

Case Report

Misdiagnosis of 30 cases of bone tumors Analysis

Jianlin Li, Jian Zhao, Wenzhong Li, Jianbo Xu, Baosheng Qian

Third Affiliated Hospital of Kunming Medical College, Department of Orthopaedics, Kunming, Yunnan, 650118, China

ABSTRACT **Object:** To explore the reasons of clinical misdiagnosis of bone tumor and establish theoretic basis for clinical diagnosis, so as to avoid or reduce misdiagnosis. **Methods:** From May 1998 to May 2008, thirty cases of bone tumor misdiagnosis were respectively reviewed. To analysis the clinical manifestation, admitting diagnosis, radiographic evaluation and pathologic evaluation before and after surgery, in order to determine the reasons of misdiagnosis. **Results:** After correcting diagnosis, 16 cases were operated (11 cases were limb salvaged, 5 cases were amputation), 8 cases were given chemotherapy, 3 cases were given radiotherapy, 1 case was died. The survival rate of three years is 86.7%, the disability of the disease is 26.6%, and the death rate is 20%. **Conclusion:** Pathologic test and medical imaging play an important role in diagnosis of bone tumor that we are to reconsiderate using clinical manifestation, pathologic test and medical imaging appropriately in order to reducing clinical misdiagnosis.

Key Words: Bone tumor; Misdiagnosis; Analysis

Bone tumors are the category of serious disorders of bone diseases, which often lead to disability and death, the patients and their families were often very panic and concern when heard the diagnosis of bone tumors. Therefore, the exact diagnosis of bone tumor and treatment can not only reduce the medical expenses and death of the patients, but also protect the doctor from the medical accident disputes or misdiagnosed problems. Master the diagnosis and differential diagnosis of bone tumors skills, avoid misdiagnosis occurred on the orthopedic clinician is particularly important. In this paper, 30 misdiagnosis cases of bone tumor in 10 years were reviewed.

CLINICAL DATA

General information

From May 1998 to May 2008, 30 cases of misdiagnosed bone tumor disease in the third affiliated hospital of Kunming medical college were included in this study, the patients aged 7 to 63 years, median age of 36.5 years, 18 males and 12 females, history of 16 d ~ 21 months. All patients had no previous history of neoplastic diseases.

Clinical features

Most patients had pain, local mass, characteristics of continuous development, about 50% of patients have fever, weight loss, eating less, a small number of patients have high fever symptoms. Local mass can be touched, a sense of tenderness and the joint activities were limited when examination.

The type of misdiagnosis

Misdiagnosis of this group can be divided into 3 types.

The authors have no commercial, proprietary, or financial interest in the products or companies described in this article.

Corresponding author: Jianlin Li, Third Affiliated Hospital of Kunming Medical College, Department of Orthopaedics, Kunming, Yunnan 650118, China Email: ljzlrl@126.com

ISSN: 1538-5124/\$-see front matter ©2010 U.S. Chinese Journal of Lymphology and Oncology. All rights reserved.

The first misdiagnosis is that the benign bone disease was misdiagnosed as malignant bone tumors in 19 patients, including osteosarcoma, or bone cyst misdiagnosed as osteomyelitis in 5 patients(Figure1); Ewing sarcoma misdiagnosed as osteomyelitis in 2 cases; malignant fibrous histiocytoma of bone misdiagnosed as fibrous dysplasia in 2 cases; chondrosarcoma be mistaken as cartilage tumor in 2 cases (Figure 2), misdiagnosed as chondroblastoma in 1 case; bone smooth muscle sarcoma misdiagnosed as osteoid osteoma in 1 case, bone angiosarcoma misdiagnosed as osteomyelitis in 1 case; misdiagnosed as giant cell tumor of bone cyst or aneurysmal bone cyst in 5 cases. The second type is that the bone lesions in the blood system tumors

were misdiagnosed as malignant bone tumor in 8 cases, bone destruction in acute lymphoblastic leukemia misdiagnosed as osteosarcoma in 1 case; acute monocytic leukemia misdiagnosed as Ewing's sarcoma of bone destruction in 1 case; malignant lymphoma misdiagnosed as bone destruction and bone metastases in 5 patients (Figure 3); acute myeloid leukemia misdiagnosed as Ewing's sarcoma in 1 case. The third type is metabolic bone disease misdiagnosed as malignant bone tumor in 3 cases, including brown tumor of hyperparathyroidism of misdiagnosed as giant cell tumor in 2 cases, Charcot bone joint disease misdiagnosed as metastatic carcinoma in 1 case (Table 1).

