

1. Harzem Ozger , MD, Prof.
Istanbul University, Istanbul Faculty of Medicine, Dept. of Orthopaedics and Traumatology, Istanbul, Turkey
harzemo@yahoo.com
2. Bugra Alpan, MD
Acibadem University, School of Medicine, Dept. of Orthopaedics and Traumatology, Istanbul, Turkey
balpan@gmail.com
3. Mustafa Sungur, MD, Asst. Prof.
Acibadem Atakent Hospital, Dept. of Orthopaedics and Traumatology, Istanbul, Turkey
drmsungur@gmail.com
4. Natig Valiyev, MD
Acibadem Maslak Hospital, Dept. of Orthopaedics and Traumatology, Istanbul, Turkey
natigvaliyev@gmail.com
5. Ata Can Atalar, MD, Assoc. Prof.
Acibadem University, School of Medicine, Dept. of Orthopaedics and Traumatology, Istanbul, Turkey
fatihdikici71@hotmail.com

RECONSTRUCTION OF PROXIMAL HUMERAL DEFECTS IN THE TREATMENT OF PRIMARY BONE SARCOMA

Introduction: Limb salvage surgery is arguably more crucial for tumors of the upper extremity than it is for the lower extremity due to the importance of preserving functions of the hand. In the upper extremity, primary malignant tumors most commonly involve the humerus. This study aims to present treatment outcomes of biological (B) and non-biological (NB) reconstructions of the proximal humerus after tumor resection.

Patients and Method: Review of our orthopedic oncology registry from 1990 to 2014 yielded 46 patients (M/F: 27/19), who underwent proximal humeral reconstruction due to defects caused by primary malignant tumors of the humerus. Patients with diaphyseal lesions involving the proximal metaphysis were included. Twelve patients with a mean age of 15,6 (2-35) had biological reconstruction. Thirty-four patients with a mean age of 29,7 (10-60) had non-biological reconstruction with tumor prosthesis. The mean follow-up period was 85,1 (6-219) months for group B and 42,5 (2-190) months for group NB. Six patients were operated for Ewing's sarcoma, 5 for osteosarcoma and one for chondrosarcoma in the group B. On the other hand, 21 patients underwent surgery for osteosarcoma, 8 for chondrosarcoma, 5 for Ewing's sarcoma, in the group NB. Average length of reconstructed segment was 13,1 (8-18) cm in the group B and 14,8 (7-26) cm in the group NB. Free vascular fibula graft was used alone or in combination in 11 patients while only cryopreserved bone was re-implanted in 1 patient for biological reconstruction. Polypropylene mesh was used for stabilization of tumor prostheses for all patients in the group NB.

Results: No local recurrence was observed in the group B group whereas local recurrence was seen in 6 patients (17,6%) at a mean period of 65,1 (4-175) months in the group NB. Overall survival was 100% at a mean of 85,1 months and 97% at a mean of 42,5 months, respectively for the B and NB reconstruction methods. Six patients in the group NB had metastases at the last follow-up. The mean number of surgical interventions for the treatment of complications was 1,2 in the group B and 0,2 in the group NB. Axillary nerve could be salvaged in 8 patients (66,7%) in the group B and 7 patients

(%20,6) in the group NB. The average upper extremity MSTS score was calculated as 75,9% in the group B whereas the average score was 70,4% in the group NB. Nonunion (5 patients) and graft fracture (4 patients) were the most common complications in the group B, whereas prosthetic infection (3 patients) was the most common complication in the group NB. Only 1 case of shoulder joint dislocation occurred in the group NB.

Conclusion: Although the groups are not demographically homogenous, the oncological outcomes seem to be superior in the group B and the complication rate is less in the group NB. Biological reconstruction is usually the result of an effort to salvage the glenohumeral joint and hence the defect is usually intercalary. Axillary nerve has a better chance of being preserved in an intercalary resection than in an intraarticular resection where the proximal epiphysometaphyseal region is sacrificed. Higher rate of axillary nerve preservation may explain the slightly better functional outcomes in the group B. Preservation of fine motor skills of the hand and elbow is usually the main predictor of functional outcome in both groups. Although upper extremity does not bear weight, nonunion and graft fracture complications in the biological reconstruction cases draw attention to the need for neutralizing rotational moments while planning and executing osteosynthesis. Whether there is a tendency towards non-biological reconstruction in cases where the preoperative conditions are unfavorable is open to discussion. Although biological reconstruction seems to result in higher number of complications in the short-term, greater number of prosthesis-related complications occur in the mid-to-long term.