

Female Sex is Associated with Higher Recurrence Risk in Giant Cell Tumors of the Bone

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INTRODUCTION: Giant Cell Tumors of bone (GCTs) are locally aggressive neoplasms with variable recurrence rates. While GCTs exhibit a slight female predominance, the influence of sex on recurrence remains unclear. This study investigated the association between sex and recurrence, adjusting for surgical approach and socioeconomic status.

METHODS: We retrospectively analyzed 300 patients with pathologically confirmed GCTs treated at a single academic institution from 1980–2023, with ≥ 2 years of follow-up. Of these, 272 presented with primary and 28 with recurrent disease. Demographics, tumor characteristics, and treatment data were collected. Campanacci grades were used for staging. Tumor size was measured by maximal radiographic dimension. Recurrence was defined radiologically or pathologically. Socioeconomic status was evaluated by Area Deprivation Index (ADI) and insurance type. Logistic regression analyzed recurrence risk by sex, adjusting for surgical method and ADI.

RESULTS: Mean age at diagnosis was 34.9 years (SD = 14.8). Recurrence occurred in 33/150 females and 17/150 males. Female sex was associated with increased recurrence risk (OR = 2.21; 95% CI: 1.16–4.17; $p = 0.0195$). Among females with axial tumors, those with recurrence had smaller tumors (47.6 ± 18.6 mm vs. 60.5 ± 23.1 mm; $p = 0.0354$). No significant associations were found for resection, curettage, Campanacci grade, pathologic fracture, ADI, or insurance. ADI and insurance were not independently associated with recurrence or effect modification by sex.

DISCUSSION AND CONCLUSION:

Female sex is independently associated with an increased risk of recurrence of giant cell tumor of bone. Smaller tumor size is correlated with higher recurrence rates among females, suggesting possible biological or anatomical factors contributing to recurrence risk. Further multi-center studies are warranted to validate these findings and elucidate underlying mechanisms.

