Influence of Physician Specialty on Treatment Recommendations in the Multidisciplinary Management of Soft Tissue Sarcoma of the Extremities

Nabil Wasif, MD, FACS; Caitlin A. Smith, MD; Robert M. Tamurian, MD; Scott D. Christensen, MD; Arta M. Monjazeb, MD; Steve R. Martinez, MD, FACS; Robert J. Canter, MD, FACS

IMPORTANCE Although prospective randomized data are available to guide the multidisciplinary management of soft tissue sarcoma (STS) of the extremities, controversy exists regarding adjuvant chemotherapy and radiation therapy.

OBJECTIVE To determine if clinical specialty introduces bias in recommendations for multimodality treatment of STS.

DESIGN Electronic survey.

SETTING Database of active members of the American Society of Clinical Oncology, the Society of Surgical Oncology, and the Connective Tissue Oncology Society.

PARTICIPANTS Members of specialty oncology societies with an active interest in STS.

EXPOSURE Physician specialty.

MAIN OUTCOMES AND MEASURES Survey responses regarding the multidisciplinary management of STS were scored on a 5-point Likert scale and analyzed using analysis of variance.

RESULTS The questionnaire was completed by 320 of 490 potential respondents (65%), including medical (18%), radiation (8%), orthopedic (22%), and surgical oncologists (45%). Respondents concurred on the use of radiation therapy for margins positive for tumor, for high-grade tumors, for improvement in local control, for tumors larger than 10 cm, and for tumors in close proximity to a neurovascular bundle. Respondents diverged on the use of radiation therapy for tumors 5 to 10 cm in size, for low-grade tumors, for radiation-associated STS, and for survival benefit. Only radiation oncologists felt that radiation therapy was underutilized as a treatment modality (mean [SEM] Likert scale score, 2.44 [0.12]; P < .001). There was agreement on the use of chemotherapy for synovial sarcoma, for high-grade tumors, for tumors larger than 10 cm, for patients younger than 50 years of age, and for survival benefit. Medical oncologists were more likely to recommend chemotherapy for margins positive for tumor (mean [SEM] score, 3.12 [0.12]; P = .03) and for improvement in local control (mean [SEM] score, 2.91 [0.12] P = .08). Surgical oncologists placed the least emphasis on chemotherapy in the overall treatment plan (mean [SEM] score, 2.60 [0.07]; P = .001).

CONCLUSIONS AND RELEVANCE Specialty bias exists in adjuvant treatment recommendations for STS. This highlights the importance of multidisciplinary STS tumor boards and interdisciplinary care to facilitate consensus decision making for individual patients.
he contemporary management of soft tissue sarcoma (STS) of the extremities requires coordinated multimodality treatment strategies involving several specialties in a multidisciplinary setting. For localized disease, surgical resection is the cornerstone of curative-intent therapy and, with the addition of radiation therapy, has been crucial in establishing limb-sparing surgery as the standard of care. This approach was validated in seminal randomized trials demonstrating equivalent survival outcomes between amputation and conservative limb-sparing surgery combined with radiation therapy.1-2

Although the magnitude of the benefit of adjuvant systemic chemotherapy for localized STS is modest, statistically significant improvements in disease-free and overall survival have been shown in some randomized phase III trials.3-4 The Sarcoma Meta-analysis Collaboration4 demonstrated an improvement in overall recurrence-free survival and a trend toward improved overall survival from pooled data. These findings were most notable for patients with STS of the extremities. Moreover, a more recent meta-analysis6 demonstrated improvement in overall survival when doxorubicin hydrochloride was used in combination with ifosfamide.

