CASE REPORT

Cookie bite cortical osteolytic lesions: a hint of skeletal metastasis from bronchogenic carcinoma

Hsing-Hao Ho, Yi-Chih Hsu, Hsian-He Hsu and Guo-Shu Huang

From the Department of Radiology, Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan

Address correspondence to Guo-Shu Huang, Department of Radiology, Tri-Service General Hospital, National Defense Medical Center, No. 325, Sec. 2, Cheng-kung Rd., Neihu 114, Taipei, Taiwan. email: gsh5@seed.net.tw

Learning point for clinicians

Cookie bite lesions indicate focal eccentric osteolytic destruction of the external cortex of a long tubular bone. These lesions are suggestive of cortical metastasis typically originating from bronchogenic carcinoma. Therefore, the lung should be the first target of investigation in patients with cookie bite cortical lesions.

Introduction

A cookie bite lesion indicates focal eccentric intracortical osteolytic destruction of a long tubular bone. Deutsch and Resnick\(^1\) coined the term to describe cortical bone metastases from bronchogenic carcinoma. Although cookie bite metastasis can develop from other primary sources, the most common primary is bronchogenic carcinoma.\(^2\)\(^,\)\(^3\) Here, we present a case of adenocarcinoma of the lung presenting with cookie bite cortical metastatic lesions involving bilateral tibia.

Case report

A 39-year-old woman visited a local clinic complaining of right leg pain for 6 months. She had no past medical history. A radiograph revealed an osteolytic lesion involving the diaphyseal cortex of the right proximal tibia. The lesion had a cookie-bite appearance indicating focal eccentric cortical osteolysis (Figure 1a). There was no periosteal reaction. She was referred to our orthopedic clinic for further evaluation.

The patient also reported mild left knee pain; therefore, magnetic resonance imaging (MRI) of both legs was performed. MRI showed two foci of eccentric cortical osteolytic destruction, one at the diaphysis of the right proximal tibia and the other at the metaphysis of the left proximal tibia, with juxtaarticular soft tissue masses. The soft tissue masses showed isointense to slightly hyperintense relative to muscle on T1-weighted images and hyperintense on T2-weighted images with fat suppression. There was medullary involvement to a lesser extent in both lesions, and perilesional edema of bone marrow and soft tissues. Heterogeneous enhancement of the lesions was observed on postcontrast T1-weighted images.

The chest radiograph showed a soft tissue mass in the retrocardiac region of the left lower lung (Figure 1b). Contrast-enhanced computed tomography revealed a lobulated soft tissue mass in the medial region of the left lower lung and multiple enlarged lymph nodes in the mediastinum. The findings were suggestive of bronchogenic carcinoma with nodal metastases. Whole-body bone scan showed additional metastatic foci in the third lumbar vertebra, left iliac spine and left patella.

Surgical resection of the masses in both legs was performed. Histopathology confirmed metastatic adenocarcinoma and positive thyroid transcription factor-1 staining was compatible with a pulmonary origin. The patient was diagnosed with adenocarcinoma of the lung with multiple bone metastases and was referred to a thoracic oncologist for further treatment.

Discussion

The term cookie bite bone metastasis was originally used to describe a small intracortical lesion.\(^1\) In 1988, Greenspan et al.\(^3\) described four radiographic patterns of bone destruction from osteolytic cortical metastases from bronchogenic carcinoma: small intracortical lesions; large osteolytic cortical destruction; saucered intracortical destruction with well-defined periosteal reaction and predominantly cortical destruction extending into the soft tissue and medullary cavity. Snoeckx et al.\(^4\) used the term cookie bite to describe an eccentric osteolytic lesion with predominant cortical destruction extending into soft tissue...
and the medullary cavity. This lesion was similar in those in the present case.

Skeletal metastases are usually intramedullary, and cortical invasion is not unusual. However, primary cortical metastases with pure cortical involvement or only minor medullary involvement are relatively rare. The majority of cookie bite metastases develop from bronchogenic carcinoma. The possible mechanism of distal spread of cancer cells to bone cortex may be arterial dissemination through a unique vascular network originating in the overlying periosteum. However, it is unclear why bronchogenic carcinoma is more likely to spread to cortex than other primary malignancies.

Here, we report a case of cookie bite metastases to the tibia from adenocarcinoma of the lung. Cookie bite lesions are suggestive of cortical metastasis associated with bronchogenic carcinoma. Therefore, the lung should be the first target of investigation in patients with cookie bite cortical lesions.

Conflict of interest: None declared.

References