Giant Cell Tumor Of Bones: A Systemic Review Of Literature

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Introduction

Giant cell tumour (GCT) of bone, or osteoclastoma, is classically described as a locally invasive tumour that occurs close to the joint of a mature bone. It makes 5 to 7% of primary bone tumours according to available literature. It usually occurs around the knee joint and distal radius with incidence of about 75%. It is generally considered to be a benign tumour. The incidence of bone GCT also varies depending on the reporting centre. It involves predominately males in age group of 20 to 40 years after physeal closure. Treatment options include curettage of tumour through a bone window with autologous bone grafting or cementing to fill the gap wherever possible. The reconstruction of the bone defect following wide excision is done depending on site of lesion.

Review

Etiopathogenesis and incidence

Giant cell tumor is described as neoplasm of undifferentiated mesenchymal stromal cells with presence of abundant, multinucleated giant cells. It is a benign aggressive tumor which involves the epiphysis and metaphysis of the long bones. Giant cell tumour has a tendency for local aggressiveness and high chances of recurrence. Giant cell tumors are named for the way they look under the microscope. Many "giant cells" are seen. They are formed by fusion of several individual cells into a single, larger complex. Many bone tumors and other conditions (including normal bone) contain giant cells. Giant cell tumor of bone is given its characteristic appearance by the constant finding of a large number of these cells existing in a typical background.

Most bone tumors occur in the flared portion near the ends of long bone (metaphysis), but giant cell tumor of bone occurs almost exclusively in the end portion of long bones next to the joints (epiphysis). Giant cell tumor of bone most frequently occurs around the knee joint in the lower end of the femur or the upper end of the tibia. The most common localization is the distal femur and proximal tibia in 55% to 60% of all the cases, the distal radius is the next place in 10%. Other common locations include the proximal femur and proximal humerus. It is characterized by local aggressive behaviour and frequent recurrence.

Clinico-radiological diagnosis

The clinical picture is that of insidious onset pain. The pain and swelling usually occurs simultaneously in comparison to malignant tumors where pain is the only presenting symptom initially. A history of preceding trivial trauma may be present. The swelling is firm to hard in consistency and gives the feeling of egg shell cracking. Other features are non specific. Radiologically, the tumour appears as an eccentric lytic lesion with cortical thinning and expansion. There is absence of reactive new bone formation. The tumour may erode the cortex and invade the joint. Pathological fracture may also be seen. CT scanning permits accurate delineation of the tumour extent and helps in deciding the line of management.

Histopathology and Treatment

General treatment regimens have not changed much in the past 30 years, in part due to the lack of randomized clinical trials. Several treatment strategies have been developed for GCT, including surgery, radiotherapy, embolization, cryosurgery, cementation, and chemical adjuvant such as phenol or liquid nitrogen. Surgical management remains the mainstay of the treatment processes. When using the Campanacci or Enneking grading system, the higher the radiographic grading, the more radical surgery. Eckardt and Grogan have recommended intralesional curettage with adjuvant therapy for stage I and II lesions and en bloc resection for stage III lesions.

GCT is mostly a true neoplastic condition with well-defined clinical, radiological and histopathological features. Radiologically, it is usually lytic and expansile without prominent peripheral sclerosis and peristomal reaction. Some pathologists consider it a low grade or potentially malignant neoplasm. The tumor is locally aggressive and destructive, and it tends to recur after simple curettage. In addition to The histopathology of GCT is characterized by frank and marked hemorrhage, numerous giant cells and stromal cells. The hemorrhage gives rise to the characteristic grossly lytic picture. Many workers have totally ignored this component and did not emphasize the role of multinucleated giant cells in the removal of hemorrhage although such is observed in different pathological lesions such as adenomatous goiter,
brown tumor of hyperparathyroidism and giant cells in reparative granulomas. The giant cells are considered reactive while stromal cells are considered “true” neoplastic cells. There had been a lot of debate about the origin of both types of cells. There is now agreement that giant cells are circulating monocytes in origin which have converted into osteoclasts after acquiring some unique features and gene expressions in osseous environment. These conclusions are based on various light, ultrastructural and immunological markers7,13. Giant cells have the characteristic features of several mycobacterial, fungal and parasitic diseases as well as sarcoidosis and foreign bodies. Several non-infectious and non-granulomatous pathological lesions other than GCTB also contain large number of giant cells; most if not all of these are considered reactive rather than neoplastic14,15. Giant cell tumor of the bone is rich in RANK Ligand positive cells, which results in giant osteoclasts that destroy the bone locally.16,17.

Surgery is the treatment of choice if the tumour is determined to be resectable. Curettage is a commonly used technique5,16. The situation is complicated in a patient with a pathological fracture. It may be best to immobilize the affected limb and wait for the fracture to heal before performing surgery. Many authors have reported satisfactory results with intralesional curettage and bone grafting. However, curettage alone has a high rate of recurrence and adjuvants like Methylmethacrylate (bone cement), Cryotherapy and Phenol have been suggested. Various reconstructive procedures have been mentioned in literature. Arthrodesis of the joint is also an alternative option, but considering the young age and level of activity, allograft reconstruction is attractive option.

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