

Does Staged Resection with Temporizing Wound Vacuum Influence Local Recurrence Risk? A Multi-Institutional Matched Cohort Analysis

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INTRODUCTION:

Soft tissue sarcomas (STS) are a heterogeneous group of cancers marked by variability in biology, behavior, presenting features, and outcomes, which makes them uniquely challenging to treat. For STS, margin status is a significant predictor of local recurrence (LR). Staged resection with a temporizing vacuum-assisted closure (VAC) delays soft tissue coverage until final margins return negative, a strategy typically employed for locally aggressive histologies and highly infiltrative tumors. However, the benefit of this strategy on LR is poorly understood relative to a single-stage approach. Hence, the objective of this analysis is to compare LR between patients treated with single-stage versus staged resection with temporizing VAC.

METHODS:

A matched cohort, multi-institutional retrospective review was performed of STS patients undergoing localized resection from 2018-2024. Patients treated with staged resection at two institutions (n=185) were matched by grade, depth, and radiation to patients treated at a third institution that typically performs single-stage resection (n=185). Demographics, tumor information, surgical, and treatment related variables were collected. The primary outcome was LR. Statistical analysis was performed using parametric and nonparametric univariate comparisons where appropriate. Kaplan Meier method was used to estimate LR free and disease specific survival while a multivariable logistic regression and Cox proportionate hazards model was utilized to identify factors associated with LR. All investigations were performed using JMP Pro (SAS, Cary NC).

RESULTS:

There was no significant difference in tumor size, depth, grade, and radiation use between staged and single-stage groups. VAC patients were more likely to have had a prior unplanned surgery and a histology of myxofibrosarcoma (p<0.01). Initial margin status was more likely to be positive in the staged group (32 vs 18%, p=0.003), while final margin status was more likely to be negative in the staged group (93.5 vs 81.8%, p<0.001). However, the rate of LR was higher in the staged group (19.5% vs 5.5%, p<0.001).

When controlling for potential confounders, initial positive margins increased LR risk (OR 4.5, CI 2.0-10.4), while radiation was protective (OR 0.3, CI 0.14-0.63). Final margin status, grade, and depth were not associated with LR.

DISCUSSION AND CONCLUSION:

Staged resection with a temporizing VAC did not improve rates of local control. Initial margin status has a strong predictive effect for LR, indicating that the first resection is the best opportunity for local control and highlighting the importance of effective pre-surgical planning. Notably, higher LR rate in the staged group likely reflects a higher propensity for staging more locally aggressive tumors, such as myxofibrosarcoma. Further analysis is recommended to determine indications for staged resection for various histologies and tumor characteristics.

	Staged Resection (n=185)	Single-Stage Resection (n=165)
Local Recurrence	19.5% (n=36)	5.5% (n=9)
Final Positive Margin	6.5% (n=12)	18.2% (n=30)
Initial Positive Margin	31.9% (n=59)	18.2% (n=30)
Prior Unplanned Resection	45.4% (n=84)	33.3% (n=55)
Diagnosis		
Liposarcoma	6.4% (n=12)	12.1% (n=20)
Myxofibrosarcoma	44.9% (n=83)	24.8% (n=41)
Undifferentiated pleomorphic sarcoma	11.9% (n=22)	13.9% (n=23)
Leiomyosarcoma	5.9% (n=11)	11.5% (n=19)
Dermatofibrosarcoma protuberans	7% (n=13)	0% (n=0)
STS - Other	23.6% (n=44)	37.3% (n=62)