THE ROLE OF RECONSTRUCTIVE SURGICAL TREATMENT OF PRIMARY MALIGNANT BONE TUMORS IN IMPROVING THE QUALITY OF LIFE OF THE NEOPLASIC PATIENT

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Primary malignant bone tumors are relatively rare compared to others, but unfortunately the prognosis is reserved. The surgical treatment consists of reconstruction or even amputation. We performed a prospective study with a follow-up of 2 years on 22 patients with osteosarcoma treated with reconstructive surgery and 10 with initial amputation.
The mean survival at 2 years was 68% in the reconstruction group and 70% in the amputation group respectively. The mean functional and quality of life scores for the reconstruction group were significantly higher [1] compared to the amputees.
Resection – reconstruction is the elective treatment since the survival rates are comparable but the quality of life significantly better for the reconstruction compared to amputation.

Key words: Bone tumor; Reconstruction; Amputation.

INTRODUCTION

Recently the limb salvage procedures have become a viable alternative to amputations in controlling the local extent of osteosarcoma. Nonrandomized studies have shown that limb salvaging procedures do not negatively influence survival[2]. Whenever complete resection of the tumor is possible and adjuvant chemotherapy is used, the limb salvage can improve the functional outcome without decreasing the surviva[2–4].

The purpose of our study was to analyze the extent of the functional improvement without also increasing the reoccurrence.

METHOD AND MATERIAL

We performed a prospective study including patients treated for osteosarcoma in our clinic during 1996–2005. The patients were divided into two groups, 22 with reconstructive surgery and 10 with amputation. The treatment method was chosen based on age and localization. The mean follow-up was 2 years, or until death.

For each patient we noted age, gender, Enneking stage of the disease, anatomical localization and size of the tumor (on imaging examination), pathological fractures where present, type of surgical treatment, the use of neoadjuvant chemotherapy, the surgical margins and procentage of necrosis due to induction chemotherapy based on anatomopathological examination.

Endoprosthetic replacement with limb salvage was considered only when there was no evidence of invasion of the neurovascular structures by the tumor and when adequate function of the extremity after resection of the tumor could be anticipated.

Informed consent was obtained from all patients or their guardians before the follow-up evaluation.

We had 2 standard follow-up forms based on two scores: the quality of life was measured based on the score of the Musculoskeletal Tumor Society[5] and the European Organization for Research and Treatment of Cancer (QLC 30) [1].

The statistical analysis was done using Wilcoxon Rank Sum test, Kaplan Meier survival curve and GraphPad software.

RESULTS

The mean age of the patients included in the study was 40.5 years.

All 32 patients had osteosarcoma stage IIB or III Enneking. 38% developed metastases. The most common primary localization was the distal femur,

in 58% of cases followed by the proximal tibia in 42% of cases.

Upon discovery of the tumor, we used the standard chemotherapy protocols applied in the Oncology Clinic Timisoara.

There was no significant difference in the evolution of the patients who underwent reconstructive surgery compared to the ones who were amputated.

The functional outcome was evaluated using the Musculoskeletal Tumor Society Score, described by Enneking *et al*.[5]

Fig. 1. Osteoscarcoma of distal femur (X-ray lateral view).

This Score is based on factors such as pain, emotional distress, daily lifestyle restrictions as well as factors specific to the tumor localization: use of crutches, ability to walk, etc. Each parameter was given 5 points to a total maximum of 30.

Fig. 2. Reconstruction procedure – modular knee prosthesis applied after distal femoral resection.

The quality of life was evaluated based on the QLC –C30 questionnaire of the European Organization for Research and Treatment of Cancer[1]. This is a score with 9 scales: 5 functional (physical, emotional, social, cognitive and role), 3 symptomatic (fatigue, nausea and vomiting) and one global, up to a total maximum of 100 points.

100 points indicates that there is no restriction of the parameter, whereas in the symptom scales 100 points indicates the maximum severity of the symptom (for example, a score of 100 points for pain indicates a maximum degree of pain-related restriction).

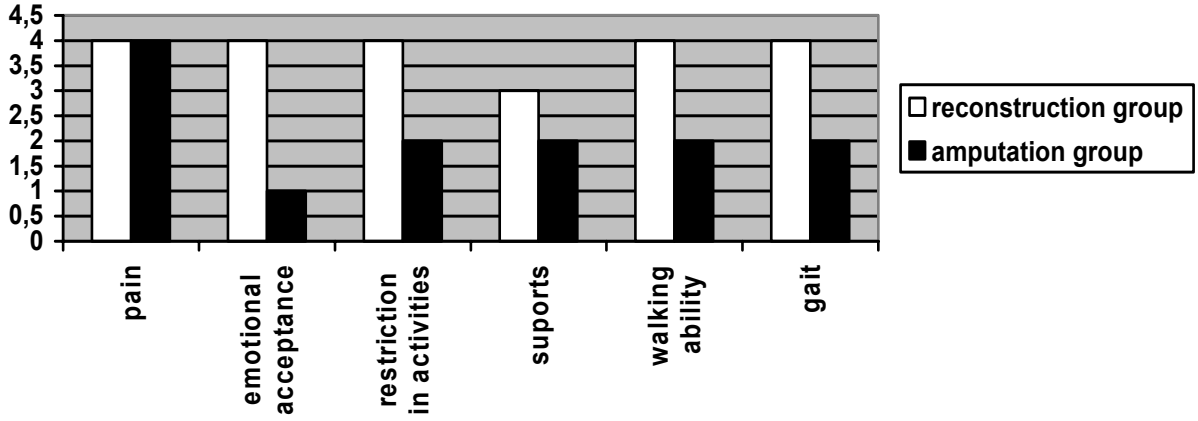

Fig. 3. Graph showing the mean functional scores according to the system of the Musculoskeletal Tumor Society. A significant difference between the treatment groups was found with regard to the use of external supports for walking ($p < 0.001$).

Fig. 4. Graph showing the mean scores according to the functional scales of the quality-of-life questionnaire (QLQ-C30) of the European Organization for Research and Treatment of Cancer. A significant difference between the treatment groups was found with regard to role of functioning ($p < 0.001$).

DISCUSSIONS

There are few published studies regarding the quality of life of the patient with osteosarcoma. This is mainly due to the rarity of the disease (2 cases per million)[6] and also the variety of the treatment methods: amputation, resection, usually with reconstruction.[6–10]

An ever increasing number of adults survive primary bone tumors and therefore it is paramount that the surgical treatment allows for an appropriate social reintegration. Unfortunately, the measuring of such is difficult and thus the data on the subject in the literature is scares. There are a few older studies[11–13] which show similar results between reconstruction and amputation.

Boyle *et al*.[14] showed that patients with no other previous problems have no significant differences between procedures.

In our study, the patients with reconstruction have better functional outcome (regarding hobbies, work, daily living) and less restrictions compared to the amputation group.

Fig. 5. Intraoperative picture –with modular knee prosthesis after distal femoral resection.

In the majority of cases from the literature, pain is not mentioned as restricting activity. Rougraff et al. [11] did not find significant differences regarding the acceptance of the situation (endoprosthesis vs reconstruction), however only 18 out of 29 patients in that study are satisfied.

The 2 years survival rate is similar between groups (68% for resection and 70% for amputation). The two groups had similarities regarding the stage of the disease, age or localization. Factors predicting good outcome such as response to chemotherapy or absence of metastasis must be considered when attempting limb salvage procedures.

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