

Treatment of oligometastases: indications and results in 156 cases

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Background: Long bone metastases are a disease of high social importance. Survival of cancer patients has improved in the last two decades, leading to an increase of diagnosed metastases. The goals of surgical treatment are to relieve pain, maintain or restore joint function, and prevent or treat pathological fractures. An oligometastatic disease is defined as a diffuse disease with metastases in a limited number of body districts (3 to 5) in which an aggressive treatment can be carried out with “curative” intent, with prognostic influence on survival and quality of life.

Questions/purposes. We asked (1) What is the survival of patients with an impending or pathologic fracture from bone metastases treated with aggressive surgical approach? 2) Can patients with solitary or oligometastases benefit from aggressive surgical treatment such as bone resection and reconstruction? 3) What is the incidence of complications requiring surgical revision, comparing intramedullary nailing and bone resection?

Patients and Methods: This is a retrospective analysis of prospectively collected patients with long bone metastases surgically treated between October 2015 and December 2021 in our Department. We reviewed 156 patients (89 females- mean age 67 years) with bone/soft-tissue metastases. The most frequent tumors were breast (31%), lung (16%) and kidney carcinoma (15%). Most frequent sites were proximal femur (83 cases), femoral diaphysis (19 cases) and humerus (28 cases). Thirty-six patients had solitary lesion, 45 were oligometastatic and 75 had multiple lesions. Surgical treatment was chosen after a multidisciplinary evaluation of general health status and life expectancy. Surgery included intramedullary nailing (46), bone resection and reconstruction with modular prosthesis (86) or standard endoprosthesis (12) and amputation (5). All patients with soft tissue metastases underwent wide excision. The Short Form-36, the Musculoskeletal Tumor Society 1993 form, and the Toronto Extremity Salvage Score were administered preoperatively and 6 weeks and 3 months postoperatively. Survival was defined as the time from surgery to the last follow-up or death. Prosthetic failures were classified according to Henderson et al. in Type I (soft tissue failure), Type II (aseptic loosening), Type III (breakage), Type IV (infection) and Type V (local recurrence). Patient’s and implant’s survival were analyzed using the Kaplan–Meier analysis, and comparison of

the curves was estimated using the log-rank test.

Results: At a mean follow-up of 12 months, 15 patients were continuously disease free, 56 were alive with disease and 85 were dead. Overall survival was 38% and 16% at two and five years from the treatment of metastases, respectively. Overall survival was significantly better for patients with solitary metastasis or oligometastases ($p<0.01$) compared to multiple lesions and after resection compared to nailing ($p<0.01$). The patients' Musculoskeletal Tumor Society 1993 form, and Toronto Extremity Salvage Score scores improved at 6 weeks and 3 months postoperatively. Patients had functional improvements after surgical treatment of bone metastases, even patients with a limited life expectancy. Implant complications requiring surgical revision occurred in 20 patients treated with prostheses, while no complications occurred in patients treated with nailing.

Conclusions: Patients treated with resection and prosthetic reconstruction had better survival than patients treated with nails (considering the selection bias). Patients with oligometastases can be aggressively treated as patients with a solitary lesion to improve survival. Intramedullary nailing is still indicated in metaphyseal or diaphyseal metastases in patients with advanced disease or poor prognosis when the life expectancy does not overcome the expected survival of the nail, avoiding the need for further surgery. About complication rate, optimal implants survival curves should stay above the curves of patients' survival.

Keywords: Oligometastases; Resection; Complications; Bone tumor;