Case Report

Intraosseous hibernoma: A metastatic mimicker to consider on the differential 

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A R T I C L E   I N F O

Article history:
Received 3 July 2020
Revised 5 October 2020
Accepted 6 October 2020

Keywords:
Kyphoplasty
Radiofrequency ablation
RFA
Intraosseous hibernoma
Hibernoma

A B S T R A C T

Intraosseous hibernoma is an uncommon brown fat tumor that with about 2-dozen case reports described in the literature. Hibernomas are more commonly found in soft tissues of the thigh, shoulder, and back. However, more cases of intraosseous hibernomas are coming to light as a result of work-up due to pain or as an incidental lesion finding. Herein, we present a case of a thoracic intraosseous hibernoma suspicious for an isolated ovarian cancer metastasis, successfully treated with radiofrequency ablation and kyphoplasty.

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Introduction

Intraosseous hibernoma is a benign soft tissue tumor with about 2-dozen cases reported in literature \cite{1-3}. Previous cases were reported as incidental lesions discovered upon work-up for swallowed glass \cite{1}, staging for carcinoma (breast, prostate, pancreas, and liver) \cite{1,2}, or low back or knee pain related to site of lesion \cite{1,3}. Herein, a case of a thoracic intraosseous hibernoma suspicious for an isolated ovarian cancer metastasis, successfully treated with radiofrequency ablation (RFA) and kyphoplasty, is reported. Institutional Review Board exemption was obtained for this case report.

Case report

A 74-year-old female undergoing work-up for ovarian cancer presented to the emergency department with chest pain,
shortness of breath and feelings of impending doom. She was tachycardic and anxious on encounter and physical exam was otherwise unremarkable. Initial laboratory work-up with complete blood count, comprehensive metabolic panel, and coagulation tests were unrevealing. Due to her presentation, there was clinical concern for pulmonary embolism and a computed tomography angiography (CTA) of the chest was ordered for further work-up. CTA did not show evidence of pulmonary embolism and incidentally demonstrated a densely sclerotic lesion involving the T3 vertebral body and posterior elements (Fig. 1). Given her history of ovarian cancer, magnetic resonance (MR) imaging was obtained to rule out metastatic disease. MR imaging demonstrated a T1 hypointense, T2 STIR intermediate signal, enhancing lesion without fat suppression (Fig. 2). The enhancing soft tissue component and extension into the posterior vertebral body elements were felt by multiple fellowship trained musculoskeletal radiologists to be suspicious for metastatic disease and biopsy was recommended.

The remaining work-up demonstrated no other evidence of metastatic disease and after consultation with the patient’s gynecologic-oncologic surgeon, the decision to proceed with same day biopsy with potential curative RFA and kyphoplasty was made as biopsy results were not immediately available. This was based upon a prior retrospective review demonstrating efficacy of RFA and vertebral augmentation for local tumor control in a series of 55 patients with spinal metastases [4].

Using a unilateral, ipsilateral extrapedicular approach, an 11-G kyphoplasty needle was advanced into the vertebral body mass under fluoroscopic guidance. Biopsy was performed and a 10-mm OsteoCool RF Ablation probe (Medtronic, Minneapolis, MN) placed (Fig. 3). Ablation of the vertebral body and pedicle was performed for 7.5 minutes without complication. Kyphoplasty was then performed without complication. Follow-up biopsy specimen (Fig. 4) revealed multivacuolated adipocytes a background of foamy cells in hematoxylin and eosin stain. Further immunohistochemical staining was positive for S100, consistent with a diagnosis of an intraosseous hibernoma. The patient’s postoperative course was uneventful, and 6-month follow-up magnetic resonance imaging did not show evidence of recurrence (Fig. 5).

Discussion

Hibernomas are rare, benign soft tissue tumors consisting of multivacuolated adipocytes, as opposed to the monovacuolated adipocytes in lipomas. They were discovered by Merkel in 1906 as “pseudolipoma” and renamed as “hibernoma” in 1914 by Gery after noting their similarity to the brown fat of hibernating animals [1]. These tumors are typically found in the soft tissues of the thigh, shoulders, and back.

Intraosseous hibernomas are exceedingly rare and are reported to present as isolated sclerotic lesions in adults aged 40-85 years old with a female predominance [1–3]. These lesions are most often discovered incidentally secondary to cancer staging or work-up for nonspecific regional pain. Due to their rarity and difficult imaging interpretation, namely T1 hypointense, enhancing lesions, they are often mistaken for osteomyelitis or malignancy (such as metastasis or lymphoma). In the 18 cases previously reported, intraosseous hibernomas were located in the pelvis (56%, 10/18), thoracic spine (22%, 4/18), lumbar spine (11%, 2/18), and femur (11%, 2/18) [1–3]. There is only 1 prior report of intraosseous hibernoma RFA. In this instance, ablation was performed for refractory pain control not potential treatment of a metastatic lesion, as in this case.

In this case report, the authors present the classic clinical scenario for an intraosseous hibernoma. It was discovered during ovarian malignancy work-up in an otherwise asymptomatic, middle-aged female. The report is complete with ra-
Fig. 2 – Multisequence, multiplanar magnetic resonance imaging pre-/post-Gadavist IV contrast of T3 lesion. Sagittal plane imaging shows T1 hypointense (a) and T2 (b) /STIR (c) hyperintense lesions. Axial plane imaging shows T2 enhancing lesion (d) within the left aspect of the T3 vertebral body with extension to the anterior margin of the left pedicle without evidence of paraspinal soft tissue mass or epidural extension on post gadolinium contrast T1 imaging (e). Mass indicated by white arrow.

Fig. 3 – Intraoperative imaging of radiofrequency ablation (RFA) at T3 vertebral body lesion using a unilateral, unipediclar approach with a 10-mm OsteoCool radiofrequency probe (a). Subsequent balloon kyphoplasty was performed at the same site (b).
Hibernoma cells with multiple small fat vacuoles (black arrows) adjacent to an osseous trabecula. Note thickening (sclerosis) of the bone (asterisk).

Fig. 4 – Hematoxylin & eosin stain (H&E) of T3 biopsy specimen at 400 x magnification. Hibernoma cells with multiple small fat vacuoles (black arrows) adjacent to an osseous trabecula. Note thickening (sclerosis) of the bone (asterisk).

Sclerosis and incomplete fat suppression are due to the heterogeneous nature of intraosseous hibernomas with suggested etiologies of sclerosis secondary to reactive sclerosis [1] or transcriptional regulation of brown adipogenesis and bone formation [3]. An isolated bone metastasis in cervical cancer was felt to be highly unusual; however, the imaging work-up, as discussed, was difficult and, as is common, was misinterpreted for a metastasis. This case serves as a reminder that an intraosseous hibernoma, although rare, should be considered in the work-up of an isolated metastatic lesion in the appropriate clinical setting.

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Fig. 5 – Six-month follow-up magnetic resonance imaging without contrast at the site of ablation without evidence of intraosseous hibernoma at T3. Sagittal T1 (a) and T2 (b) with hypointense signal intensities at T3 ablation site and iso-intensity of residual T3 vertebral body to adjacent vertebral bodies (white arrow).