Title:
Quantitative Margin Assessment Predicts Local Recurrence in Myxofibrosarcoma

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Background:
Myxofibrosarcoma is characterized by infiltrative growth, which contributes to high rates of positive surgical margins and local recurrence. Conventional margin assessment is qualitative, based on the closest margin (negative vs. positive), and does not reflect the circumferential extent of tumor involvement at the resection margins. In particular, this approach may underestimate the burden of microscopic residual disease in tumors with diffuse infiltration. We hypothesized that a quantitative assessment reflecting the extent of margin involvement would better predict local recurrence. The purpose of this study was to evaluate the clinical significance of a quantitative margin assessment method in patients with myxofibrosarcoma.
Methods:
We retrospectively reviewed 74 consecutive patients who underwent surgical resection for myxofibrosarcoma at our institution between 2014 and 2024. A positive margin (PM) was defined as the presence of tumor cells at the resection margin, and a close margin (CM) as tumor cells located within 1 cm of the margin. Using whole-mount pathological sections, margins were systematically evaluated in six directions (superior, inferior, medial, lateral, anterior, and posterior). For each case, the number of positive and close margin (PM+CM) was calculated. Clinicopathological variables, including age, sex, tumor size, histological grade, use of radiotherapy, use of chemotherapy, and occurrence of local recurrence, were collected. Associations between these variables and local recurrence were analyzed. Local recurrence-free survival was estimated using Kaplan-Meire method.
Results:
At a median follow-up of 39 months (range, 6–124), local recurrence occurred in 16 patients (21.6%). The 5-year local recurrence-free survival rate was 72.6%. Based on conventional qualitative assessment, PM and CM were identified in 26 (35%) and 37 (50%) patients, respectively. The median number of margins with PM was 0 (range, 0–5), and that with CM was 1 (range, 0–5). The number of PM alone was not significantly

associated with local recurrence (1.1 vs. 0.5, p = 0.144). In contrast, the number of PM + CM was significantly higher in patients with local recurrence than in those without recurrence (2.3 vs. 1.5, p = 0.019). No other clinicopathological factors showed a significant association with local recurrence. Furthermore, there was a strong positive correlation between the number of PM+CM and local recurrence rate (r = 0.913, p = 0.011).

Conclusions:

The number of PM+CM is a significant predictor of local recurrence in myxofibrosarcoma. This quantitative margin assessment may provide additional prognostic information beyond conventional qualitative evaluation. Surgical strategies aimed at minimizing both positive and close margins across all directions may contribute to improved local control.