Giant cell tumor (GCT), also known as osteoclastoma, is a locally aggressive benign tumor arising in the epiphysis of bone. It accounts for 3%–8% of all bone tumors. About 75%–90% of GCTs occur in long tubular bones with more than 50% arising in the distal femur and proximal tibia. Flat bone involvements such as ribs, skull, patella, sternum, and clavicle are rare. Sixty–seventy percent of patients with GCT are between 20 and 40 years of age, rarely affecting too young or too old. We present here an unusual case of GCT of the clavicle in a 62-year-old female.

Keywords: Bone tumors, clavicle, giant cell tumor, osteoclastoma

Introduction
Giant cell tumor (GCT), also known as osteoclastoma, is a locally aggressive benign tumor arising in the epiphysis of bone. It accounts for 3%–8% of all bone tumors. About 75%–90% of GCT occur in long tubular bones with more than 50% arising in the distal femur and proximal tibia.[1] Flat bone involvements such as ribs, skull, patella, sternum and clavicle are rare.[2] GCT usually occurs after completion of maturation of the skeleton.[3] Sixty–seventy percent of patients with GCT are between 20 and 40 years of age, rarely affecting too young or too old.[8] We present here a case of GCT of the clavicle in an elderly female.

Case Report
A 62-year-old female presented with the complaints of pain and swelling over the right side of the upper chest for the past 1 year. There was no history of fever, loss of appetite, loss of weight, or tuberculosis. On examination, the swelling was firm, nontender, and fixed to underlying bone. X-ray showed an expansile sclerolytic lesion involving medial end of the right clavicle with associated cortical destruction. No obvious perilesional soft tissue component was seen. Adjacent ribs appeared normal. Likely mass of malignant origin, possibilities considered were chondrosarcoma, osteosarcoma, or myeloma [Figure 1a]. Fine needle aspiration cytology smears were cellular, composed of cells predominantly in sheets, clusters, and few singly scattered. Cells were round to oval, with moderate amount of cytoplasm, round-to-oval nucleus, and inconspicuous nucleoli. Pleomorphism was mild. Many multinucleated giant cells containing 20–100 nuclei were present, abutting the clusters of mononuclear cells as well scattered throughout the smear. Their nuclei were similar in morphology to that of mononuclear cells. Metachromatic material implicating osteoid or chondroid formation was not seen. No necrosis or mitosis was seen. Features were suggestive of a benign giant cell-rich lesion of bone possibly aneurysmal bone cyst or GCT [Figure 1b]. Preoperative magnetic resonance imaging could not be done due to limitation of resources. Partial right clavicectomy was done. Grossly, tumor measuring 6.5 × 6.5 × 4.5 cm was solid, firm-hard, and reddish brown in color [Figure 1c]. Histopathology sections showed a tumor composed of uniformly distributed osteoclastic giant cells interspersed with mononuclear stromal cells. Both types of cells had similar round-to-oval nuclei with vesicular chromatin and inconspicuous nucleoli [Figure 1d]. There was mild pleomorphism with no areas of hemorrhage or necrosis. Margins were free of tumor. A diagnosis of GCT, medial end...
of the right clavicle, was rendered. On follow-up for 1 year, no recurrence or metastasis was noted.

**Discussion**

Clavicle is a rare site for bone tumors accounting for about 0.45%–1% of all tumors. The oncologic properties of tumors of clavicle closely resemble that of flat bones than long bones with metastatic tumors more common than primary tumors. Among primary, tumors are more likely to be malignant than benign. GCT is a locally aggressive benign bone tumor, which usually affects young adults in their third to fourth decades of life. Patients older than 55 years of age very rarely develop GCT. Majority of the reported cases are located in long bones and only a few occurring in unusual locations.

GCT of the clavicle is rare with only 15 cases reported in literature in the last 40 years [3,4,6-15] [Table 1]. Out of these, 7/15 were male and 8/15 were female. Eight were present on the lateral end, while 7 were present on the medial end of clavicle. Six were present in <20 years of age, 6/15 in 20–49 years of age, and 3/15 in ≥60 years of age. Out of these three, two were a known case of polyostotic Paget’s disease for many years and developed GCT at 79 years of age [6,14]. On postsurgical resection, there was no recurrence or metastasis over 1 year of follow-up in these three cases. [6,12,14]

**Table 1: Characteristics of patients with giant cell tumor clavicle reported in the literature (1980-2020)**

| Year published | Author | Age/sex | SITE | Treatment | Follow up- metastasis and recurrence | Comments |
|----------------|--------|---------|------|-----------|-----------------------------------|----------|
| 1981           | Nusbacher et al. [14] | 79/male | Left medial end | Open biopsy | No | Known case of polyostotic Paget’s disease for many years |
| 1988           | Smith et al. [6] | 79/male | Medial end | - | - | Known case of polyostotic Paget’s disease for many years |
| 1989           | Friedman et al. [7] | 42/female | Left lateral end | Wide excision | No | - |
| 1989           | Friedman et al. [7] | 34/female | Right lateral end | Wide excision | No | - |
| 1989           | Beg et al. [9] | 25/female | Left medial end | Wide excision | No | - |
| 2007           | Puri et al. [9] | 14/female | Medial end | Intralesional curettage | - | Solitary pulmonary nodule 1-year post surgery. Managed conservatively due to constant size |
| 2013           | Bajpai et al. [15] | 30/male | Left lateral end | Wide excision | No | - |
| 2014           | Vaibhav et al. [10] | 18/male | Right lateral end | Wide excision and reconstruction with fibular graft | No | - |
| 2015           | Nagano et al. [11] | 54/male | Right medial end | Wide excision | No | - |
| 2016           | Khatri et al. [12] | 60/male | Left lateral end | Wide excision | No | - |
| 2016           | Strom et al. [13] | 4/female | Medial end | Curettage+cement | No | - |
| 2016           | Strom et al. [13] | 6/male | Lateral end | Curettage+cement | No | - |
| 2016           | Strom et al. [13] | 10/female | Lateral end | Curettage+cement | No | - |
| 2017           | Akinsdife et al. [14] | 28/female | Left medial end | Wide excision and reconstruction with fibular graft | No | - |
| 2020           | Kumar et al. [15] | 8/female | Right lateral end | Wide excision | No | - |
| Present case   | Garg et al. | 62/female | Right medial end | Right partial claviculectomy | No | - |
McCarthy and Weber reported that the behavior of GCT in the elderly patients is similar to lesions occurring in younger patients in terms of location of tumor, radiographic features, and clinical course. However, tumors in older age group may have less aggressive course on account of lack of recurrences as compared to younger patients.\[^5\]

Although there is a list of differential diagnosis of GCT of bone, unusual location (clavicle) and elderly age group narrows it down to metastatic carcinoma, osteoarthritic cyst, pigmented villonodular synovitis, osteosarcoma, and brown tumor of hyperparathyroidism.\[^2,5\] GCT is a rare complication of Paget’s disease, a chronic bone disorder of elderly commonly affecting clavicle. Therefore, any elderly patient with GCT should be studied for the possibility of Paget’s disease too.\[^5\]

To conclude, clavicle is a rare site for bone tumors and shares its oncologic properties to that of flat bones than long bones. GCT of the clavicle in the elderly patients has been rarely reported. It has a similar biologic behavior to lesions in younger patients.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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