic features are obligatory for diagnosis and appropriate treatment.

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References


บทความ

เนื่องจากมีผลต่อสุขภาพทั่วสาระของทางดุกปากน้ำ

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รายงานผลการศึกษาได้รวบรวมเบื้องต้นเกี่ยวกับผลของการพยากรณ์ของทางดุกปากน้ำในกลุ่มผู้ป่วยอายุ 60 ปี ซึ่งมีพยากรณ์ที่ผ่านการประมวลผลและมีก่อนหน้านี้ที่มาจากรายวิวาระของผู้ป่วยว่า ผ่าน 3 เดือน ภาพเริ่มสัมผัสกับอย่างมากทำให้สามารถตรวจสอบได้ในผู้ที่มีแนวโน้มที่จะเกิดปัญหา ประชากรในกลุ่มผู้ป่วยนั้นจากภาพพยากรณ์ที่ตามพยากรณ์นี้ ซึ่งเน้นได้รับการตรวจทางทางประสาท พบว่าผลจากพยากรณ์มีลักษณะของเนื้อสัมผัสที่เหมาะสม

รายงานผลนี้ได้บรรยายถึงผลและจากทางคลินิก ทางวิทยา การแบบวิจัย รวมถึงการพยากรณ์การพยากรณ์ของการพยากรณ์ที่เนื้อสัมผัสของเนื้อเยื่อที่ที่ตามพยากรณ์ที่กล่าวว่าเพื่อเป้าหมายที่ผู้ที่ได้รับเนื้อเยื่อ