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Case Presentation

Multiple myeloma diagnosed secondary to analysis of a lytic bone lesion encountered during mohs micrographic surgery

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Abstract

An 89-year-old man underwent Mohs micrographic surgery for treatment of a squamous cell carcinoma of the scalp. A lytic bone lesion was found that led to the diagnosis of multiple myeloma.

Introduction

Each year in the United States, over 20,000 patients are diagnosed with Multiple Myeloma (MM)[1]. This diagnosis is often obtained during a work-up for suspicious symptoms (bone pain, fatigue), radiographic findings (lytic lesions), or laboratory abnormalities (hypercalcemia, anemia, azotemia, or a serum monoclonal protein). In this case, the discovery of a lytic bone lesion in an elderly man undergoing Mohs Micrographic Surgery (MMS) for squamous cell carcinoma (SCC) on his scalp, led to the definitive diagnosis of MM. Whereas it is quite common to find lytic bone lesions at diagnosis, it is uncommon to diagnosis MM through gross examination of such lesions. We present this case to highlight the importance of investigating suspicious findings discovered during cutaneous surgery.

Case Report

An 89-year-old man initially presented for Mohs micrographic surgery (MMS) for a SCC located on his scalp. The patient's past medical history was significant for mild dementia, coronary artery disease, hypertension, hyperlipidemia, and trauma to his back three years prior. At that time, he sustained several compression fractures and was treated with vertebroplasty. Imaging at the time of his vertebroplasty revealed no lytic lesions. His family history was significant for lung cancer, but no blood disorders or malignancies.

Mohs Micrographic Surgery of the scalp lesion required one stage to achieve negative margins. Repair of the post surgical defect was achieved with a Burrows triangle advancement flap. When the Burrows triangle was removed adjacent to the Mohs defect, a 3mm lytic bone lesion was noted, surrounded by several smaller perforations (Figure 1). Gentle probing revealed intact bone deep to this outer cortex defect. Biopsies were taken by carefully prying a sample of bony matrix from the edge and removing a soft globule of amorphous gelatinous material from the center of the lytic lesion. These biopsies revealed a diffuse infiltrate of plasma cells. Subsequent pathologic evaluation, including kappa/lambda double in-situ hybridization staining, demonstrated purely kappa-restricted clonal cells, consistent with MM (Figure 2). The patient was notified and referred to the medical oncology department.

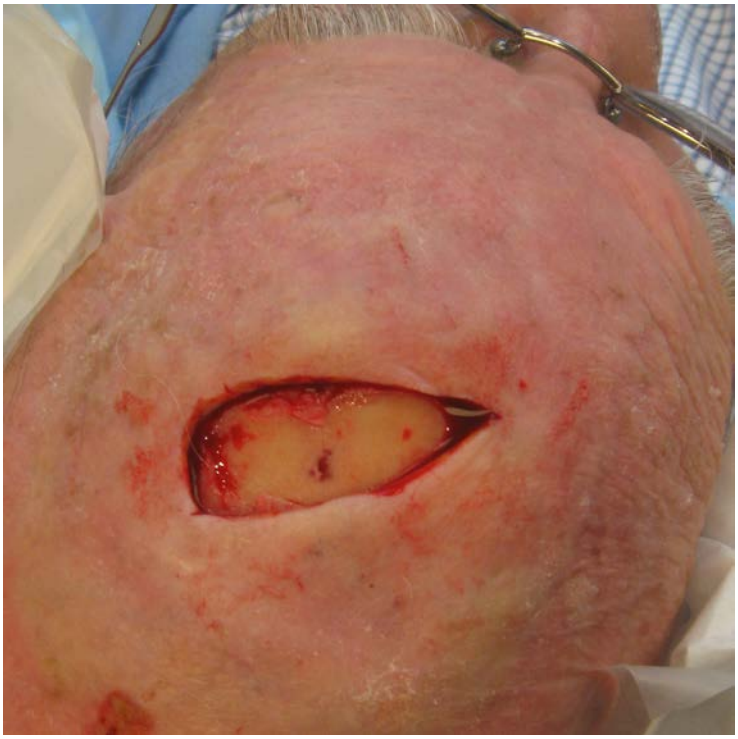

Figure 1. Mohs micrographic surgery post-surgical defect with a 3mm lytic bone lesion surrounded by several smaller perforations.