Despite the availability of data from randomized trials, variation in the multimodality treatment of patients with STS of the extremities exists. Although patient-specific factors have been identified that contribute to the variation in treatment and outcome, physician-specific factors have not been well studied. Martinez et al7 showed that African American patients with STS of the extremities receive lower rates of adjuvant radiation therapy and experience worse disease-specific survival than do white patients. Similarly, low socioeconomic status is associated with poorer overall survival for patients with STS.8 Recently, our group showed that physician experience influences treatment sequencing in STS.9

The objective for our study was to assess the influence of physician specialty in the management of patients with STS of the extremities. We hypothesized that clinical specialty leads to bias in recommendations for adjuvant radiation therapy and systemic chemotherapy among patients undergoing curative-intent surgery for STS of the extremities. As secondary objectives, we sought to explore patient- and tumor-specific factors influencing physician recommendations for radiation therapy and chemotherapy, as well as the specialty-specific perceived benefits of these treatments.

Methods

Study Design and Survey Instrument
We conducted our study using survey methods. The survey was developed by 2 of the authors (N.W. and R.J.C.) following a literature review and a small focus group discussion. Pilot testing of the survey was performed internally at the University of California at Davis Medical Center in Sacramento for face and content validity to develop the final construct of 16 questions. Commercially available software (QuestionPro) was used for digitization and electronic dissemination via the World Wide Web in November 2009, as has been discussed previously.10

A cover paragraph explaining the purpose of our study accompanied the survey, and a reminder was sent to participants who did not respond to the initial request. No incentive was provided to complete the survey.

The complete survey questionnaire is provided in Table 1. The initial set of questions was structured to identify physician specialty. Subsequent modules addressed utilization of radiation therapy or systemic chemotherapy in the management of localized STS amenable to treatment with curative intent. Patient- and tumor-specific factors influencing the use of either radiation therapy or chemotherapy were queried. We did not specifically inquire about brachytherapy or intraoperative radiation therapy because these techniques are not widely available, even among academic, tertiary referral centers.

Results

Demographics
The questionnaire was sent to 490 potential respondents and completed by 320 (65%). Data on the breakdown by specialty, by years in practice, and by percentage of clinical practice devoted to sarcoma care are outlined in Table 2. For specialty, “others” consisted primarily of pediatric hematologists/oncologists and pathologists.

