

Advanced Case of Spindle Cell Sarcoma on Routine Pathology After a Total Hip Arthroplasty

A Case Report

Simon Greenbaum, MD, Jonathan Krystal, MD, Benjamin J. Levy, MD, David Hirsh, MD, David S. Geller, MD, and Sun Jin Kim, MD

Performing routine pathology on tissue removed during total hip arthroplasty is a practice that remains controversial.¹⁻⁶ Various studies have indicated that there is rarely a discrepancy found between the preoperative diagnosis and the histopathologic diagnosis made from these tissue samples, rendering the postoperative histopathology unnecessary.^{1,4-6} The orthopaedic literature contains case reports of non-Hodgkin's lymphoma, occult osteomyelitis, and various systemic inflammatory diseases being found on routine pathology.^{5,7,8} We present a case of occult metastatic sarcoma discovered on routine pathology from a femoral head during a total hip arthroplasty in a patient with no known risk factors for the disease. Billings et al.⁹ previously reported on two cases of aggressive sarcomas being discovered on routine femoral head pathology, one from a patient with known Paget's disease and the second in a patient with previous irradiation. To our knowledge this is the first published case report of previously unrecognized sarcoma being identified on routine pathology from total hip replacement in a patient with no known risk factors.

Case Report

An 81-year-old female with bilateral hip degenerative joint disease underwent a right total hip arthroplasty in October of 2010 (Fig. 1A). The procedure was performed as intended. There were no complications, and she proceeded to complete the standard postoperative total hip protocol. She was first evaluated by physical therapy on postoperative day one and

progressed until she was stable for discharge to a rehabilitation facility on postoperative day three. Routine histologic evaluation of the resected femoral head was performed and revealed degenerative changes consistent with osteoarthritis.

In February of 2011, she returned for surgical management of degenerative joint disease of the contralateral hip. The procedure was routine (Fig. 1B) except for greater-than-expected blood loss during acetabular preparation, which was attributed at the time to preoperative use of aspirin. Bleeding was controlled and hemostasis was achieved by intermittent packing of the acetabulum and compression. Implants were placed without difficulty and the patient tolerated the procedure well. Despite the increased bleeding noted from the acetabulum, total blood loss was estimated to be only 500 cc. At the time of surgery, the bone and soft tissue did not grossly demonstrate any apparent abnormality. The patient once again progressed through the standard postoperative protocol, and physical therapy recommended discharge to sub-acute rehabilitation.

The femoral head was sent for routine histopathology examination but was noted to be abnormal and suspicious for malignancy on inspection by the pathology team. On the basis of this suspicion, the patient remained an inpatient for an oncologic workup. Final histopathology revealed a large lesion within the femoral head consistent with poorly differentiated spindle cell sarcoma (Fig. 2). The patient underwent staging computed tomography and was found to have a large pelvic mass involving bone and soft tissue structures. Additionally, multiple lesions throughout her ribs and a destructive lesion on the left side of her C1 arch, consistent with metastatic disease, were noted. A subsequent biopsy of the chest wall mass confirmed identical histological findings of metastatic spindle cell sarcoma. After discussion with the patient regarding her goals and personal preferences, the medical and orthopaedic oncology teams pursued a palliative approach in accordance with the patient's wishes.

Simon Greenbaum, MD, Jonathan Krystal, MD, Benjamin J. Levy, MD, David Hirsh, MD, David S. Geller, MD, and Sun Jin Kim, MD, Department of Orthopaedic Surgery, Montefiore Medical Center, Bronx, New York, USA.

Correspondence: Simon Greenbaum, MD, 1250 Waters Place, New York, New York 10461, USA; simongreenbaum@gmail.com.

