METHODS OF SURGICAL TREATMENT FOR THE PRIMARY TUMORS OF THE SPINE

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ABSTRACT :

Primary tumors of the spine are rarely seen. When they are located on the body or posterior elements, the patient first complains of back ache. After an appropriate diagnostic evaluation, the next step would be preoperative planning using modern imaging techniques. The modalities for proper treatment are complete surgical removal, instrumentation and fusion if instability is caused, adjuvant or neoadjuvant chemo and/or radiotherapy and embolisation.

Between 1990 and 1995, at the department of Orthopaedics and Traumatology, İstanbul medical faculty, we have surgically treated 26 patients with primary spinal bone tumors. The histopathologic diagnosis of the patients are; chordoma (3), chondrosarcoma (2), primary epitheloid sarcoma (1), giant cell tumor (2), eosinophilic granuloma (2), primary bone lymphoma (1), aneurysmal bone tumor (2), osteochondroma (1), fibrous dysplasia (1), osteoid osteoma (6) and osteoblastoma (5). All of the patients have been preoperatively evaluated using conventional radiography, computerized tomography, MRI, Tc99 bone scintigraphy and angiography when required. The most important factors influencing the surgical strategy are histopathologic diagnosis, anatomic localization and blood supply of the mass.

A well vascularized giant cell tumor on LV 5 has fully disappeared after embolisation and another at the same localization has shrinked to a very small volume making the surgical intervention quite easy. All the masses have been totally removed using posterior and/or anterior route. Five operations resulted with instability of the spinal column and fusion with instrumentation has been added. We have neither seen any early or late complications nor any local recurrences.

Primary tumors of the spine can be successfully treated using modern, sophisticated preoperative imaging techniques and the aid of preoperative embolisation.

Key words: *Primary spinal tumor, modern imaging techniques, wide resection.*

INTRODUCTION

Primary neoplasms of the spinal column are very rare pathologies; only 10% of all bony tumors are located on the spine. The main complaint of the patients referring them to a physician is back ache or low back pain (95%) (4).

Although spinal tumors are rarely seen, back pain is not, so the diagnosis, evaluation and therapy of spinal tumor is quite difficult. Suspicion is the first step of early diagnosis. Modern preoperative staging studies and advances in surgical techniques have increased long term survival rates. The main factors influencing the treatment strategy are; the biology of the neoplasm, present spinal deformities and neurologic status (3).

In this paper we discuss the results of surgically treated primary spinal tumors at our institution.

MATERIALS and METHODS

Between 1990 and 1995, at the Department of Orthopedics and Traumatology, İstanbul Medical Faculty, we have surgically treated 26 patients with primary spinal bone tumors. Sixteen of the patients are male, 10 are female; the mean age is 25.6 years (4-49) and the mean follow-up period is 43.5 months (6-59). The histopathologic diagnosis of our patients are as follows: chordoma (3), chondrosarcoma (2), primary epitheloid carcinoma (1), giant cell tumor (2), eosinophilic granuloma (2), primary bone lymphoma (1), aneurysmal bone tumor (2), osteochondroma (1), fi-

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brous dysplasia (1), osteoid osteoma (6) and osteoblastoma (5). The affected levels are; cervical vertebrae (2), thoracal vertebrae (7), lumbar vertebrae (13) and sacral vertebrae (4). Among these neoplasms, the two costochondral corner chondrosarcomas were multilevel thoracal pathologies, the sacral tumor effected the whole vertebra and the anatomic localizations of the rest were corpus (6), posterior elements (lamina, pedicul, transvers process or extended) (13) and totalinvolvement (1).

The presenting complaint was back ache and/or low back pain in all patients, local mass in a patient with chondrosarcoma, muscle weakness in seven patients, scoliotic deformity in two patients and incontinance in three patients.

The preoperative work-up of each patient included plain radiography, Tc99 whole body scan, computerized axial tomography, after 1991, magnetic resonance imaging when needed, selective antiography and embolization in the lumbosacral region in well vascularized tumors.

A well vascularized giant cell tumor on LV5 has fully disappeared after embolisation and radiotherapy, did not recur after 25 months of follow-up and another one on the same localization has shrinked to a very small volume thus reducing the morbidity of surgical intervention.