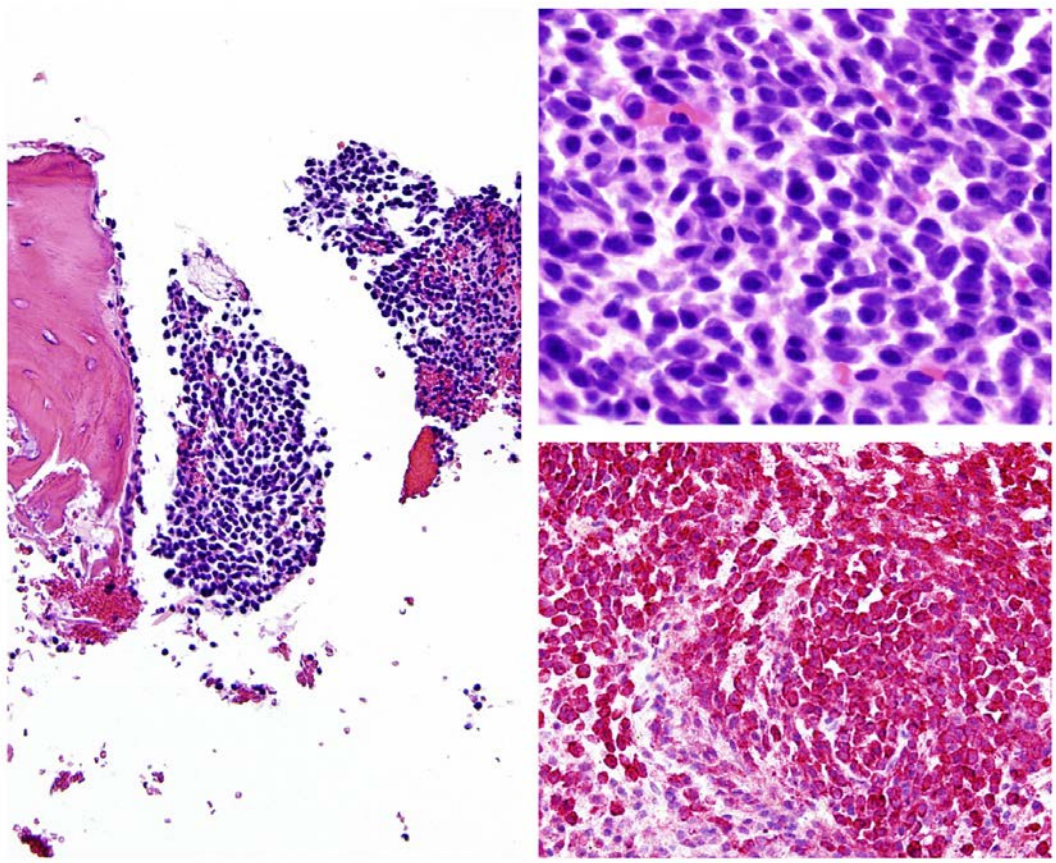

Figure 2. Left panel: On the left side of the image there is a fragment of lamellar bone of the outer table of the calvarium with an adjacent sheet of lymphoid cells (x200); Right upper panel: The lymphoid cells are all plasma cells (x400); Right lower panel: Kappa and lambda double-labeled in-situ hybridization staining shows kappa-restricted (red) plasma cells consistent with multiple myeloma. No lambda (brown) staining is visible (x200).

Oncologic staging, with serum free light chain analysis and serum protein electrophoresis with immunofixation and a full radiographic bone survey, supported the pathological diagnosis. Initial laboratory studies revealed normal hemoglobin, calcium, and albumin levels and mildly elevated creatinine. Serum protein electrophoresis with immunofixation showed an M-spike and an elevated free kappa light chain and kappa/lambda ratio. A bone survey revealed multiple lytic lesions in the calvarium (Figure 3), and one lesion in both the left mandible and right clavicle. No other lytic lesions were visualized, although one healing rib fracture

was noted in addition to a fracture of the lateral portion of his right clavicle and osteopenia of his vertebral bodies. Despite these radiographic findings, the patient denied bone pain and was asymptomatic. After full oncologic consultation, he ultimately elected to pursue active surveillance over aggressive anti-myeloma therapy owing to his age, comorbidities, his dementia, and overall low burden of disease. Over the course of 22 months, he experienced a gradual functional decline and the onset of progressive bone pain. However, he preferred to remain off myeloma therapy. His scalp SCC never recurred and no additional SCCs were ever identified. Eventually, he transitioned to hospice care and died shortly thereafter.