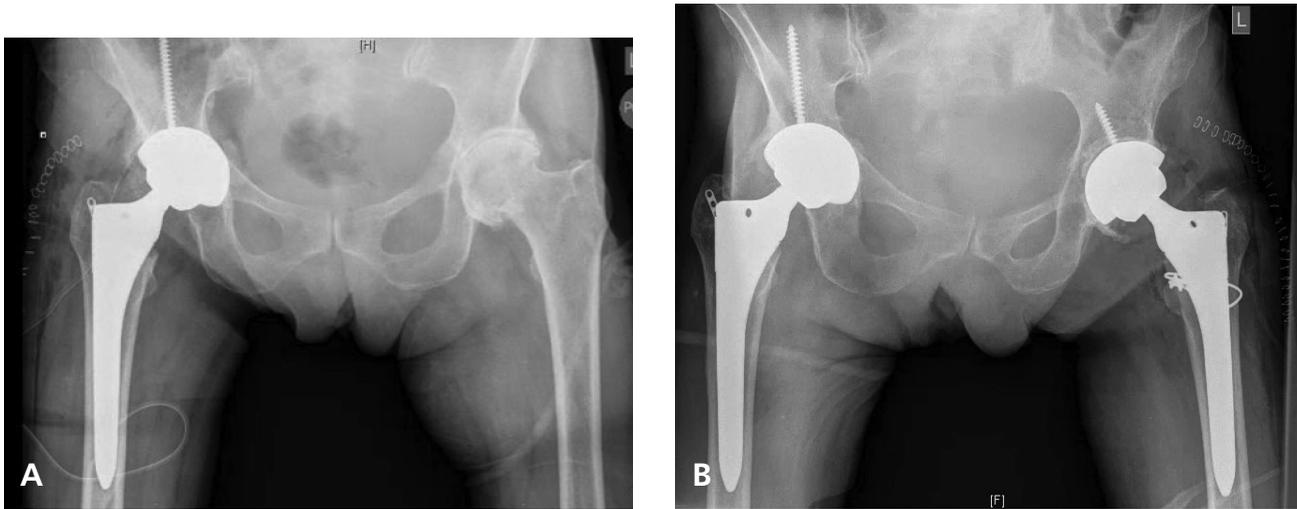


Figure 1 A, Postoperative image from initial right total hip, degenerative disease in left hip is demonstrated. B, Postoperative image from left total hip replacement.

Discussion

There is no universal standard regarding performance of histopathologic examinations on tissue excised during total hip arthroplasty. A recent meta-analysis demonstrated a 0.16% rate of clinically relevant discrepancies in histopathologic and preoperative diagnoses, defining “clinically relevant” as a result that leads to a change in the anticipated treatment plan. Of the reviewed studies from this analysis, significant discrepancies included cases of osteomyelitis and non-Hodgkin’s lymphoma.⁵ Despite the infrequency of clinically relevant findings, the results may be potentially life altering such as the case of a newly diagnosed malignancy. However, the practice remains controversial because of this very low incidence and the relatively high cost and workload, especially at high-volume joint centers.

The current case represents an incidental finding of a previously unrecognized metastatic high-grade malignancy

made following a routine total hip arthroplasty. Spindle cell sarcoma is a poorly differentiated, highly malignant tumor of bone and soft tissue; early detection is among the most important prognostic indicators of outcome.¹⁰ Prior to our index procedure, there was no radiographic or clinical indication of disease. Had the diagnosis been made earlier, more aggressive treatment may have been possible.

To our knowledge, there have been only two prior reported cases of high-grade sarcoma being identified on routine pathology from total hip arthroplasty. This is the first reported case in which there were no identified risk factors in the patient’s history prior to the operation. There are several reports in the literature of other significant findings, including previously unidentified osteonecrosis, rheumatoid arthritis, pigmented villonodular synovitis (PVNS), giant cell tumors, and myeloproliferative disorders that were found on routine pathology.⁵ Lauder et al.³ reported on a case of

