

TITLE: Evaluation and Comparison of Factors Associated with Local Recurrence in Operated Cases of Osteosarcomas- A Retrospective Study

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Place of Study:

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AIMS & OBJECTIVES:

Varying and conflicting factors have been enumerated for local recurrence of Osteosarcomas in literature. Local recurrence rates between 10 to 20% have been shown by most studies with surgical margin and response to chemotherapy being the most commonly cited prognostic factors for local recurrence. Majority of studies reporting prognostic factors in local recurrence of Osteosarcomas are from the Western world. There is a paucity of data from the developing world on the incidence and associated prognostic factors for local recurrence of Osteosarcomas. The aim of our study was to determine the incidence of local recurrence in operated cases of Osteosarcoma and to identify the prognostic factors related to local recurrence from a data pool of our patients with emphasis on prognostic factors which might play an important role in the third world.

MATERIALS & METHODS:

Ours was a retrospective study, with evaluation of patients with osteosarcoma who were operated between Jan, 2004 and Jan, 2012. Our reference period in extracting patient data from the hospital records was January 1, 2004 and January 1, 2012. Patients with metastasis at the time of presentation and those who died within 3 months following surgery were excluded from the study. A total of 76 cases of Osteosarcoma were identified from the records. Within this cohort, two groups of patients were formed, LR group with local recurrence and NR group with no (local) recurrence. Parameters which were evaluated for each tumor included tumor volume (calculated on the MRI & from the gross specimen sent for histopathology after excision/amputation), surgical margins, type of surgery, pathological fracture, vicinity of neurovascular bundle and histologic

subtype. Statistical analysis was performed to look for any significant difference between the Local Recurrence (LR) group and Non recurrence (NR) group.

RESULTS:

A total of 90 cases of Osteosarcomas operated between the reference period were identified. Out of these, 12 were excluded due to metastasis at presentation. Six patients who died within three months post-surgery were also excluded from the study. Therefore a total of 72 patients were available for analysis. Local recurrence was present in 13 patients (recurrence rate of 18.01%). These patients constituted the LR group whereas the remaining 59 patients constituted the NR group. Statistical analysis was done using the Fisher's test for continuous variables and Chi Square test for nominal variables. There was no statistically significant difference between the LR and NR group vis a vis age and gender. All the patients in the LR group underwent limb salvage surgery. In the NR group, 39 patients (81.3%) underwent limb salvage surgery and 14 (18.7%) underwent amputation. None of the patients in LR group had a pathological fracture as against 6 patients (11.3%) in the NR group. Surgical margins were inadequate in one patient (12.5%) of LR group and 8 patients (14.8%) of NR group and the difference was not statistically significant. Radiological images were assessed to measure the tumour volume and proximity to neurovascular bundle. The mean tumor volume in LR group was 169.2 cc as against 466.1 cc in the NR group and there was statistically no significance of the same. Neurovascular bundle was encased in 8 patients in the NR group and one patient of LR group whereas it was displaced in 9 patients of NR group and 4 patients of the LR group. Statistically, involvement of the neurovascular bundle was not a significant factor in the causation of local recurrence in our study. Conventional Osteosarcoma was the most common histological subtype among both the groups. Chemotherapy induced tumor necrosis was less than 90 % in 6 patients (66.6%) of LR group and 32 patients (60.4%) of NR group. Both histological subtypes and response to chemotherapy were not statistically significant between the two groups at $p < 0.05$. The mean delay in surgery post chemotherapy was 2.3 months in LR group and 1.1 month in NR group and this difference was statistically significant ($p = 0.018$) for local recurrence.

CONCLUSION:

Factors such as tumor volume, surgical margins, type of surgery, pathological fracture, vicinity of neurovascular bundle, histologic subtype and chemotherapy induced necrosis do not play a statistically significant role in causing local recurrence following surgical treatment of Osteosarcomas. Delay in surgery post chemotherapy is a significant factor in local recurrence in our study. This is important in the Indian context since high patient volumes combined with

limited resources in the developing world play a significant role in this delay. The main drawback of our study is its retrospective nature and less number of patients.