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Surgical treatment of humeral bone metastases - indications and outcome

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Background: The humerus is the second most common localization of metastases in the long bones. We sought to evaluate the indications and results of various surgical treatment options.
Methods: We retrospectively analyzed the files of 135 patients with actual or impending pathological fractures of the humerus due to bone metastasis of kidney (n=40), lung (n=32), breast cancer (n=26), and other tumors (n=37), who underwent surgical treatment between 1997 and 2011. Mean follow-up was 15 months for all patients (range, 0-117 months) and 27 months for survivors (range, 1-117 months). A two-sample t-test was used to compare means. Fisher's exact test was used to compare unrelated samples. Survival curves were calculated with the Kaplan-Meier method and compared with the log-rank test.
Results: 56 patients underwent endoprosthetic replacement, 45 patients a compound osteosynthesis with a plate and bone cement and 34 patients received an intramedullary nail. There were no significant differences in the duration of surgery between the 3 groups. Trauma surgeons used significantly more nails, compared to orthopedic oncologists (23/28 vs. 11/107, p<0.001). Intramedullary nailing was performed only in patients with multiple metastases, while 13 of the patients who received an endoprosthesis and 9 of the patients who underwent a compound osteosynthesis had solitary metastases. Patients with lung and breast cancers had a significantly higher probability to receive an intramedullary nail than patients with kidney cancer (12/32 and 12/26 vs. 5/40, p=0.009), who in turn underwent more endoprosthetic replacements (21/40 vs. 11/36 and 5/26, p=0.009). Overall survival amounted to 51% after 1 year and 16% after 3 years. Patients undergoing intramedullary nailing had a significantly worse overall survival after 1 year (24%), compared to those undergoing compound osteosynthesis (56%, p=0.007) and endoprosthetic replacement (64%, p<0.001), probably reflecting the differences in tumor biology and stage of disease. 8 patients suffered from failure of fixation, 4 after intramedullary nailing and 2 each after endoprosthetic replacement and compound osteosynthesis. These differences were not statistically significant.
Conclusion: All of the aforementioned surgical modalities appear to have a low failure rate, provided that the patient's stage and tumor biology are taken into consideration during treatment planning.

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