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CORR Insights®: Is It Appropriate to Treat Sarcoma Metastases With Intramedullary Nailing?

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Where Are We Now?

Two of the most-discussed and debated topics in orthopaedic oncology are the management of sarcoma and metastatic disease of bone. It is appropriate to view these conditions separately, as the

approaches to overall and surgical management are distinctly different.

Sarcoma typically is treated by complete surgical resection, often in attempt to completely eradicate all signs of malignancy and provide long-term survival. In contrast, metastatic bone disease is a systemic process, and complete surgical resection is unlikely to impact the overall survival of a patient to any meaningful degree.

In patients with a sarcoma that has spread to bone, the treatment considerations are closest to metastatic disease of bone, in that surgery likely will not impact survival and the surgical goals instead focus on pain control, functional restoration, and implant durability. A primary concern in this management approach (stabilization without formal resection) for metastatic sarcoma is local control of the tumor. Sarcoma cannot be controlled reliably with intralesional

excision or debulking, and any procedure short of complete resection results in a high risk for local recurrence, threatening implant integrity and patient quality-of-life. Thus, the clinician is faced with genuine clinical uncertainty, as it is unclear whether treatment of an impending or actual pathologic fracture in metastatic sarcoma by stabilization without en bloc resection will provide a durable reconstruction for the remainder of a patient's life. Moon and colleagues have provided the most-informative report to date; they show that intramedullary fixation, with selection criteria similar to metastatic carcinoma, is justifiable and was the definitive surgical procedure in 85% of patients.

Where Do We Need To Go?

A tenet common to all surgical intervention is that the success of a procedure is dependent on appropriate indications and patient selection. This report emphasizes that intramedullary nailing of metastatic sarcoma is not recommended as a universal treatment.

This CORR Insights® is a commentary on the article "Is It Appropriate to Treat Sarcoma Metastases With Intramedullary Nailing?" by Moon and colleagues available at: DOI: [10.1007/s11999-016-5069-8](https://doi.org/10.1007/s11999-016-5069-8).

The author certifies that he, or a member of his immediate family, has no funding or commercial associations (eg, consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

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This *CORR Insights®* comment refers to the article available at DOI: [10.1007/s11999-016-5069-8](https://doi.org/10.1007/s11999-016-5069-8).

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The authors note a large number of patients over this same time period who were managed with resection and reconstruction rather than intramedullary stabilization. Although these cases are not presented in detail, it would be expected that this group would have larger tumors, more bone destruction, and better prognoses. If these individuals had not been selected out, and had instead been treated with an intramedullary nail, without question, the proportion of patients undergoing further surgery would have been higher.

Further analysis of the patients in this series who did require a reoperation reveals two clear observations: (1) They live longer and (2) the dominant reason for reoperation was tumor progression. Whereas the overall median survival of the cohort was 5 months, emphasizing the overall poor health and dire state of patients with metastatic sarcoma, the median survival of those who underwent additional surgery was 42 months, with revisions occurring at a median of 12 months after surgery (well after the majority of the cohort had succumbed to disease). Four of the five patients who underwent reoperation were directly related to tumor progression, a rate higher than reported in prior investigations describing intramedullary fixation of metastatic disease of bone [1, 4, 6]. While tumor progression may be the documented cause of reoperation, it is

ultimately the patient's more favorable prognosis that allowed tumor growth to become an issue. Thus, the most significant gap in knowledge that remains is reliably determining an accurate prognosis for this select group of patients. If individuals who will experience prolonged survival and adequate control of their systemic disease can be accurately identified, interventions designed around complete tumor removal and more durable reconstruction may minimize the need for reoperations.

How Do We Get There?

Choosing patients anticipated to have less than 6 months of survival would improve the success of intramedullary fixation in metastatic sarcoma. The ideal indication would be someone who is barely a surgical candidate, but is suffering from pain or dysfunction, such as from an impending or actual pathologic fracture, that would be successfully addressed with intramedullary stabilization alone. Appropriate patient selection is heavily dependent upon clinical judgment, but may be assisted by reliable sources of information on prognosis. Reports utilizing clinical factors to predict survival, such as nomograms or Bayesian belief networks [3, 5], may help treating surgeons accurately select patients with a dismal prognosis. Most survival

estimates in sarcoma are based upon the success of treatment with curative intent, and do not provide the level of detail required to make a decision about short-term survival of a patient with a large disease burden. Fortunately, attempts to predict survival in patients with metastatic bone disease have included sarcoma as a diagnostic category [2]. Continuing research in this area is certainly justified, and these models will only be strengthened by the addition of more observations over time, with the possibility of further stratification by sarcoma subtype.

Finally, orthopaedic oncologists must keep current on changing systemic treatments, which may influence survival in metastatic sarcoma as it has in metastatic carcinoma and multiple myeloma. If a future intervention were to extend someone's life for as short as an additional 6 months, it could have a notable negative impact on fixation durability to the point that a formal resection and reconstruction would be warranted.

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