Editorial

The surgeon will see you now: selecting soft-tissue sarcoma patients for pulmonary metastasectomy

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Soft-tissue sarcoma (STS) is a heterogeneous disease comprised by a number of histologic subtypes. Patterns of metastases, however, are common amongst these tumors. In particular, the lung is the primary site of metastases in STS and pulmonary metastases develop in up to 50% of STS patients (1-4). In the relative absence of effective systemic therapy, metastatic STS presents significant challenges in oncology, and pulmonary metastasectomy (PM) has become a common therapeutic modality for patients with metastatic pulmonary disease (3,5). The data underlying the rationale for PM for STS, however, are comprised predominantly by low level evidence, and it has been argued that the favorable outcomes of PM studies are resultant from selection biases towards tumors with favorable tumor biology. Whereas to some extent this may be true, an opposing argument supports the viewpoint that a thorough understanding of patient characteristics associated with favorable clinical outcomes could be utilized to intentionally select individuals in whom PM is beneficial. Such data would be clinically useful and could contribute to a decision-making framework for patients with STS.

In their study, Chudgar and colleagues from Memorial Sloan Kettering Cancer Center endeavored to identify factors associated with improved survival for patients with STS undergoing PM. Their study features a robust dataset of 539 patients undergoing 760 therapeutic-intent PMs over the span of 23 years, representing the largest single-institution study on STS pulmonary metastases. In this report, the authors demonstrated median overall survival (OS) of 33.2 months and median disease-free survival (DFS) of 6.8 months for their entire cohort. These survival estimates compare favorably with previous reports of PM for STS in which patients experienced OS ranging 16 to 36 months (6-9). Other studies on PM for STS, however, have demonstrated slightly higher DFS of 9 to 20 months, though these were studies of significantly smaller population samples (5,10). To dissect the underpinnings of these findings, Chudgar et al. conducted elegant statistical analyses to determine the association between clinicopathologic variables and treatment characteristics with OS and DFS. Multivariable analyses demonstrated that leiomyosarcoma histologic subtype, primary tumor size ≤10 cm, increasing time from primary tumor resection to development of metastases, solitary lung metastasis, and minimally invasive resection, were each associated with a lower hazard of death. Disease-free interval ≥1 year and having a single pulmonary metastasis were associated with lower hazard of disease recurrence. Among factors contributing to recurrence, pleomorphic sarcoma (PS) and malignant fibrous histiocytoma (MFH) tumor types, tumor sizes larger than 10 cm, and high-grade tumors were associated with shorter disease-free intervals. In contrast to previous reports, histologic grade, while predicting a shorter disease-free interval (1,9), was not associated with increased risk of death. Consistent with previous findings that OS is negatively associated with the number of metastases resected (1,7), patients in this study who presented with synchronous extrapulmonary metastases or with more than one pulmonary metastasis had a shorter DFS.

A time-honored debate in PM has been centered on the

use of minimally invasive versus open surgical approaches (10-12). In particular, computed tomography imaging has a known 20% failure rate for the detection of small pulmonary metastases (versus manual palpation), not all non-imaged lesions are malignant, and the clinical impact of small, non-imaged metastases is unknown (11). Over the course of the study, Chudgar and colleagues demonstrated a 4-fold increase in the use of minimally invasive surgery (MIS). Interestingly, in multivariable analyses, MIS was associated with a reduced risk of death, while extent of resection and completeness of resection were not. The authors present an argument that MIS is most commonly selected for peripheral, low-volume metastatic disease and therefore acknowledge that robust preoperative selection criteria can aid surgeons in identifying both patient candidates for MIS and those who may achieve longer survival with PM. Overall, the data presented in this publication offer a foothold for more widespread use of the video-assisted thoracoscopic surgery (VATS) approach to pulmonary resection.

In summary, Chudgar and colleagues have delineated prognostic factors that are clinically useful in selection of STS patients for PM. Such a comprehensive understanding of these preoperative factors has utility for refining the selection of patients with STS pulmonary metastases who will benefit from surgery, from both OS and recurrence free survival standpoints. The impact of this manuscript lies in the strengthened support for PM as a safe, reliable, and effective therapeutic approach for patients with STS pulmonary metastases while our understanding of the biology underlying STS metastases evolves.

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