

# Osteonecrosis of the Humeral Head in a Patient with Non-small Cell Lung Cancer Receiving Bevacizumab

Marianna Koczywas, MD, and Mihaela C. Cristea, MD

A 43-year-old Filipino woman, never-smoker, was diagnosed with stage IV adenocarcinoma of the lung in February 2009, with metastatic disease to the liver and brain. The biopsies of the lung mass and liver confirmed poorly differentiated, TTF-1-positive, EGFR-mutated (exon 19) adenocarcinoma of the lung. The patient underwent a craniotomy followed by brachytherapy for the isolated brain metastases. Subsequently, she initiated erlotinib plus celecoxib versus placebo on a clinical trial in April 2009, to which she responded for 12 months. In February 2010, she initiated second-line carboplatin/pemetrexed/bevacizumab for six cycles with complete resolution of the positron emission tomography uptake to the lung primary and liver metastases. The patient started maintenance bevacizumab in June 2010. In February 2011, she presented with left shoulder pain with absence of trauma or bone metastases. Magnetic resonance

imaging of the shoulder revealed avascular necrosis of the left humeral head (Figure 1). The positron emission tomography/computed tomography scan showed mild fluorodeoxyglucose uptake to the left shoulder and a stable, fluorodeoxyglucose-negative, left upper lobe mass (Figure 2). After the diagnosis of avascular necrosis was made, bevacizumab was discontinued and the patient initiated maintenance pemetrexed. Her pain responded to anti-inflammatory medications.

Avascular necrosis of the femoral head has been reported in two patients with colorectal cancer receiving bevacizumab and one patient receiving sunitinib.<sup>1</sup> Prolonged antiangiogenic therapy may impair the bone metabolism leading to osteonecrosis.<sup>2</sup> To our knowledge, this is a first report of osteonecrosis of the humeral head in a patient treated with bevacizumab alone without bisphosphonates or other agents with increased risk of bone necrosis.

City of Hope - Nursing Research and Education, Duarte, California.

Disclosure: The authors declare no conflicts of interest.

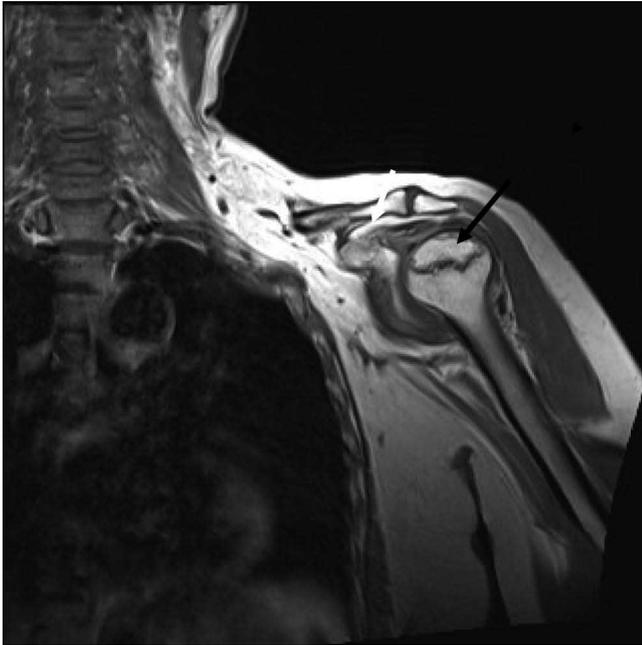
Address for correspondence: Mihaela C. Cristea, MD, City of Hope - Nursing Research and Education, 1500 East Duarte Road, Duarte, CA 91010. E-mail: mcristea@coh.org

Copyright © 2011 by the International Association for the Study of Lung Cancer

ISSN: 1556-0864/11/0611-1960

## REFERENCES

1. Mir O, Coriat R, Gregory T, et al. Avascular necrosis of the femoral head: a rare class-effect of anti-VEGF agents. *Invest New Drugs* 2011; 29:716–718.
2. Assouline-Dayana Y, Chang C, Greenspan A, et al. Pathogenesis and natural history of osteonecrosis. *Semin Arthritis Rheum* 2002;32:94–124.



**FIGURE 1.** Magnetic resonance imaging of the left shoulder showing abnormal bone marrow signal in the left humeral head consistent with avascular necrosis.



**FIGURE 2.** Positron emission tomography image showing mild fluorodeoxyglucose uptake to the left humeral head.