

Case Report: A Rare Huge Giant Cell Tumor of the Proximal Tibia

Bingxin Zheng

The Affiliated Hospital of Qingdao University

Lingling Sun

The Affiliated Hospital of Qingdao University

Guojian Qu

The Affiliated Hospital of Qingdao University

Chongmin Ren

The Affiliated Hospital of Qingdao University

Peng Yan

The Affiliated Hospital of Qingdao University

Bin Yue (✉ bonetumor0532@163.com)

The Affiliated Hospital of Qingdao University

Case Report

Keywords: Giant cell tumor of bone, Amputation, Proximal tibia

Posted Date: June 14th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-606935/v1>

License:   This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Giant cell tumor of bone is a common primary borderline bone tumor, while giant cell tumor of bone in the extremities are generally not very large. Because most tumors have already been controlled by some treatments at the time of pain or finding the tumor. Huge giant cell tumors of bone in the limbs are very rare.

Case presentation: We describe a case of a huge giant cell tumor of the proximal tibia with 6-year history and not receiving any treatment. It is not until the rupture and bleeding appeared that the patient is referred to the doctor, and amputation is the only treatment.

Conclusions: This report suggests that although giant cell tumor of bone is a borderline tumor, early diagnosis and treatment are essential in order to improve patient prognosis.

Background

Giant cell tumor of bone (GCTB) is a common primary borderline bone tumor, accounting for about 5% of all primary bone tumors[1]. It generally involves the metaphysis of long bones, and is locally aggressive, osteolytic and often accompanied by pain. Metastasis occurs in about 5% of cases, mostly to the lung. Some giant cell tumors of the sacrum and pelvis are found to be relatively large because the pelvis and sacrum tumors can be asymptomatic in the early stages, and only when the tumor volume reaches a certain level, the patient will show symptoms [2]. However, giant cell tumors of bone in the extremities are often not very large at the time of diagnosis, even in patients with Campanacci stage I. Here we present a rare case of a huge giant cell tumor of the proximal tibia.

Case Presentation

A 65 years old female patient found her right leg with local mass 6 years ago and attended in a local hospital, diagnosed as "giant cell tumors of bone", but the patient refused any treatment. The patient's tumor developed progressively during the past 6 years, and now it has grown to the size of a basketball. The tumor collapsed 15 hours ago with oozing blood and exudate, and the skin temperature of the right lower limb increased and the swelling was serious. Therefore, she went to the emergency department of our hospital and was treated with local bandage and hemostasis. Blood test results showed that hemoglobin 65g/L and albumin 27g/L. Since the onset of the disease, the patient's spirit is poor, with poor diet and poor sleep, and weight loss is obvious.

The three-dimensional computed tomography (CT) examination of the patient's tibia and fibula indicated bone destruction at the upper end of the right tibia, considering the high possibility of giant cell tumor of bone involving the fibula head. Chest CT showed multiple small nodules in the left lung, the largest of which was about 4mm in diameter, with clear boundaries.

Considering that the tumor of the patient's knee joint was huge in size, encroaching on blood vessels and nerves, and the skin was broken, so the condition of limb salvage was not available, we decided to perform emergency surgery for amputation. The amputation operation was successful and the patient recovered well. Postoperative pathological results indicated giant cell tumor of bone with positive H3.3G34W immunohistochemical staining. The patient recovered well after operation and was able to perform daily activities with prosthetic limbs.

Discussion And Conclusions

As a common bone tumor, the combination of clinical manifestations, imaging examination and pathology is the main diagnostic basis of GCTB, and surgical treatment is still its first choice. Campanacci stage is the key factor affecting the recurrence, and appropriate surgical procedures should be selected according to different Campanacci stages. The criteria of Campanacci stage are as follows: stage I, the tumor does not involve the bone cortex; stage II, the tumor invades the bone cortex but does not penetrate the cortex. stage III, the tumor penetrates bone and extends into soft tissue [3]. The higher Campanacci stage and the smaller mean area of subchondral bone, the more inclined surgical method is extensive excision and prosthesis reconstruction, otherwise, the curettage of the lesion should be chosen as far as possible.