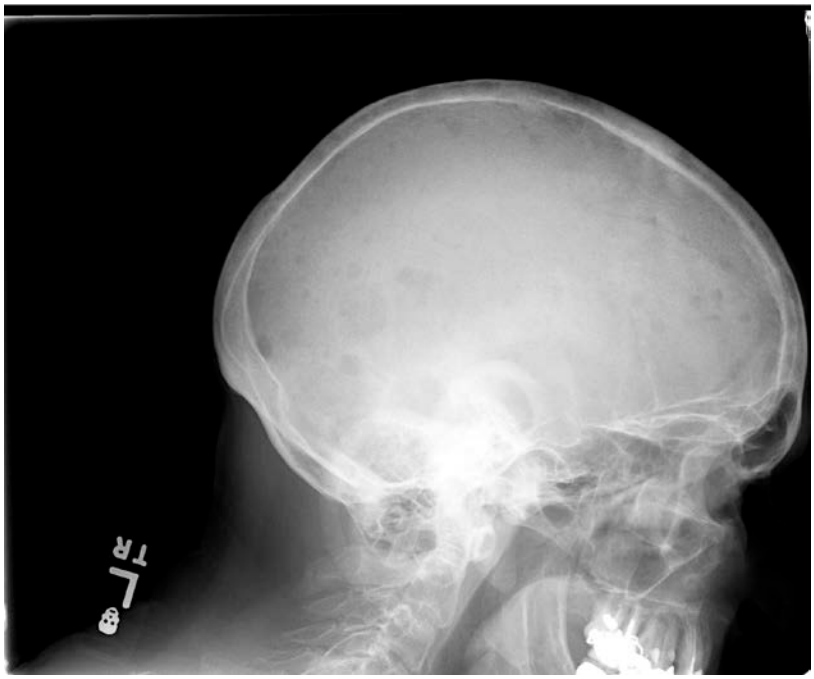

Figure 3. Skull radiograph illustrating multiple small and medium sized lytic lesions scattered throughout the patient's calvarium.

Discussion

The differential diagnosis of this clinically identified lytic bone lesion of the skull included direct extension from the patient's SCC, metastasis, a primary bone tumor, or a benign lesion. Malignancies that commonly metastasize to the skull in men include prostate, lung, and renal neoplasms. Whereas prostate cancer is typically osteoblastic and MM is usually osteolytic, other tumors may demonstrate a combination of osteolysis and osteosclerosis [2]. Primary tumors, such as osteosarcomas may also present as lytic lesions. Osteosarcoma has a bimodal age distribution peaking in adolescence, then again in those over 60. Skull osteosarcomas occur more commonly in older patients, especially in the setting of Paget's disease [3]. Other malignancies such as Ewing sarcoma, lymphoma, and histiocytosis should also be considered, as well as benign lesions such as a hemangioma, bone cyst, or osteofibrous dysplasia, all of which may produce lytic bone lesions.

Although the differential diagnosis for this lesion was broad, biopsy provided the definitive diagnosis of MM. Multiple myeloma represents 10% of all hematologic malignancies and is characterized by the proliferation of monoclonal plasma cells in bone marrow. These neoplastic cells overproduce immunoglobulin or light chain proteins, and cytokines, which cause hyperviscosity, protein deposition, and end organ damage, particularly renal insufficiency [4]. Invasion of local bony tissue produces the classic osteolytic lesions and resultant hypercalcemia. The most common presenting symptoms of MM are bone pain, seen in 58% of patients, and fatigue, seen in 32% of patients [4]. Although asymptomatic, this patient's skeletal survey showed characteristic lytic bone lesions, compression fractures, and osteopenia.

Definitive diagnosis of MM involves serum or urine electrophoresis, evaluation of end organ damage, and bone marrow analysis. Bone marrow aspirate analysis remains the diagnostic gold standard. Treatment of MM involves chemotherapy and/or autologous stem cell transplantation. The median survival of patients diagnosed with MM is 33 months for all ages, and 26.4 months for those 70 years and older [4].

Although some studies have suggested an association between MM and other primary tumors, the National Cancer Institute's Surveillance, Epidemiology and End Results (SEER) Program, shows no increase in risk of developing an additional primary cancer following the diagnosis of MM in 23,838 patients surviving 2 months or more after diagnosis [5]. Thus, diagnosis of MM in the presence of acantholytic SCC, and the close physical proximity of these two lesions, was likely coincidental.

Conclusion

The purpose of presenting this unique case is to highlight the need for the cutaneous surgeon to not hesitate to evaluate novel or unusual findings during cutaneous surgery because they may lead to unexpected and important diagnoses. Although the differential for this lesion was broad, bone biopsy, in the setting of Mohs surgery for SCC, provided the definitive answer in this chance diagnosis of Multiple myeloma.

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