We performed an excisionel open biopsy, when the preoperative evaluation studies were suggestive of osteoid osteoma or osteoblastoma, and incisional open biopsy on all the other cases except the patients with primary lymphoma and epitheloid sarcoma who underwent CT guided needle biopsy. Patients with chordoma and the one with a giant cell tumor on LV5 had postoperative adjuvant radiotherapy (RTx) after primary wound healing, beginning in the third postoperative week. The surgical therapy consistd of local resection in all patients with osteoblastoma and osteoid osteoma and posterior fusion and instrumentation in one patient with osteoblastoma due to instability after resection. One patient with eosinophilic granuloma of the left pedicule of LV1 had local resection and posterior fusion with instrumentation. Another patient with aneurismal tumor affecting the whole TV11 had preoperative embolisation, anterior and posterior resection with combined instrumentation and fusion. All the other patients with benign neoplasms had only local resection; the patients wore thoracolumbasacral orthosis (TLSO) for six months postoperatively. The modified en bloc costochondral resections for TV 6, 7, 8 and TV 2, 3, 4 localized chondrosarcomas and posterior fusion with instrumentation were performed as a same day surgery on one patient and the posterior session was performed after 15 days on the other one. The primary bone lymphoma on LV1 had anterior and posterior resection with anterior PMMA and crossed Steinman wires as a spacer and posterior instrumentation and fusion. The giant cell tumor on LV5 was excised by combined transperitoneal abdominal and posterior routes followed by fusion with anterior fibular strut greft and posterior fusion with instrumentation. All the chordomas and the sacral epitheloid sarcoma were resected by combined transperitoneal abdominal and posterior routes; no fusion was necessary, as all of them were located below the level of SV2. The surgical margins were wide in all patients except one sacral chordoma and the giant cell tumor on LV5 with marginal margins who had postoperative adjuvant radiotherapy. In order to prevent the complications of RTx to the abdominal organs, we inserted a silicone mammary prosthesis wrapped in a prolene mesh in the retroperitoneal region sutured to the surrounding tissues.

The control examinations yielded no local complications and no local recurrences. The neurologic compromise of paraparesia in five patients, urinary and bowel incontinance in two patients have totally disappeared after the surgery. In one patient with presacral epitheloid sarcoma, we had to sacrify the nerve roots including S2 and lower levels in order to get a wide margin and urinary incontinance, sexual impotence and dropped foot on the right side resulted postoperatively. Due to the same reason, we sacrificed the roots below S3 in another patient with sacral chordoma and urnary and bowel incontinance was the result.

As to spinal deformity, one patient with an osteoid osteoma on TV10 pedicule had a 15° preoperative scoliosis with back ache; postoperatively the pain disappeared but the scoliosis remained. Another patient with osteoid osteoma on LV3 pedicule had a preoperative scoliosis of 40° which was measured as 20° on the last control examination at the and of the third postoperative year.

DISCUSSION

Primary tumors of the spinal column are rarely seen. Spinal neoplasms are secondary lesions, like metastasis, especially in adults. The age of the patient at diagnosis is a significant prognostic factor. 70% of

primary tumors are malignant above the age of 21 and most are benign below 21. In adults, lesions located on the corpus and pedicules are commonly malignant and lesions on posterior column are commonly benign (3).

In 80% of patients, the first symptom is pain. Night pain and persistance inspite of analgesic medication should be suggestive of malignancy. Spinal deformity may be the first symptom in quite a number of patients. Scoliosis should be suggestive of osteoid osteoma and osteoblastoma and kyphosis should be suggestive of vertebral collapse 51). Neurologic deficit is rarely the first symptom but 70% of patients have neurologic deficit of any kind at time of diagnosis (2). The neurologic prognosis of the patients depends on the biologic habits of the tumor, the preoperative neurologic status and the localization of the mass in the medullary canal (5).

Although vertebrae have no true anatomic compartments, some anatomic structures create natural dissection and resection levels. In order to obtain "clean" surgical margins, all neural, non-neural, vascular, bony and ligamentous structures can be sacrificed; when an instability of the vertebral column results, appropriate fusion and instrumentation has to be added (6).

Modern and sophisticated imaging modalities like CT, MRI, whole body scans, angiography etc. are vital for the preoperative staging studies and operative planning in order to obtain wide surgical margins, which is the aim for an effective oncologic surgical therapy. Selective angiography and consecutive embolisation is a powerful tool for complete treatment of a spinal tumor or for reducing it's size, thus reducing the perioperative morbidity and mortality.

CONCLUSION

The prognosis for survival has improved dramatically for cancer patients over the past three decades. Advances in systemic therapy have prolonged survival even in those who cannot becured.

Advances in surgical technique and biomaterials have not only improved survival and functional outcome but they have diminished many postoperative complications as well.

Improved medical management, antibiotics, preoperative planning using sophisticated imaging technique along with preoperative embolization and early postoperative mobilization have made surgical management much less risky.

Advances in fixation systems, local and systemic therapy and in our inderstanding of the biology of cancer promise even greater improvement for the future.

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