For giant cell tumors of the pelvis, sacrum and spine, neoadjuvant therapy with denosumab is required in most cases due to the large size of the tumor at the time of diagnosis and its proximity to important organs and tissues. Denosumab can inhibit osteoclast, promotes new bone formation, and harden the boundary of lesion [4–5]. Preoperative denosumab neoadjuvant therapy can effectively reduce the tumor volume, make the tumor boundary clearer, reduce the blood supply to the lesion site, reduce the difficulty of surgery, and thus reduce the tumor staging and recurrence rate [6].

Sometimes GCTB near the articular surface also be treated with denosumab neoadjuvant therapy in order to preserve the articular surface as much as possible. Unlike the pelvis and sacrum, GCTB in the extremities are generally not very large because most tumors have already been controlled by surgery or other treatment at the time of pain or finding the mass.

The patient in this case had a rare large tumor that broke through the bone cortex and involved surrounding soft tissues, joint cavities, and fibular head. Due to the invasion of blood vessels, nerves and skin ulceration, the limb was not equipped with the condition of limb salvage. Preoperative chest CT showed multiple small nodules in the left lung, the largest of which was about 4mm in diameter. The postoperation positron emission tomography-computed tomography (PET-CT) indicated small nodules in the upper lobe of left lung and the lower lobe of right lung with no metabolism. The lung is the target organ for distant metastasis of GCTB. In this case, the onset time of this patient was long and the tumor volume was large, so special attention should be paid to the lung in the follow-up.

Abbreviations

GCTB
Giant Cell Tumor of Bone
CT
Computed Tomography
PET-CT
Positron Emission Tomography-Computed Tomography

Declarations

Ethics approval and consent to participate

This case report was approved by the Ethics Committee of the Affiliated Hospital of Qingdao University. Written informed consent was obtained from the patient for publication.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any relevant images.

Availability of data and materials

The data regarding the findings are available within the manuscript.

Competing interests

The authors declare that they have no competing interests.

Funding

This project was supported by the Medjaden Academy & Research Foundation for Young Scientists (Grant No. MJR20211114). The funder did not partake in any steps of the study from study design to manuscript preparation.

Authors' contributions

Resources: Sun Lingling, Chongmin Ren, Peng Yan, Writing – original draft: Bingxin Zheng, Guojian Qu. Writing – review & editing: Bingxin Zheng, Bin Yue. All the authors have read and approved the final manuscript.

Acknowledgements

Not applicable

References

1. Rădulescu R, Bădilă A, Nuțiu O, Manolescu R, Ciobanu T, Sajin M, et al. Giant-cell tumor of the bone (GCTOB): clinical case. *Rom J Morphol Embryol*. 2013;54:433–6.
2. Ji T, Yang Y, Wang Y, Sun K, Guo W. Combining of serial embolization and denosumab for large sacropelvic giant cell tumor: Case report of 3 cases. *Medicine*. 2017;96:e7799.
3. Campanacci M, Baldini N, Boriani S, Sudanese A. Giant-cell tumor of bone. *J Bone Joint Surg Am*. 1987;69:106–14.
4. Mak IW, Evaniew N, Popovic S, Tozer R, Ghert M. A Translational Study of the Neoplastic Cells of Giant Cell Tumor of Bone Following Neoadjuvant Denosumab. *J Bone Joint Surg Am*. 2014;96:e127.
5. Thomas D, Henshaw R, Skubitz K, Chawla S, Staddon A, Blay JY, et al. Denosumab in patients with giant-cell tumour of bone: an open-label, phase 2 study. *Lancet Oncol*. 2010;11:275–80.
6. van der Heijden L, van de Sande MA, Hogendoorn PC, Gelderblom H, Dijkstra PD. Neoadjuvant denosumab for extensive giant cell tumor in os ischium: a case report. *Acta Orthop*. 2015;86:393–5.