Role of Radiation Therapy in Management of STS
Although respondents agreed that radiation therapy plays an important role in treatment overall (mean [SEM] Likert scale score, 3.81 [0.04]), significant variation in responses among specialties was observed. Radiation oncologists placed the most emphasis on the role of radiation therapy (mean [SEM] score,
Table 1. Complete Questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible Responses</th>
</tr>
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</table>
| 1) What is your Specialization? | a) Medical Oncology  
  b) Orthopedic Oncology  
  c) Radiation Oncology  
  d) Surgical Oncology  
  e) Other |
| 2) How much of your clinical practice is devoted to the treatment of soft tissue sarcoma? | a) Exclusively sarcoma >75%  
  b) Significant amount 25%-75%  
  c) Not a major component <25%  
  d) Almost never <5% |
| 3) When did you complete your oncology training? | a) <5 years ago  
  b) 5-15 years ago  
  c) 15-25 years ago  
  d) >25 years ago  
  e) n/a |
| 4) At your institution, are you able to access a multidisciplinary Sarcoma Tumor Board to present your sarcoma cases for discussion and review? | a) Yes  
  b) No |
| 5) If you have access to a Sarcoma Tumor Board, how helpful are the discussions/recommendations in the management of your patients on a scale of 1-5 (1 = Never helpful and 5 = Always helpful)? | Likert scale 1 2 3 4 5 |
| 6) In patients with localized extremity soft tissue sarcoma, what is the importance of radiation therapy as a part of your treatment plan on a scale of 1-5 (1 = Not essential 5 = Essential)? | Likert scale 1 2 3 4 5 |
| 7) When making decisions regarding radiation therapy in localized extremity soft tissue sarcoma, which of the following patient or tumor characteristics would prompt you to recommend radiation on a scale of 1-5 (1 = Never and 5 = Always)? | a) Primary tumor size 5-10 cm Likert scale 1 2 3 4 5  
  b) Primary tumor size >10 cm Likert scale 1 2 3 4 5  
  c) Patient age <50 years Likert scale 1 2 3 4 5  
  d) ECOG 2/KPS 70% Likert scale 1 2 3 4 5  
  e) Low tumor grade Likert scale 1 2 3 4 5  
  f) Well-differentiated liposarcoma Likert scale 1 2 3 4 5  
  g) Myxoid liposarcoma Likert scale 1 2 3 4 5  
  h) Leiomyosarcoma Likert scale 1 2 3 4 5  
  i) MFH/Pleomorphic sarcoma Likert scale 1 2 3 4 5  
  j) Other histologic subtype (fill-in) Likert scale 1 2 3 4 5  
  k) Microscopically positive margin Likert scale 1 2 3 4 5  
  l) Tumor deep to fascial plane Likert scale 1 2 3 4 5  
  m) Tumor close to neurovascular bundle Likert scale 1 2 3 4 5  
  n) Local control benefit with radiation Likert scale 1 2 3 4 5  
  o) Survival benefit with radiation Likert scale 1 2 3 4 5 |
| 8) In patients with localized extremity soft tissue sarcoma who are candidates for radiation therapy, on a scale of 1-5 do you prefer preoperative or postoperative radiotherapy (1 = Always preoperative 5 = Always postoperative)? | Likert scale 1 2 3 4 5 |
| 9) When choosing between preoperative and postoperative radiation therapy, which of the following factors would influence you to recommend preoperative or postoperative radiation for localized extremity soft tissue sarcoma on a scale of 1-5 (1 = Never and 5 = Always)? | a) Tumor downstaging in preoperative setting Likert scale 1 2 3 4 5  
  b) Improved tissue perfusion in preoperative setting Likert scale 1 2 3 4 5  
  c) Well-defined treatment volume in preoperative setting Likert scale 1 2 3 4 5  
  d) Increased acute morbidity/wound complications Likert scale 1 2 3 4 5 with preoperative radiotherapy  
  e) Increased late tissue morbidity with Likert scale 1 2 3 4 5 postoperative radiotherapy |

(continued)
4.26 [0.10]) (Figure 1A). Similarly, radiation oncologists were also more likely to think that radiation therapy was underutilized in the management of localized STS (mean [SEM] score, 2.44 [0.12]; *P* < .001) (Figure 1B).

**Factors Influencing Use of Radiation Therapy**

The variables most likely to influence a treatment recommendation in favor of radiation therapy were the presence of margins positive for tumor (mean [SEM] Likert scale score, 4.50 [0.04]), the presence of a high-grade tumor (mean [SEM] score, 4.35 [0.04]), improvement in local control (mean [SEM] score, 4.29 [0.04]), the presence of a tumor larger than 10 cm (mean [SEM] score, 4.22 [0.05]), and the presence of a tumor close to a neurovascular bundle (mean [SEM] score, 4.07 [0.04]), ranked in order of importance (Table 3). Survival benefit was the least important consideration (mean [SEM] score, 2.67 [0.06]). A tumor size of 5 to 10 cm and patient age younger than 50 years ranked low as indications for adjuvant radiation therapy.

