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Pathologic fractures on benign tumors (a retrospective analysis of 25 cases)

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ABSTRACT

The Pathologic fractures usually occur during normal activity or minor trauma due to weakening of the bone by disease .The clinical features was minor injury force, spontaneous fracture, and functional fracture. These fractures occurred in giant cell tumors, chondroma, solitary fibrous tumor of bone, aneurismal cyst, fibroma desmoplastic, fibrous dysplasis, osteoid osteoma in patients with no story of trauma. The surgical treatment consisted to curette the tumor bone and the fixation was made by different materials (nails, pins, blade plates) followed by cancellous grafting or resection-reconstruction. Six months later, we noted only one case of recurrence in giant cell tumor of the knee and was amputed. All patients were consolidated and the functional long term prognosis was excellent after physiotherapy

Introduction

Unlike fractures of normal bone, Pathologic fractures usually occur during normal activity or minor trauma due to weakening of the bone by disease (1). They are a mode of revelation of bone tumors and metastatic skeletal lesions. Conditions associated with pathologic fractures include underlying metabolic disorders, primary benign tumors and primary and metastatic malignant tumors(2) The pathologic fractures create a serious morbidity in patient with tumors .Some pathologic fractures require the same treatment as a normal fracture, while others may require highly specialized care. Orthopedic surgeon who treat these fractures should focus on proactive treatments designed to prevent pathologic fractures before their occur .In this study, we reviewed the age, fracture locations, the fracture forces The purpose of this retrospective study is to evaluate the clinical features of pathologic fractures on the benign bone tumors.

Materials and methods

Our study is a retrospective analysis of 25 cases of adult patients with pathologic fractures collected between May 2011 and May 2013 in Orthopedic and traumatology department of Ibn sina hospital. 10 men and 15 women aged 15 to 60(mean, 40) The fractures were classified into seven groups :giant cell tumors(10), chondroma(6), solitary fibrous tumor of bone(4) ,aneurismal bone cyst(2), fibroma desmoplastic(1), fibrous dysplasis(1), osteoid osteoma(1).Based on their inducing force, pathologic fractures were classified into four grades: spontaneous fracture, functional fracture, traumatic injury, minor injury. Patient's age, fracture site, histological diagnoses were well reviewed. The common site of fracture were: proximal Femur(12), proximal tibia(4),proximal Fibula(1) ,distal radius (5), Humerus (2). The mean follow-up period was 24 months and the mean bone defect was 4.5 cm (range: 3.5 to 6cm) the average age is 40 years. The female predominance is clear with 64% women.

Clinical study

The pathologic fracture occurs suddenly and reveals the tumor process in 90%. The clinical signs are same that the fracture on a normal bone: total impotence of the member, Painful intensity went trying to move the member. Radiological views visualize the fracture line on lytic image or condensing (osteoid osteoma) and mixed in some cases. In cases of giant cell tumor or aneurismal bone cyst, soft tissue invasion can be find. The clinical features were minor injury force, spontaneous fracture, functional fracture, and traumatic injury. These fractures occurred in patients with no story of trauma and when they turned over body in bed or sit up or when they were taking functional activities such us moving the chair.

Sites:

- In the lower limbs: 18 cases with 72% (Femur: 12 cases, Tibia: 4 cases, Fibula: 1 and phalange:1).- In the upper limbs: 7 cases with 28% (hand:5 cases, Humerus:2).Based

Treatment:

Of the knee was performed in one patient with a tumor giant cell near the knee and one patient with chondroma on the distal phalange was resected.

Results

Our results are satisfactory, six months later; we noted only one case of recurrence in giant cell tumor of the knee and was amputed. All patients were consolidated and the functional long term prognosis was excellent after physiotherapy.

Discussion:

Pathologic fractures usually occur during normal activity or minor trauma due to weakening of the bone by disease (1). They are a mode of revelation of bone tumors and metastatic skeletal lesions. When these fractures occur on tumor the treatment can not be in a similar fashion to that non pathologic fracture. These fractures can be occurred early or late depending on the nature and type of the tumor. Based on age distribution of pathological fractures in our study ranged from 15 to 60 years. There were 11/25 pathological fractures in the 15-20 year group with incidence fracture rate 44% which is highest among all age

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group. Feng at al(3) reviewed 4327 cases of bone tumors and they found that tumor-like had the highest incidence fracture rate in 11-20 year group. The possible reasons might be that some lesions are prone to fracture in this age group such us bone cyst, fibrous dysplasia and osteosarcoma (4) .On the seat of the fracture, we observed a predominance of chondromas at the hand (83.5%) whereas usually this location does not exceed 50% (2).The fracture often reveals chondroma based on the size and low bone mass of these small bones. Meanwhile, in agreement with literature data or 65% of solitary bone cysts are seated at the proximal metaphysis of the humerus (5), in this seat 4 cases that we have identified.

Six years later, we have noted 1 case of recurrence occurred at 6 months after treatment of giant cell tumor of the knee. For these tumors, the recurrences are observed in 2 or 3 postoperative years (6,7). The number reported in the literature is around 30% (7). They are more related to the type of conservative treatment or not as the radiological and histological appearance of the tumor (6, 7).

Tomeno reported no recurrence rate: 0% after excision or amputation. It can reach 25 to 40% after curettage and cancellous grafting. Surgical treatment for these tumors is recommended however, its debatably for aneurysmal bone cyst (7,8). Some authors recommended to operate this tumor in humeral seat when displacement fracture is large (9), when it located in the femur on zone cervical with a risk of cephalic necrosis it must operate (10). When the size exceeding 1/8th of the affected bone is also an element of decision (9). Moreover, the presence of a benign tumor regardless of its nature does not seem to influence the evolution of the fracture or its period of consolidation (1).

Based on the results and theoretical considerations, the treatment of the tumor should not be changed completely by the fracture: The choice between conservative treatment, curettage-grafting, resection and reconstruction depends on the displacement of the fracture, the seat, the nature of the tumor (1) and local recurrence (2).

Conclusion:

Pathological fractures reveal a benign bone tumor. It is imperative to know the exact nature and to determine the clinical and radiological features of pathologic fractures on the benign bone tumors profile of the tumor for to indicate the surgical biopsy. It’s not on bone cysts. Essential for small or aneurismal bone cysts, treatment depends on the usual parameters of fracture. In other cases, curettage, biopsy and grafting can be made. For giant cell tumors and other benign risk tumors, the resection and reconstruction should be considered.

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