Figures

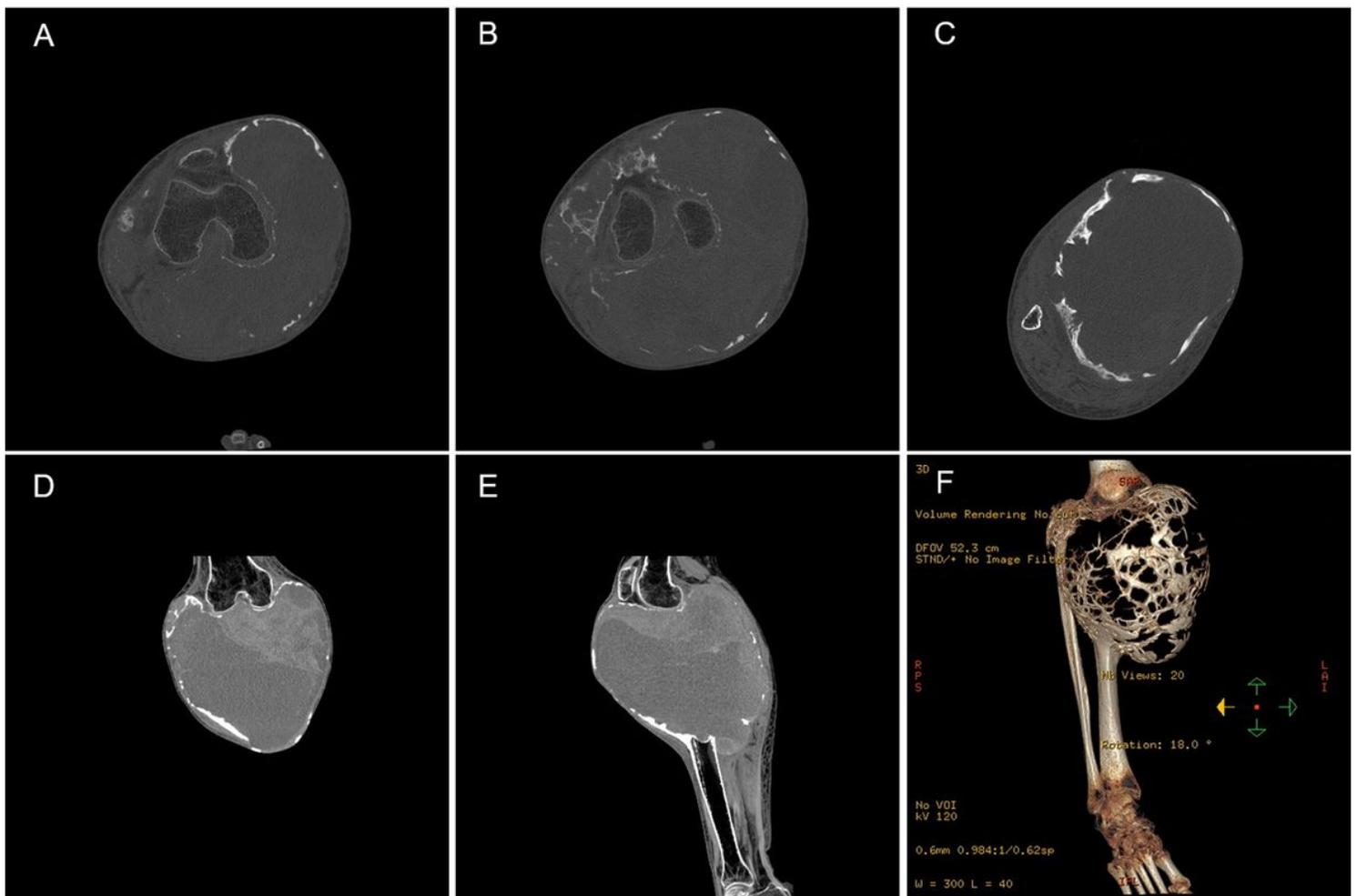


Figure 1

Preoperative three-dimensional computed tomography images of tibia and fibula. Tumor broke through the bone cortex of the upper end of the right tibia and involved surrounding soft tissues, joint cavities, and fibular head. (A-C): the axial reconstruction images. (D): the coronal reconstruction image. (E): the sagittal reconstruction image. (F): three dimensional reconstruction image.