**Variation in Responses to Use of Radiation Therapy**

Interspecialty variation was observed in responses for all variables except for margins positive for tumor (Table 3). In par-
Table 2. Characteristics of Respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Respondents, No. (%)</th>
</tr>
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<tbody>
<tr>
<td>Specialty</td>
<td></td>
</tr>
<tr>
<td>Surgical oncology</td>
<td>144 (45)</td>
</tr>
<tr>
<td>Orthopedic oncology</td>
<td>70 (22)</td>
</tr>
<tr>
<td>Medical oncology</td>
<td>58 (18)</td>
</tr>
<tr>
<td>Radiation oncology</td>
<td>26 (8)</td>
</tr>
<tr>
<td>Others</td>
<td>22 (7)</td>
</tr>
<tr>
<td>Total</td>
<td>320 (100)</td>
</tr>
<tr>
<td>Years in practice</td>
<td></td>
</tr>
<tr>
<td>&lt;5</td>
<td>67 (22)</td>
</tr>
<tr>
<td>5-15</td>
<td>118 (38)</td>
</tr>
<tr>
<td>&gt;15</td>
<td>122 (40)</td>
</tr>
<tr>
<td>Total</td>
<td>307 (100)</td>
</tr>
<tr>
<td>% of practice devoted to sarcoma care</td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>39 (12)</td>
</tr>
<tr>
<td>25-75</td>
<td>124 (39)</td>
</tr>
<tr>
<td>&gt;75</td>
<td>157 (49)</td>
</tr>
<tr>
<td>Total</td>
<td>320 (100)</td>
</tr>
</tbody>
</table>

In particular, both radiation oncologists (mean [SEM] Likert scale score, 4.33 [0.14]) and medical oncologists (mean [SEM] score, 4.04 [0.08]) favored radiation therapy for tumors 5 to 10 cm in size compared with other specialists. For patients younger than 50 years of age, radiation oncologists were more likely to consider radiation therapy to be important (mean [SEM] score, 3.81 [0.18]) compared with surgical and medical oncologists. For tumors deep to the fascial plane, radiation oncologists were again more inclined to offer radiation therapy (mean [SEM] score, 4.46 [0.11]). Interestingly, radiation oncologists most strongly disagreed that radiation therapy was not indicated for low-grade tumors (mean [SEM] score, 2.13 [0.14]) or radiation-associated sarcoma (mean [SEM] score, 2.44 [0.22]). Of all respondents, radiation oncologists showed the highest agreement with an improvement in local control with adjuvant radiation therapy (mean [SEM] score, 4.63 [0.10]), whereas surgical oncologists showed the highest disagreement with a survival benefit from adjuvant radiation therapy (mean [SEM] score, 2.55 [0.09]).

Influence of Years in Practice and Percentage of Clinical Practice Devoted to Sarcoma Care on Use of Radiation Therapy

We stratified respondents by years of practice (<5, 5-15, and >15 years) and percentage of clinical practice devoted to sarcoma care (<25%, 25%-75%, and >75%) to assess the effect of experience on factors influencing the use of radiation therapy. In all of the variables listed in Table 3, no significant difference in aggregate response was seen for respondents when considering percentage of clinical practice (<25%, 25%-75%, and >75%) independent of specialty. For years of practice, those respondents who had been in practice for 5 to 15 years were more likely to recommend radiation therapy for tumors larger than 10 cm than were those in practice for more than 15 years (mean [SEM] Likert scale score, 4.39 [0.06] vs 4.09 [0.08]; P = .011). A survival benefit for radiation therapy was more important for respondents in practice for more than 15 years than for those in practice for less than 5 years (mean [SEM] score, 2.86 [0.1] vs 2.35 [0.1]; P = .007).

Role of Chemotherapy in Management of STS

Systemic chemotherapy was considered a less important factor than radiation therapy in the overall management strategy for STS of the extremities (mean [SEM] Likert scale score, 2.78 [0.05]). Again, variation in response by specialty was observed. Medical oncologists (mean [SEM] score, 3.00 [0.09]) placed the greatest emphasis on systemic chemotherapy, and surgical oncologists the least (mean [SEM] score, 2.60 [0.07]; P = .001) (Figure 2A). Overall, specialists agreed that systemic chemotherapy was appropriately utilized (mean [SEM] score, 3.17 [0.05]) (Figure 2B).