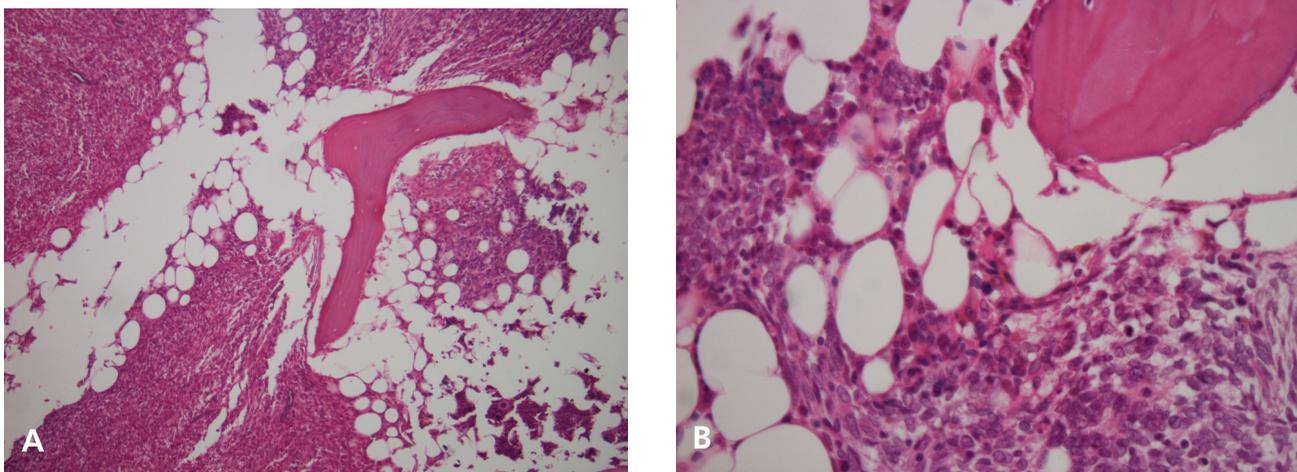


Figure 2 High-grade spindle cell sarcoma involving the femoral head bone marrow; A, 40X H&E, B, 400X H&E.

non-Hodgkin's lymphoma being found on routine pathology after a total hip replacement. Zwister et al.⁸ found that 1.6% of the femoral heads removed during a 10-year period were suspicious on histopathology analysis for high grade B-cell lymphoma. They concluded that routine pathology should be performed since these patients will require close follow-up. However, long-term treatment outcomes after diagnosis were not reported.

Given the current state of decreasing reimbursement for total joint arthroplasty, hospitals and surgeons are being pushed to look at more cost-effective ways to perform the procedures. Recently, some authors have looked at the cost-effectiveness of sending routine pathology for all hip replacements. Recent studies concluded that routine pathology was not cost-effective and should be reserved for cases in which the primary diagnosis is unclear.^{1,2,4,6} Despite this review, many authors continue to advocate for the routine use of histopathology in all total joint replacements in an effort to uncover unexpected pathological findings.^{3,5,8,9,11} Some of this may be driven by defensive medicine practices and fear of litigation from missed diagnoses. Additionally, the cost-benefit analysis is not without ethical implications, as the benefit to the individual patient for whom an unexpected diagnosis is revealed is certainly of very high value.

With the introduction of advanced pre- and postoperative pain and rehabilitation protocols, many arthroplasty surgeries across the United States are moving to outpatient surgery centers. Physically locating arthroplasty surgeries away from the hospital setting may pose additional logistical issues for sending excised tissues for routine histopathology examination. Transporting the specimens to a qualified laboratory also adds additional costs.

The nature of case reports is highlighted by their inherent uniqueness and rarity. Individual cases cannot necessarily be generalized to wider populations, which limits their level of evidence and persuasiveness. Ultimately, the decision to send or not send routine pathology for arthroplasty cases must be made by the institution performing these operations.

Based on this experience, we feel that the benefit of routine pathology still outweighs the costs to the medical system. Despite the low incidence of clinically significant and unexpected pathology, the potential to diagnose and treat unknown and potentially serious or fatal disease justifies the cost incurred by sending tissue for pathologic testing. In the case presented, although the disease was advanced at the time of diagnosis, the ability to diagnose and develop

a treatment plan for this otherwise undetected malignancy may help to justify routine pathologic screening.

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Conflict of Interest Statement

None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

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