Table 1: Misdiagnosis of 30 cases of bone tumors Analysis

Diagnosed disease	n	Cause of misdiagnosis		
		Clinical misdiagnosis	Radiological misdiagnosis	Pathological misdiagnosis
Osteosarcoma	5	2	3	
Ewing sarcoma	2	1		1
Malignant fibrous histiocytoma of bone	2	1	1	
Chondrosarcoma	3	2		1
Bone smooth muscle sarcoma	1		1	
Angiosarcoma of Bone	1	1		
Giant cell tumor of bone	5	2	2	1
Lymphoblastic leukemia	1	1		
Monocytic leukemia	1		1	
Myeloid leukemia	1	1		
Malignant lymphoma	5	3	2	
Brown tumor of hyperparathyroidism	2	1		1
Charcot bone joint disease	1	1		

Imaging

All patients had X-rays and CT imaging evidence: the

performance of space-occupying lesions or destruction of lesion, the majority showed osteolytic destruction, near the joint with joint effusion signs of lesions. Nearly 1/3 of the patients were

with periosteal reaction, 5 misdiagnosed cases of osteosarcoma showed bone destruction, periosteal reaction early found in 3 patients, cystic lesions change found in 1 case with pathological fracture who was performed scrapings bone plate and screw by primary hospital. Nine cases with blood system tumors were misdiagnosed bone lesions that showed a single image or multiple points, flake osteolytic destruction, there is no periosteal reaction and soft-tissue mass shadow. Hyperparathyroidism bone lesions are osteolytic destruction of images, there is no periosteal reaction, no soft tissue swelling of the film. Five patients were misdiagnosed giant cell tumor of bone imaging lesions are osteolytic destruction, eccentric distribution, no periosteal reaction, X-ray film is no soft tissue mass. Line isotope bone scan (SPECT) of patients showed radionuclide uptake of bone lesions in shadow.

RESULTS

The correct diagnosis of misdiagnosed patients underwent surgical treatment of 16 patients (9 males, 7 females), of which 11 cases of limb salvage, amputation in 5 cases. Chemotherapy in 8 cases, limb salvage surgery combined with chemotherapy in 9 cases, amputation combined with chemotherapy in 5 cases; radiotherapy and chemotherapy in 5 cases; one case is 17-year-old male who was misdiagnosed as osteomyelitis, he was not correctly diagnosed until death and was confirmed as Ewing's sarcoma and brain metastases by autopsy. After correcting diagnosis and relevant treatment, 6 cases were normal living, 12 cases were survival with disease, 8 cases of disability. In following 3 years, 6 cases died due to tumor recurrence or metastasis, the survival rate was 80.0%, disability rate was 26.7%, and the mortality rate was 20%.

DISCUSSION

The incidence features of malignant bone tumors such as osteosarcoma, Ewing's sarcoma

The incidence age of osteosarcoma was generally younger, more happened before the age of 30^[1]. The onset age of Ewing's sarcoma is lower, and majority is in their teens or than 10 years, more than 20 years old were rare^[1]. Two disease involved long bone often, if the flat bone osteosarcoma onset is more common in the ages than 50 years^[1,2]. Onset of Giant cell tumor of bone is more common in 30-50 years old, the lesions were located in the epiphyseal end of long bone, which was eccentric osteolytic^[1,2,3]. Therefore, more common in the surrounding joints, and pain are often the first symptoms, followed by mass and local

swelling^[1,4]. As the rapid growth of malignant tumors of bone, threatening the joint function, if the disease was misdiagnosed or the treatment was not timely, often leading to death, disability rate is very high.

Imaging characteristics of malignant bone tumors

The lesions was mostly osteolytic, located in metaphysis or the epiphysis^[3-5], the periosteal reaction or reactive new bone formation were often found^[4,5], which was often associated with soft tissue mass, and the longer of the duration of the disease was, the greater of the soft-tissue mass was^[6,7]. Angiography of vascular lesions often showed an increase in blood supply, isotope scan showed radionuclide uptake lesions^[8-9].

The diagnostic characteristics of bone tumors

Image examination of bone tumors were in general occupying lesions, preliminary diagnosis may be done according to images of checks^[2,4,5], but it was difficulty to discriminate whether the benign or malignant lesions with images alone, and also result in the misdiagnosis^[9-10]. The exact diagnosis must depend on clinical presentation, imageology and pathological examination^[11-13]. Ignore any one can go wrong.

Analysis of misdiagnosis

Pathological examination in today's environment of evidence-based medicine is especially important. It is not enough to guide treatment relied on the clinical diagnosis of benign and malignant, there must be cell type and localization diagnosis^[6,7,8]. Among the misdiagnosed cases in this group, one was overlooked pathologic examination, the operations were made relied on the clinical presentation and examination image only. Which resulted in very serious mistake and results, and this is the fault of the clinician. The second category was that misdiagnosis and mistreatment caused by clinical and pathological medical errors, such as a typical case is the second in 8 patients. This condition often occurs in patients with difficult and complicated cases, the clinic symptoms and medical image is not typical, the Clinicians and pathological doctors were negligence, lack of communication, which resulted in misdiagnosis and mistreatment^[14-16]. The third category is that pathological misdiagnosis mislead the clinicians with a mis-pathologic diagnosis, which include 6 cases of typical cases of misdiagnosis. This condition is often occurred in very young pathologist who was often short of knowledge and experience^[14,16]. In addition, the endoscopic tissue cells is

very easy to confuse and the self-confidence of the examiner was susceptible to the mis-conclusions.