Factors Influencing Use of Chemotherapy in Treatment

No single variable was rated as greater than 4.0 in the recommendation to utilize systemic chemotherapy. The presence of synovial sarcoma (mean [SEM] Likert scale score, 3.67 [0.12]),
the presence of a high-grade tumor (mean [SEM] score, 3.54 [0.06]), and the presence of a tumor larger than 10 cm (mean [SEM] score, 3.24 [0.06]) were the most important variables identified by respondents in their decision to recommend systemic chemotherapy (Table 4). Improvement in local control (mean [SEM] score, 2.54 [0.06]), the presence of surgical margins positive for tumor (mean [SEM] score, 2.84 [0.06]), and the presence of tumors 5 to 10 cm in size (mean [SEM] score, 2.85 [0.05]) were the least important. The survival benefit from chemotherapy was considered to be more substantial than that for radiation therapy (mean [SEM] score, 3.17 [0.06]).

**Variation in Responses by Specialty in Use of Chemotherapy**

Overall, no significant differences in responses were seen in recommending systemic chemotherapy for patients younger than 50 years of age or for any tumor size. Medical oncologists were more likely to recommend systemic chemotherapy for high-grade tumors (mean [SEM] Likert scale score, 3.75 [0.15]), and orthopedic oncologists were more likely to recommend it for synovial sarcoma (mean [SEM] score, 3.73 [0.12]). Medical oncologists were also more likely to attribute an improvement in local control to systemic chemotherapy (mean [SEM] score, 2.91 [0.12]; \( P = .08 \)) and to recommend it for margins positive for tumor (mean [SEM] score, 3.12 [0.12]; \( P = .03 \)).

**Influence of Years in Practice and Percentage of Clinical Practice Devoted to Sarcoma Care on Use of Systemic Chemotherapy**

Years in practice only influenced the opinion about local control with chemotherapy. Respondents with more than 15 years in practice felt that systemic chemotherapy had a greater effect on local control than those with less than 5 years in practice (mean [SEM] Likert scale score, 2.71 [0.06] vs 2.31 [0.10]; \( P = .02 \)). Respondents who had greater than 75% of their clinical practice devoted to sarcoma care had differing responses on several of the factors compared with those who had less than 25% of their clinical practice devoted to sarcoma care. They placed more importance on systemic chemotherapy overall (mean [SEM] score, 3.05 [0.12] vs 2.65 [0.07]; \( P = .014 \)) and on the survival benefit from therapy (mean [SEM] score, 3.32 [0.15] vs 3.00 [0.08]; \( P = .02 \)). They were also more likely to recommend systemic chemotherapy for tumors larger than 10 cm.
Abbreviation: MFH, malignant fibrous histiocytoma.

for patients with high-grade STS, with large tumors, or with fi-

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recommendations that are based on expert opinion rather than

the preponderance of treatment guidelines and tumor board

intuitive, it has not been well studied in the medical litera-

tion of their specialty-specific modality. Although this may seem

vors to guide treatment decisions in the multidisciplinary manage-

ment of STS of the extremities, there is a lack of consensus re-

garding relative indications for the use of adjuvant radiation

therapy and systemic chemotherapy. By studying specialty-
specific responses to scenarios on the use of radiation therapy

and systemic chemotherapy in the treatment of localized STS,

we show that physician specialty is an important factor con-

tributing to variability in treatment recommendations.

The importance of radiation therapy in the management

of STS of the extremities was rated highest by radiation on-

cologists, who were also more likely to assert that radiation

therapy is underutilized in the multimodality treatment of pa-

tients with STS. Similarly, among all the responding physi-

icians, medical oncologists assigned the greatest importance

to systemic chemotherapy, even though, overall, most respond-

ents felt that current utilization was appropriate.

Considerable interspecialty variation was observed with

regard to indications for treatment, which suggests that, even

among experts, there is a diversity of opinions regarding the

multidisciplinary management of STS of the extremities. In

general, clinicians’ recommendations tend to be biased in fa-

vor of their specialty-specific modality. Although this may seem

intuitive, it has not been well studied in the medical litera-

ture, in general, or in the sarcoma literature, in particular. Given

the preponderance of treatment guidelines and tumor board

recommendations that are based on expert opinion rather than

level I evidence for a rare disease process such as STS of the

extremities, it would seem to be important to deconstruct the

process by which clinicians at the individual and group level

arrive at treatment recommendations.