Figure 2

The general view of the lower limb with a tumor like basketball.

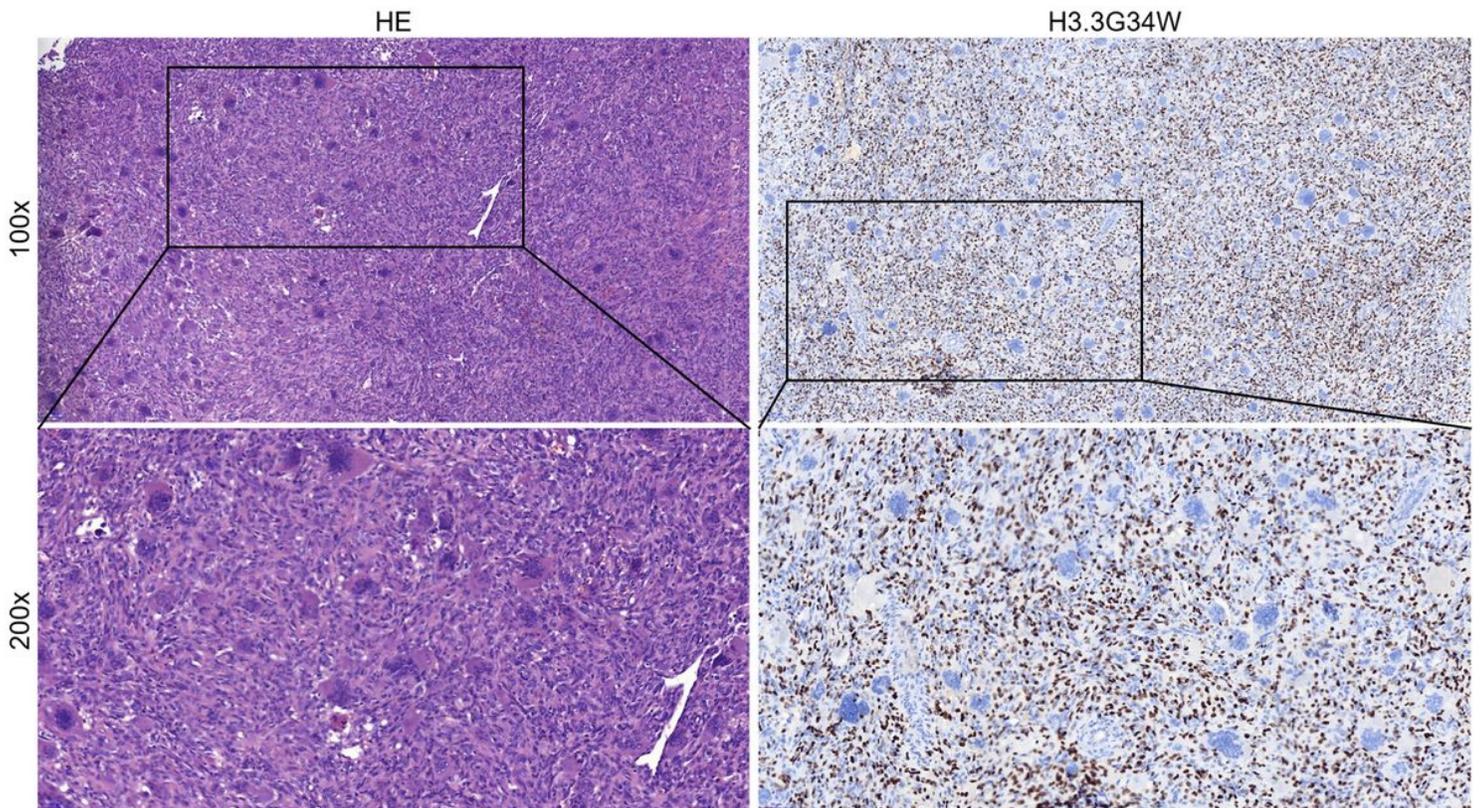


Figure 3

Representative photos of haematoxylin and eosin staining (A) and H3.3G34W immunohistochemistry staining (B) (Magnification at 100x and 200x).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile1.pdf](#)