

# Management of bone tumor

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**Feng Li**, Professor of Orthopedics, Doctoral Supervisor, Director of the Orthopedics Department, Tongji Hospital, Tongji Medical College of HUST, China. He entered Tongji Medical College and completed the medical curriculum in 1985. Afterwards, he became a surgeon in the Orthopedics Department of Tongji Hospital. He received a Medical Doctor degree at Tongji Medical College in 1993. He had postdoctoral training at University of Bern, Switzerland from 1996 to 1998. In 2008, he visited Washington University in St. Louis, USA as a guest Professor.

His major interest is spine surgery especially cervical spine surgery. He constantly tries to improve surgical strategies in order to provide better treatment for patients. For surgeries involving C1 and C2 cervical vertebrae, he introduced a video-assisted anterior transcervical approach, serving as a viable alternative to the traditional transoral approach. He modified the surgical approach for the posterior cervical spine surgery. These modifications enable the surgery to be less invasive and provide the patients with fast postoperative recovery and better quality of life.

He has been an active investigator of research on osteoporosis and degeneration of human spine for more than 15 years. He published more than 200 peer-reviewed papers in national and international journals including *Nature*, *JBMR*, *Spine*, *Oncogenesis*, *Sci rep*, *Medicine*, *Cell Signal*. He is an academic editor for several journals. Dr. Li serves as the chairman of the spine surgery group of Hubei Province Orthopedic Association. He is also a member of multiple orthopedic society.

A bone tumor can be benign or malignant (bone cancer). Most bone tumors are benign. However, benign tumors can grow adequately large to compress surrounding tissue and weaken the bone, leading to fractures. In addition, bone tumors can secrete chemokines that affect metabolism. In this column, Dr. Cai and colleagues reported two interesting cases of tumor-induced osteomalacia caused by small mesenchymal tumors in bone. The condition is characterized by severe osteoporosis, with the symptoms being bone pain, pseudofracture, and muscle weakness. These symptoms are due to overproduction of fibroblast growth factor 23 by the tumors. Because of the small size of the lesions and chronic symptoms, diagnosis of this condition can be difficult and misdiagnosis is frequent. The tumors were located through positron emission tomography-computed tomography (PET/CT) imaging followed by magnetic resonance imaging (MRI). Resection of the tumors resulted in symptom relief.

Bone cancers can be divided into two main subtypes: cancers originating from bone (primary bone cancer) and cancers metastasized from other tissues (secondary bone

cancer). Primary bone cancer is very rare. Osteosarcoma is the most common primary bone cancer, with a high tendency to metastasize to the lungs. The five-year survival rate for patients with osteosarcoma is very low, highlighting the need for more effective treatment of osteosarcoma. Osteosarcoma shows a significant variation in its pathological presentation and prognosis between and within different subtypes. Therefore, individualized treatment holds promise for better prognoses and outcomes. In this column, Dr. Wang and colleagues summarized the recent key discoveries in individualized treatment for osteosarcoma.

Compared to primary bone cancer, secondary bone cancer is more common because the bone is the most common target organ of metastasis. Certain cancers, such as lung, breast, prostate, and kidney cancers, are more likely to cause bone metastasis. Bone metastasis leads to considerable morbidity due to skeletal-related events (SREs), including bone pain, hypercalcemia, pathologic fracture, and compression of the spinal cord. In this column, Dr. Zheng Zhang and colleagues reviewed the conventional

and novel therapies for bone metastatic diseases, which include drug therapy, radiotherapy, and surgery. Drugs targeting osteoclasts, such as bisphosphonates and receptor activator of nuclear factor kappa-B ligand inhibitors, are widely used to prevent or treat SREs. The potential development of new therapies for bone metastasis was also discussed.

For the pain caused by bone metastasis, local radiotherapy is a very rapid and effective treatment. In this column, Dr. Peng Zhang and colleagues evaluated the efficacy of radiotherapy on bone pain and analyzed the time course of pain relief following radiotherapy. A total of 70 patients with painful bone metastases were recruited for the study. Most patients achieved complete or partial pain relief after radiotherapy. They concluded that the optimal dose and fractionation regime of radiotherapy remain debatable, and individualized therapy may be beneficial for treatment of patients with metastatic bone pain.

The sacrum is a triangular-shaped bone consisting of five segments. Tumors of the sacrum are rare. The most common initial symptom of a sacral tumor is local pain. As the disease develops, radicular pain, motor deficit, and eventually bladder/bowel dysfunction develop because of compression of nerve roots by the tumor. Because of their mild early symptoms, sacral tumors

are usually diagnosed very late, and surgery then becomes a challenge. Excision of sacral tumors with intralesional margins is rarely curative owing to the high likelihood of local recurrence. Recently, total en bloc spondylectomy (TES) has been used to treat thoracic and lumbar tumors, with better outcomes and very low local recurrence. In this column, Dr. Fang and colleagues reported their experience with one-stage TES for the treatment of sacral tumors. They demonstrated that one-stage en bloc resection via the posterior approach is feasible, safe, and effective for sacral tumors.

Recent years have witnessed great progress made in the diagnosis and treatment of bone tumors owing to the improved understanding of these diseases. Bone tumors are diseases with great variation. Therefore, the diagnosis and treatment should be individualized in order to achieve better prognosis and outcome. This column presents some new developments in the management of bone tumors, which may be beneficial for doctors in this field.

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