Current National Comprehensive Cancer Network guide-

lines recommend consideration of adjuvant radiation therapy

for patients with high-grade STS, with large tumors, or with fi-

nial margins close to or positive for tumors.11 Our respondents
demonstrated the highest agreement across all specialties in
cases of STS of the extremities with margins positive for tu-

mor, with a high-grade tumor, with a tumor size of greater than

10 cm, or with a tumor close to a neurovascular bundle. Al-

though respondents rated improvement in local control as a sig-

nificant benefit of radiation therapy, improvement in overall

survival was not. These responses are consistent with the pub-
lished literature regarding the oncologic benefits of adjuvant

radiation therapy.12

However, subtle but important differences emerged when

we analyzed the responses by physician specialty. Radiation

oncologists were more likely to offer radiation therapy to pa-
tients younger than 50 years of age and for tumors 5 to 10 cm

in maximal size. Furthermore, they were more inclined to dis-
agree with the statements that radiation therapy is not indi-
cated for radiation-associated STS of the extremities and that
radiation therapy is not indicated for low-grade STS of the ex-

tremities. These are controversial areas in which specific evi-
dence-based data and guidelines are not available and for which
clinicians may have substantially different views of the risk-

benefit ratio of treatment.13,14

Overall, respondents viewed chemotherapy as less impor-
tant than radiation therapy in the multidisciplinary manage-
ment of STS of the extremities. This appropriately reflects the
conflicting nature of data from randomized trials examining the
benefits of adjuvant chemotherapy in STS of the extremities.
Interestingly, both radiation and surgical oncologists placed less
emphasis on a survival benefit with chemotherapy than did
medical oncologists and orthopedic oncologists. Medical on-
cologists felt that chemotherapy played a greater role in local
control than did surgical oncologists. These opinions are sup-
ported by outcomes data. In the previously quoted meta-
analysis of systemic therapy in STS,6 the hazard ratio with
adjuvant chemotherapy for local recurrence was 0.73 (95% CI,
0.56-0.95), which corresponds to a 4% reduction in absolute risk.
For synovial sarcoma, orthopedic oncologists felt most strongly
about recommending chemotherapy, which may be explained
by practice patterns (ie, orthopedic oncologists treat a higher
proportion of younger patients with bone sarcoma and STS for
whom chemotherapy is more routinely administered).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall Mean</th>
<th>Medical Oncology</th>
<th>Orthopedic Oncology</th>
<th>Radiation Oncology</th>
<th>Surgical Oncology</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor 5-10 cm in size (n = 312)</td>
<td>2.85 (0.05)</td>
<td>3.25 (0.13)</td>
<td>3.10 (0.11)</td>
<td>2.67 (0.23)</td>
<td>2.55 (0.07)</td>
<td>.11</td>
</tr>
<tr>
<td>Tumor &gt;10 cm in size (n = 311)</td>
<td>3.24 (0.06)</td>
<td>3.62 (0.14)</td>
<td>3.54 (0.11)</td>
<td>2.89 (0.26)</td>
<td>2.99 (0.08)</td>
<td>.10</td>
</tr>
<tr>
<td>Age &lt;50 y (n = 311)</td>
<td>3.04 (0.06)</td>
<td>3.25 (0.14)</td>
<td>3.52 (0.11)</td>
<td>2.59 (0.19)</td>
<td>2.80 (0.07)</td>
<td>.13</td>
</tr>
<tr>
<td>High-grade tumor (n = 312)</td>
<td>3.54 (0.06)</td>
<td>3.75 (0.15)</td>
<td>3.74 (0.11)</td>
<td>3.19 (0.27)</td>
<td>3.39 (0.08)</td>
<td>.04</td>
</tr>
<tr>
<td>Pleomorphic sarcoma or MFH (n = 314)</td>
<td>3.29 (0.06)</td>
<td>3.30 (0.14)</td>
<td>3.51 (0.11)</td>
<td>3.07 (0.26)</td>
<td>3.17 (0.08)</td>
<td>.02</td>
</tr>
<tr>
<td>Synovial sarcoma (n = 312)</td>
<td>3.67 (0.12)</td>
<td>3.73 (0.12)</td>
<td>4.01 (0.09)</td>
<td>3.30 (0.23)</td>
<td>3.55 (0.08)</td>
<td>.049</td>
</tr>
<tr>
<td>Margins positive for tumor (n = 314)</td>
<td>2.84 (0.06)</td>
<td>3.12 (0.12)</td>
<td>2.84 (0.19)</td>
<td>2.41 (0.20)</td>
<td>2.81 (0.08)</td>
<td>.03</td>
</tr>
<tr>
<td>Improvement in local control (n = 313)</td>
<td>2.54 (0.06)</td>
<td>2.91 (0.12)</td>
<td>2.61 (0.12)</td>
<td>2.37 (0.21)</td>
<td>2.32 (0.08)</td>
<td>.09</td>
</tr>
<tr>
<td>Survival benefit (n = 313)</td>
<td>3.17 (0.06)</td>
<td>3.27 (0.13)</td>
<td>3.56 (0.10)</td>
<td>2.77 (0.23)</td>
<td>2.99 (0.08)</td>
<td>.08</td>
</tr>
</tbody>
</table>