Countermeasures

To avoid misdiagnosis occurred, this study suggested that from the following aspects: First, a scientific, comprehensive diagnosis and treatment processes of bone tumors must be established. Patients who suspected to be bone tumors should be taken a comprehensive history and physical examination, followed by routine non-invasive imaging tests such as X ray, CT, MR and laboratory tests. If these findings suggested the tumor but can not be clearly determined, the specific qualitative or invasive imaging, such as angiography, puncture angiography, the lesion puncture biopsy or open biopsy. If the diagnosis can't be made after above test, the communication of the clinicians-image doctor, clinicians-pathologist, pathologist-image doctor, even the clinicians-image doctor-pathologist^[16,17]. This scientific, reasonable process is once formed, the misdiagnosis will be minimized and even eliminated. For the reason, the incidence of misdiagnosis was greatly reduced in our hospital nearly 3 years.

Second, clinicians should develop an objective, scientific, dialectical clinical thinking. The diagnosis must be made relied on diagnostic basis and evidence, can not rush to a conclusion completely by rule of thumb. This is important for a clinician, especially for a basic-level clinicians. Only scientific and rational examination, relying on an objective basis, after thinking and materialist dialectics to make the diagnosis and treatment, the subjectivism, empiricism errors will be avoid.

Third, establish the concept of evidence-based medicine, repeatedly emphasized clinic- imaging - pathology three-pronged diagnosis and treatment^[3,7,8]. The diagnosis and treatment of bone tumors concerns with the patient's life, health and family well-being, a little slip of concentration have a tremendous impact on patients and their families. Therefore, a doctor, especially the pathologist, must establish the concept of evidence-based medicine, in medical practice must start from the objective evidence, clinical - image - pathology three combinations. Once out of touch the combination of these three areas, it is easy to commit errors of subjectivism and empiricism. So the concept of evidence-based medicine must be repeatedly reinforced and continue to strengthen and sum up in the practice of clinicians.





REFERENCES

- Mario Campanacci original, Zhang Xiangsheng, Zhang Qin translation. Bone and soft tissue tumors. 1st edition. Changsha: Hunan Science and Technology Press.1999:332-374
- Li chang qin, Fu jian bin, Sun Qing ,et al. The imaging diagnosis of osteosarcoma next to bone - Report of 16 cases. Chinese Journal of Cancer Prevention and Treatment, 2006, 13 (10):781-783
- Koizumi M, Koyama M. Diagnostic imaging of skeletal metastasis. Nippon Rinsho, 2006,64(9):1731-1737
- Wong K F, Shu S J, Luk I S C,et al. Multicentric osteosarcoma presenting as retrobulbar mass: a diagnostic enigma. Pediatr Blood Cancer, 2006, 46(7):815-819
- Xu Aide. Bone tumor imaging: Xu Aide. Illustrations imaging bone and joint diseases. 1st edition. Jinan: Shandong Science and Technology Press, 2002:263-285
- Yu yonglin, Xin xiaotang, Sun qiuru ,et al. Intraspinal tumors in the performance characteristics of MRI. Journal of Cancer Prevention and Treatment, 2008, 15 (9):713-714
- Hong dukai, Li wenrui, Li yiqiang ,et al. Children 4 cases of Ewing's sarcoma misdiagnosed . Misdiagnosis of China, 2006,6 (3): 541-542
- Muscolo D L, Ayerza M A, Makino A, et al. Tumors about knee misdiagnosed as athletic injuries. J Bone Joint Surg Am, 2003, 85:1209-1214
- Martin M, Paul H. Suyarbaker. musculoskeletal cancer surgery.1st ed Washington: Kluwer Academic Publishers, 2001:8-35
- Dou huaizhou, Zhao xinju, Wang Chen. Surgical treatment of spinal metastases clinical analysis. Journal of Cancer Prevention and Treatment, 2008,15 (11): 858-860.
- Li Y, Dang T A, Shen J H, et al. Identification of a plasma proteomic signature to distinguish pediatric osteosarcoma from benign osteochondroma. Proteomics, 2006, 6(11): 3426-3435
- Husmann K, Muff R, Bolandder M E, et al. Cathepsins and Osteosarcoma: Expression anlysis identifes cathepsin K as an indicator of Metastasis. Molecular Carcinogenesis, 2008,47(1): 66-73
- Jiang huai, Xie Wei, Lv Jianjun,et al. Misdiagnosis of malignant bone tumors. Chinese Journal of Bone Tumor and Bone Disease, 2007,6 (1) :25-28
- Hu Jun, Xiangyang. Malignant bone tumor of early misdiagnosis and countermeasures. Nurses Journal, 2008, 23 (17):1613-1614
- Ou Yangzhi. Misdiagnosed with primary hyperparathyroidism the line iliac surgery. Clinical misdiagnosis and mistreatment, 2006,19 (5): 69-70
- Liu tonghua, Me guixiang, Zuo Anlan. Misdiagnosed as metastatic carcinoma of bone marrow plasma cell leukemia. Clinical misdiagnosis and mistreatment, 2007, 20 (2):441-442
- Xiao Yanbin, Xu Jianbo, Ma xiang, et al. Limb in patients with bone cancer the first salvage therapy in treatment failure, Chinese Journal of Cancer, 2007,17 (4) :336-338