



## CORR Tumor Board

**CORR® Tumor Board: Is Prophylactic Intervention More Cost-Effective than the Treatment of Pathologic Fractures in Metastatic Bone Disease?**

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**W**hat are the surgical and research implications of “Is Prophylactic Intervention More Cost-effective Than the Treatment of Pathologic Fractures in Metastatic Bone Disease?” DOI: [10.1007/s11999-016-4739-x](https://doi.org/10.1007/s11999-016-4739-x).

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The costs for orthopaedic care of patients with metastatic disease of

bone are rising. Generally speaking, the increased incidence of cancer, and increased longevity of patients who have cancer, particularly those with tumors that have a propensity to metastasize to bone, have contributed to the cost of care. Of course, there are other dynamics involved in medical economics, and assessing these can be extremely complex. For most physicians, it would be extremely challenging to become a master of this arena in the setting of a busy clinical practice, with teaching and research responsibilities, and we applaud those who have directed their career path to doing so.

We all have a sense, though, of when certain care options should be less costly than others. Patients who are treated prophylactically come in mentally prepared for the surgery and its recovery, and the operations tend to go more smoothly. For these reasons and perhaps others, it seems intuitive that the cost to care for a patient with a metastatic bone lesion should be less if it is fixed prior to fracture than after fracture. In their study, the authors test

*A Note from the Editor-in-Chief: We are pleased to present the next installment of The CORR® Tumor Board column. The CORR® Tumor Board column provides multidisciplinary perspective on the themes raised in selected CORR® tumor papers. In this column, we will discuss the implications of the highlighted article from the varied disciplines of the Tumor Board members: Orthopaedic surgery, pathology, and radiology. This month’s column features the study “Is Prophylactic Intervention More Cost-effective Than the Treatment of Pathologic Fractures in Metastatic Bone Disease?” by Blank and colleagues available at: DOI: [10.1007/s11999-016-4739-x](https://doi.org/10.1007/s11999-016-4739-x).*

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this logic. Their paper argues in favor of what we sense to be the case, but also demonstrates the challenges of collecting and analyzing the appropriate data. If cost data could be collected across more or all centers in the country, in a similar way, true and complete, the results would only increase in validity and applicability. In the end, who better to advocate for best practices with an eye to cost for orthopaedic care of patients with metastatic disease of bone than orthopaedic surgeons?

*What issues does this study raise in terms of musculoskeletal imaging?*

**Jim S. Wu MD**

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From an imaging standpoint, the study underscores the importance of accurately detecting metastatic bone lesions and reporting their risk of pathologic fracture. The detection of metastatic disease through myriad imaging studies can be complicated. For instance, prostate cancer metastases are best assessed with bone scan; however, bone scan would not be as useful for the evaluation of metastatic renal cell carcinoma or multiple myeloma. Many clinicians

are aware of these nuances, but it is important for the radiologist and clinician to work in concert in order to optimize the detection and characterization of potential bone metastases. Next, the study underscores the importance for the radiologist to document the risk of fracture of the bone lesion in their report as this can impact management. Often, reports will comment about the size of the lesion, matrix, and bony destruction, but not mention risk of fracture. Commenting on the risk of fracture is important and can help guide treatment, as shown by the results of this article. Ultimately, we must all work together as a team in order to effectively treat patients with metastatic disease of bone.

*What more does the surgeon need to know about musculoskeletal pathology in order to get the most out of this study?*

**Sara O. Vargas MD**

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The work by Blank and colleagues brings up some of the thorny issues involved in examining the cost-effectiveness of prophylactic fixation of cancer metastasis. Understanding the

pathobiology of the bone lesions under study can no doubt help with simpler questions, such as those asked by the authors related to cost comparisons between operation types. It can also shed light on more complex questions, such as understanding a patient's life expectancy and anticipating whether a patient with metastatic cancer is likely to die of disease before progressing to fracture.

A metastatic tumor's tendency to stimulate osteoblastic or osteoclastic activity in the affected bone can, for example, influence the likelihood of fracture. Likewise, a tumor's tendency to grow within the medulla as opposed to the cortex can affect progression to fracture. In the current study, lesions such as nonossifying fibroma, fibrous dysplasia, enchondroma, and neurofibroma are benign disorders; they should not be construed as metastatic lesions, nor are they expected to result in metastasis. Therefore, costs of fixation need not be balanced against any concerns for impending death due to metastatic disease. Hematologic malignancies such as multiple myeloma and lymphoma arise from blood cell types that, even in a nonneoplastic state, circulate through the body. Their involvement of bone/bone marrow is not considered "metastasis" in the same biologic way that solid tumor metastases occur. Chemosensitivity

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of tumors such as some types of lymphoma can greatly affect the risk that a lesion will progress to fracture.

Ideally, we may someday know enough about the pathobiology of metastatic tumor types to effect the ultimate in fracture prophylaxis: to

understand what makes certain tumors “home” to bone, and to develop the tools to block them from landing there in the first place.