Abbreviation: MFH, malignant fibrous histiocytoma.

* Indicating significant results of analysis of covariance. Between-group differences are further discussed in the text.

(mean [SEM] score, 3.58 [0.18] vs 3.03 [0.08]; P = .009) and for

patients younger than 50 years of age (mean [SEM] score, 3.29 [0.16] vs 2.86 [0.08]; P = .004).
For clinical scenarios in which adjuvant treatment is clearly indicated, such as radiation therapy for large or high-grade STS and chemotherapy for younger patients with favorable subtypes, any lack of agreement by specialists is concerning. Either the current data are felt to be inadequate to inform clinical decision making or there is unfamiliarity with data outside one’s scope of practice. An argument could also be made for better quality studies. Furthermore, if the first point of contact for a patient is a specialist who places less importance on adjuvant therapy, then the treatment algorithm may not progress beyond surgical resection. Our data also point to the importance of a multidisciplinary STS tumor board. Even though individual physicians may have differing opinions about treatment, in aggregate, the best course for the patient will be charted by discussion and consideration of all treatment options. Finally, experience as measured by the percentage of clinical practice devoted to sarcoma care may also influence treatment. In particular, physicians who had greater than 75% of their clinical practice devoted to sarcoma care placed more importance on systemic chemotherapy and a potential survival benefit with these therapies. This bias likely arises from systemic chemotherapy for patients younger than 50 years of age and for tumors larger than 10 cm.

Certain limitations of our study must be acknowledged. Some are related to the survey methods that we used to collect our data. The use of a survey instrument has the inherent limitation of respondent bias because only physicians who were interested or inclined to respond took the time to do so. Although electronic dissemination results in easy and rapid delivery, many e-mail addresses were not valid or had filters, which meant that the survey never arrived to the intended recipient. By opting to only include physicians who were active members of selected oncology societies with a self-declared interest in sarcoma care, we also potentially introduced a selection bias. It is likely that there are additional physicians who treat a substantial number of patients with STS in their clinical practice who were not solicited to participate or who did not participate in this survey. Finally, although statistically significant differences were seen in the mean response rates for many of the questions, whether these translate into meaningful clinical differences is not demonstrated by our data.

