Treatment of Aggressive Giant Cell Tumor: Intralesional Curettage VS Resection Endoprothesis

A Systematic Review/Meta Analysis

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بسم الله الرحمن الرحيم
قالوا
سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم
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List of Abbreviations

Abb.	Full term
ABC	*Aneurysmal Bone Cyst*
EC	*Extended Curettage*
GCT	*Giant Cell Tumors*
MSTS	*Musculoskeletal Tumor Society*
RANK k-B	*Receptor Activator of Nuclear Factor k-B*
RANK-L	*Receptor Activator of Nuclear Factor Ligand*
SPSS	*Statistical Package for Social Science*
SR	*Segmental Resection*

Introduction

Giant cell tumors (GCT) are benign tumors that may have aggressive behavior, it is usually found peri-articular, (Distal femur, proximal tibia, distal radius) with unclear pathogenesis[1,2,3].

GCT has high recurrence rate as regard of being benign tumor with small percentage of metastasis up to 9% [1,2].

GCT is usually presented with pain and limited range of motion due to close proximity to the joints with 12% of patients presented at first by pathological fracture [4,5], presentation with a pathological fracture is thought to indicate more aggressive disease with a high risk of local recurrence and metastatic spread [5,6,7].

It is usually treated surgically with intralesional curettage being the preferred modality to preserve the anatomy of the bone bearing in mind the young age of affected group [8,9,10].

Various studies suggest that wide resection is associated with a decreased risk of local recurrence when compared with intralesional curettage and may increase the recurrence free interval rate from 84% to 100% [6,11,12,13].

However, wide resection is associated with higher rates of surgical complications and lead to functional impairment, generally necessitating reconstruction [13,14,15,16].

GCT is considered aggressive when possessing the following features: wide zone of transition, cortical thinning, expansile remodeling, or even cortical bone destruction, with an associated soft-tissue mass.

Additionally, it may also contain free-fluid levels due to secondary ABC formation which may occur in up to 14% cases of bone GCT. It may be differentiated from the primary ABC by the presence of an enhancing soft tissue component.

Aim of the Work

To evaluate advantages and disadvantages of the two major modalities in treatment of giant cell tumor (intralesional curettage, resection and replacement with endoprothesis).

Review of Literature

Epidemiology:

GCT represents around 4-5% of all primary bone tumors and approximately 20% of benign primary bone tumors. the peak incidence is between the ages of 20 to 45.

It's rarely seen in immature individuals and children below 10 years with no race or geographic difference [17].

GCT is usually solitary lesion with very low incidence of being multicenteric.

Pulmonary metastasis is a rare complication that spontaneously regress or remain asymptomatic for years.

Patients with recurrent lesions or primary lesion with aggressive behavior (campanacci III) are at high risk of pulmonary metastasis.

Giant cell tumor usually occurs de novo but also may occur as a rare complication of Paget disease of the bone. The incidence is increased in patients with Paget disease of the bone, in which giant cell tumor is a rare neoplastic complication. Giant cell tumor is a rare complication compared with Paget sarcoma, which has an incidence of sarcomatous change of <5%.

A slight female predominance is noted; approximately 50-57% of cases involve female patients. Vertebral tumors tend to occur in younger patients; 29% of these tumors occur in those aged 10-20 years [18].

Sites of involvement:

Giant cell tumors typically affect the ends of long bones, especially the distal femur, proximal tibia, distal radius and proximal humerus. Around 5% affect flat bones, especially those of the pelvis. The sacrum is the commonest site in the axial skeleton, while other vertebral bodies are less often involved. Fewer than 5% of cases affect the tubular bones of the hands and feet [17].

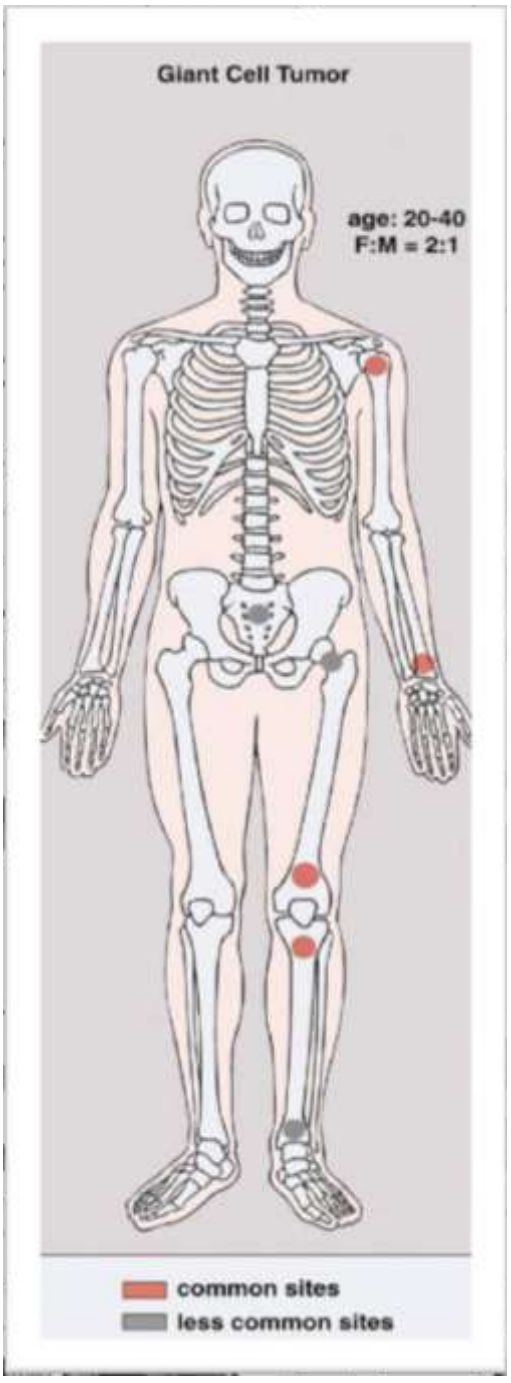

Figure (1): Giant cell tumor. [17]

Clinical features of GCT:

The clinical behavior of GCTs ranges from latent, non active tumors to locally aggressive tumors with destruction of the cortex and soft tissue extension. The clinical course of a GCT often is complicated by the tumor's tendency toward local recurrence. Depending on the type of treatment and the local presentation of the tumor, recurrence rates of a primary GCT range from 0% to 65%. Despite their generally benign nature, GCTs are able to seed lung metastases. The frequency of lung metastases ranges from 2% to 5% and the risk for development of lung metastases seems to be associated with local recurrence. In rare occasions, patients can have lung metastases with fatal progression [19].

The main clinical symptoms are non-specific, local swelling, warmth, and pain radiating independently of weight-bearing. Pathological fracture is the first sign in approximately 15% of cases. The duration of symptoms varies between two to six months and by then, in one-third of cases, the size of the tumor exceeds 50% of the diameter of the affected bone, it has destroyed the cortical bone and reached the subchondral region [20].

Pathogenesis:

Three types of cells are found in benign GCT of bone [21, 22]. Type I cells look like interstitial fibroblasts, make collagen, and have the capacity to proliferate. This cell is likely the tumor component of GCT. Type I cells share some features of mesenchymal stem cells, they possess features that suggest they could represent an early differentiation into osteoblasts [21, 22, 23].