

Orthopedic Surgery Division

Introduction

Orthopedic Surgery Division is in charge of a treatment of bone and soft tissue tumors. We aim at radical cure of bone and soft tissue tumor patients while preserving physical function and restraining outbreak of bone complications. Surgical resection is the main treatment modality for all bone and soft tissue tumors. However, for high-grade malignant bone and soft tissue tumors, combination of chemotherapies and radiotherapy is indispensable for improvement of the cure rate and limb salvage operation. An additional important duty of our division is treatment of bone complications by cancer metastasis. Surgery, rehabilitation and guidance of best-support care for cancer patients, are included in this work.

Routine Activities

Our division consists of four staff orthopedic surgeons, five orthopedic surgical residents and one physical therapist. Outpatient clinics are held on every weekday at NCCH and on every Monday and Friday at NCCH East. Approximately 30 patients are always hospitalized and undergo surgery, chemotherapy, and/or radiation therapy. Six major operations are performed weekly. We make efforts to overcome the difficult-in-treat bone and soft tissue sarcoma at spine, pelvis and retroperitoneal region with adjuvant chemotherapy or reconstruction surgery. We also conduct standard chemotherapies or several clinical trials for patients of advanced bone and soft tissue sarcomas. In order to accomplish best medical care for patients we have made close cooperation with medical oncologists, pediatricians, thoracic, abdominal, plastic surgeons, and radiation oncologists. A physical therapist helps palliative treatment team and a lymph edema outpatient clinic.

Every morning at 8:00 a.m., all staff surgeons and residents have a morning conference and make rounds on the 17A and 12A ward. A weekly clinical conference is held every Tuesday from 17:30 to 19:00 to discuss the diagnosis, operative procedures, postoperative rehabilitation schedules, and chemotherapy regimens of each patient with all staffs and pediatricians. We also have a preoperative

conference about diagnosis and operative procedures of patients every Friday from 19:30 to 20:30. Panel discussions about radiographic diagnosis of bone diseases are held twice a week. Monthly joint clinical pathological conference with pathologist is held on first Wednesday from 18:30 to 19:00.

Research Activities

Our research activities include: (1) the development of new surgical techniques for treatment of malignant bone and soft tissue tumors that is consistent with the good function of the affected limbs; (2) the development of the treatment strategy for spinal, pelvic, retroperitoneal or trunk malignant tumors that are the most difficult and challenging field in the musculoskeletal oncology; (3) the establishment of the treatment to overcome the local advanced or relapsed malignant tumors; (4) the establishment of the most efficient treatment strategy for metastatic bone tumors that seriously distress patients' quality of life; (5) the development of effective chemotherapeutic regimens for highly malignant bone and soft tissue tumors.

From the projects listed above, several topics were presented in the year. (I) In a phase II study of ifosfamide and VP16 for malignant soft tissue sarcoma in a single institute, the combination showed 32% clinical response and moderate toxicity even in elder patients. (II) In high dose ifosfamide and cisplatin-doxorubicin alternative chemotherapy for patients with osteosarcoma, this chemotherapy did not show any superiority for multi-drug regimens included with high dose MTX therapy. (III) The value of needle biopsy in the diagnosis of musculoskeletal tumors. (IV) Dose dense chemotherapy is essential for treatment strategies for Ewing's sarcoma/PNET of bone in adolescents and adults. (V) High expression epidermal growth factor receptor, HER2/neu, CD117/c-kit in adult soft tissue sarcomas. (VI) Prognosis of clear cell sarcoma: Multi-institutional retrospective study. (VII) Low-grade malignant peripheral nerve sheath tumors varied cytological and histological patterns. (VIII) Scapula-splitting posterior approach for upper thoracic wall or brachial plexus sarcomas.

Clinical Trials

1. A single institute clinical trial of high dose IFO 14gr/m², CDDP 120mg/m² and DOX 60mg/m² neoadjuvant chemotherapy for osteosarcoma or bone malignant fibrous histiocytoma.
2. A single institutional clinical trial of IFO 2gr/m²/d x 5 and VP16 100mg/m²/d x 5 for advanced soft tissue sarcoma.
3. A multi-institutional clinical trial of IFO-DOX neoadjuvant chemotherapy for newly diagnosed high grade soft tissue sarcoma (JCOG0304).
4. A multi-institutional clinical trial of VCR, CPM, ADR and IFO, VP16 for Ewing's Family sarcoma.
5. A multi-institutional phase II trial of Glivec for advanced, refractory bone and soft tissue sarcomas with c-kit strong positive staining.

Patient Statistics

A total of 221 new patients were admitted in 2004. 38 malignant bone tumors including osteosarcoma (14), chondrosarcoma (5), malignant fibrous histiocytoma of bone (3), Ewing's sarcoma (4), lymphoma (8), and others (4), 65 soft tissue sarcomas including liposarcoma (19), MFH (14), myxoid fibrosarcoma (9), leiomyosarcoma (5), synovial sarcoma (7), Ewing/PNET (5), fibrosarcoma (4), MPNST (1), rhabdomyosarcoma (1), myxoid chondrosarcoma (3), and others (15), 29 metastatic bone tumors were treated in 2004.

● H. Chuman ●

Table 2. Type of procedure

Spine surgery	23
Wide resection	71
Biopsy for malignant lesions	60
Prosthesis	26
internal fixation for pathologic fracture	16
Amputation	13
Resection	88
Others	23
Total	320
Plastic surgery (composite graft, skin graft)	34

Table 3. Operative morbidity and mortality

Major complications 4.60%	
(Wound infection, pulmonary infarction, pneumonia, massive tissue necrosis, paralysis)	
Minor complications 3.80%	
(Minor skin necrosis, superficial infection)	
Operative death within 30 days	0%
Postoperative hospital death	0%

Table 1. Number of patients

Malignant bone tumor	48
Malignant soft tissue tumor	83
Benign lesion	102
Metastatic tumor	47
Other	34
Total	320

Table 4. Survival rates

Histological subtype	Stage	No. of pts.	5yr survival (%)	
			5yrs survival	10yrs survival
Osteosarcoma	131	63.10%	59.30%	
Rhabdomyosarcoma	194	34.40%	27.50%	
Liposarcoma	159	86%	72.40%	
Myxofibrosarcoma	67	83.20%	62.20%	
MFH	53	46.70%	36.40%	
Synovial sarcoma	50	61.90%	48.10%	
Leiomyosarcoma	32	33.60%	-	
Angiosarcoma	30	15.40%	-	
MPNST	25	45.20%	36.10%	
Epithelioid sarcoma	25	40.10%	26.70%	
Ewing's sarcoma	21	50.40%	37.80%	
Fibrosarcoma	20	71.80%	35.90%	

Histological subtype: Japanese classification (bone tumor: soft tissue tumor; 3rd ed)
Treat. year: 1980-2003