Does Advanced Imaging Have a Role in Local Surveillance of Soft Tissue Sarcoma?

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Background and Purpose

Early detection of soft tissue sarcoma (STS) recurrences may decrease the morbidity of reoperation and improve oncologic outcomes. The benefit of surveillance imaging compared to clinical follow up in detecting local recurrences (LR) of STS remains controversial.

The goals of this study were to:

- Determine the proportion of LR detected by clinical signs and symptoms compared to surveillance imaging (clinically occult).
- Determine whether there was a difference in the size of local recurrence detected with imaging compared to clinical surveillance.
- Determine if clinically occult LR was associated with patient, tumor, or operative characteristics.

Methods

- We retrospectively reviewed the electronic medical records of all patients at a single sarcoma center who underwent excision of a STS between August 1999 and December 2018.
- Patients routinely underwent advanced imaging and clinical follow up at intervals based on currently available guidelines for sarcoma surveillance.
- The number of LR first identified by advanced imaging versus clinical detection (physical examination, self-detection, or symptomatic presentation) were compared.
- The median size of LR in each group was compared using a Kruskal-Wallis test. Logistic regression with a Wald Chi Square Test was performed to evaluate if tumor, patient, or operative characteristics impact the sensitivity of physical examination. A p value <0.05 was considered to be statistically significant.

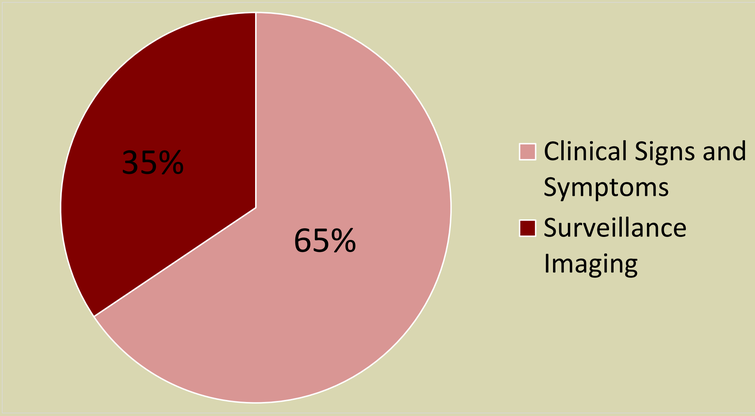

Figure 1. Proportion of local recurrences detected by clinical versus advanced imaging surveillance

Variable	Odds Ratio	95% Confidence Interval	P Value
Age	0.99	0.95 - 1.03	0.66
Body Mass Index	1.03	0.9 - 1.12	0.7
Tumor Depth (Superficial vs. Deep)	1.15	0.16 - 8.18	0.89
Tumor Size (Largest Dimension)	0.99	0.9 - 1.09	0.83
Acral vs. Upper Extremity	3.06	0.09 - 108.47	0.54
Back/Torso/Neck vs. Upper Extremity	0.39	0.03 - 4.9	0.46
Lower Extremity vs. Upper Extremity	1.58	0.3 - 8.34	0.59
Pelvis/Sacrum vs. Upper Extremity	1.27	0.12 - 13.35	0.84
Primary vs. Flap Closure	2.08	0.26 - 16.41	0.49
Radiation Status	1.97	0.47 - 8.19	0.35

Table 1. Association of patient, tumor, and operative characteristics with local recurrence detection method. None of the variables were significant predictors.

Results

- Sixty-one of 365 patients (16.7%) developed a LR. Patient, tumor, and operative characteristics did not differ between recurrent and nonrecurrent groups.
- Sixty-five percent (40/61) of LR were detected clinically, and 35% (21/61) were detected with advanced imaging surveillance. (Figure 1)
- The median size of LR detected by clinical versus imaging surveillance was not significantly different, at 3.9 cm (IQR: 2.5-7.8) and 4.5 cm (IQR: 2.7-6.2) and [p=0.98],respectively.
- Detecting LR with imaging was not associated with any patient, tumor, or operative characteristics, including patient age or BMI; tumor size, location, or depth; or flap closure (Table 1).

Discussion

- Clinical surveillance (signs, symptoms, and physical examination) identified most LR, but advanced imaging detected LR in approximately one third of cases.
- We did not identify any factors that could predict which sarcoma patients are at higher risk for clinically occult LR.
- LR detected with advanced imaging were not significantly smaller than those detected clinically, suggesting that some LR remain occult even at sizes where most become clinically apparent.
- In spite of this being the largest study on LR surveillance, it is still limited by the rarity of STS and LR.
- While larger, prospective studies may not be feasible, additional research will be needed to further define the indications for advanced imaging in STS surveillance.