To conclude, physician specialty appears to influence recommendations for adjuvant radiation therapy and chemotherapy in STS of the extremities. This bias likely arises from divergent interpretations of published literature and perhaps from a lack of familiarity with data outside one’s clinical scope of practice. Multidisciplinary clinics and tumor boards may be an effective tool for discussions among different specialties to reach consensus decisions and to minimize variation due to specialty bias. However, the effect of specialty bias on multimodality treatment recommendations of expert panels and tumor boards warrants further study.

REFERENCES

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Study concept and design: Wasif, Tamurian, Christensen, Monjazeb, Canter.
Acquisition of data: Smith, Tamurian, Canter.
Analysis and interpretation of data: Wasif, Smith, Monjazeb, Martinez, Canter.
Drafting of the manuscript: Wasif, Smith, Canter.
Critical revision of the manuscript for important intellectual content: Wasif, Tamurian, Christensen, Monjazeb, Martinez, Canter.
Statistical analysis: Wasif.
Administrative, technical, and material support: Tamurian, Canter.
Study supervision: Tamurian, Canter.
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Overcoming Specialty Bias
Karen L. Sherman, MD; Jeffrey D. Wayne, MD; Karl Y. Bilimoria, MD, MS

Using a national survey of sarcoma experts with an exceptionally high response rate, Wasif and colleagues present an interesting study designed to evaluate whether physician specialty influences adjuvant treatment recommendations in the multidisciplinary management of soft tissue sarcoma and the perceived benefit of these modalities. They reveal a specialty bias in treatment recommendations for soft tissue sarcoma of the extremities that provides unique insights into understanding the existing variation in treatment approaches for this relatively rare disease.

This study raises some important issues regarding the current treatment of soft tissue sarcoma and the factors influencing recommendations for adjuvant therapy. Not surprisingly, Wasif and colleagues identified physician specialty-associated variation in adjuvant treatment recommendations for many clinical scenarios involving soft tissue sarcoma of the extremities. These findings suggest that the quality of available evidence may be insufficient to standardize clinical decision making and, importantly, that physician specialty may play a prominent role in treatment decisions. This may be based on training paradigms (ie, better knowledge of the literature in one's own domain), or it may also be self-serving (eg, physician reimbursement may prompt utilization of their services). Nonetheless, the coordinating physician's specialty may have the greatest effect on the treatment plan and use of adjuvant therapies by controlling subsequent referrals.

Given its rarity and histologic heterogeneity, soft tissue sarcoma presents several unique challenges in patient management. To address this challenges, the National Comprehensive Cancer Network has compiled comprehensive patient treatment guidelines that are universally available and updated annually by a multidisciplinary specialist panel from each member institution. Although the majority of evidence on which the guidelines are based is level 2A (based on lower level evidence) for the vast majority of recommended interventions, there is consensus among the multispecialty panels. Additional histology-specific studies on the role and sequence of adjuvant treatment may guide treatment for specific histologic subtypes. In the end, we concur with Wasif and colleagues and with the National Comprehensive Cancer Network sarcoma panel: All sarcoma patients should be managed by a multidisciplinary team with expertise in sarcoma to mitigate individual physician and physician specialty treatment bias.

ARTICLE INFORMATION
Author Affiliations: Surgical Outcomes and Quality Improvement Center, Division of Surgical Oncology, Department of Surgery, Feinberg School of Medicine, and Northwestern Institute for Comparative Effectiveness Research in Oncology, Robert H. Lurie Comprehensive Cancer Center, Northwestern University, Chicago, Illinois (Sherman, Wayne, Bilimoria).

Corresponding Author: Dr Bilimoria, Surgical Outcomes and Quality Improvement Center, Division of Surgical Oncology, Department of Surgery, Northwestern University, Feinberg School of Medicine, 676 N St Clair, Ste 6-650, Chicago, IL 60611 (k-bilimoria@northwestern.edu).

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