A 68-Year-Old Woman with a Remote History of Breast Cancer Presenting with Low Back Pain to a Chiropractic Clinic in Hong Kong with Imaging Findings Consistent with a Vertebral Hemangioma and Vertebral Metastatic Lesions

Patient: Female, 68-year-old
Final Diagnosis: Vertebral metastasis
Symptoms: Low back pain
Medication: —
Clinical Procedure: Magnetic resonance imaging • positron emission tomography-computed tomography
Specialty: Chiropractic • Oncology • Radiology
Objective: Rare disease
Background: Patients commonly visit chiropractic clinics for treatment for low back pain, which is often due to injury or degenerative spinal conditions. Rarely, serious underlying pathology may be identified. This report describes a 68-year-old woman with a remote history of breast cancer presenting with low back pain to a chiropractic clinic in Hong Kong with imaging findings consistent with vertebral hemangioma and vertebral metastatic lesions.
Case Report: A 68-year-old woman with a history of breast cancer status after chemotherapy and mastectomy 20 years prior presented to a chiropractor with an acute exacerbation of chronic low back pain with lower extremity paresis. She previously visited her general practitioner and underwent radiography, which supported diagnoses of degenerative lumbar spondylosis and hemangioma of the fifth lumbar vertebra. Given the patient’s worsening status and previous cancer, the chiropractor ordered lumbar magnetic resonance imaging at the initial visit, consistent with multilevel spinal metastasis. The chiropractor referred the patient to an oncologist who performed positron emission tomography/computed tomography, which suggested breast cancer recurrence and metastasis. The greatest hypermetabolic activity was evident within the level of the suspected vertebral hemangioma, suggesting this finding which initially appeared innocuous on plain radiography contained underlying metastasis.
Conclusions: This case illustrates that when patients fail to respond to treatment for low back pain, clinical referral should be undertaken for investigations to identify possible serious underlying pathology.
Keywords: Chiropractic • Hemangioma • Low Back Pain • Neoplasms

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Background

Less than 1% of patients with low back pain presenting to a primary care setting have a serious cause of their symptoms, such as cancer [1]. However, patients with cancer can have a delay in their diagnosis because low back pain is common in the general population, and most patients with spinal metastasis initially have only pain, rather than neurological symptoms [2]. Further, symptoms may be mistakenly ascribed to a non-neoplastic cause, such as degenerative changes appearing on radiographs [3]. Accordingly, clinicians treating spinal disorders, such as chiropractors, must be aware of the potential missteps in diagnosis of spinal metastasis.

Vertebral hemangioma (VH) is a benign tumor and is the most common primary spinal tumor, found in about 26% of the adult population [4,5]. VHs most often occur in the lower thoracic region but can be found throughout the spine [4]. Occasionally VHs are atypical or aggressive, and mimic the appearance of metastasis [6]. Even more rarely, cancer can metastasize into a pre-existing hemangioma, which is termed a collision tumor [7,8].

Spinal metastasis is most often found in patients aged 40 to 65 years [2] and is most often caused by breast cancer [9], the most common type of cancer affecting women [1]. Considering that breast cancer recurs in about 18% of women [4], a history of breast cancer in a patient with new-onset low back pain is considered a red flag [10]. This finding often warrants diagnostic imaging, with magnetic resonance imaging (MRI) being the most appropriate test [11].

Although plain radiography is often used as an initial screening tool for spinal problems [12], it can be insufficient when used in isolation for those patients with a history of cancer [11]. Radiography has a low sensitivity for detecting spinal malignancy, and may only detect lesions when 30% to 75% of bone is destroyed [13,14]. Advanced imaging capable of detecting physiologic properties, such as positron emission tomography (PET) and MRI, are more sensitive to detecting metastasis [13,14].

Chiropractors are portal-of-entry healthcare providers that most often see patients for low back pain [15]. As a result, these providers rarely encounter patients with previously undiagnosed cancer, which can present as spinal metastasis [16-18]. We present a patient who presented as a diagnostic challenge to a chiropractor, as the patient previously had imaging suggesting benign VH and degenerative spondylosis yet ultimately received a diagnosis of spinal metastasis.

This report is of a 68-year-old woman with a remote history of breast cancer presenting with low back pain to a chiropractic clinic in Hong Kong with imaging findings consistent with a VH and vertebral metastatic lesions.

Case Report

Patient Information

A 68-year-old woman presented to a chiropractor in Hong Kong with a 1-month history of low back pain, which was exacerbated by lifting a light object. Her low back pain radiated to the right posterior thigh and involved a sensation of numbness and tingling in this distribution. Symptoms were exacerbated by standing. She reported a pain severity of 6 out of 10 on the numeric pain rating scale. She had a 3-year history of chronic but mild low back pain preceding her recent exacerbation. Her medical history was significant for breast cancer, which was diagnosed 20 years prior and had been treated with chemotherapy and unilateral right mastectomy. She denied any recent weight loss or changes in urinary function but did endorse chronic constipation. The patient was a non-smoker, non-drinker, was retired from a position as a clerk, and had 2 adult children. She had no family history of cancer.

The patient gradually developed low back pain 3 years previously and visited her general practitioner, being initially treated with acetaminophen and referred for physical therapy, where she completed rehabilitative exercises. After her worsening of symptoms 1 month prior, the general practitioner ordered lumbar radiographs, the report of which noted disc space narrowing at L4/5 and L5/S1 and a coarse bony texture of the L4 and L5 vertebral bodies with vertical trabeculation, findings which a board-certified medical radiologist interpreted as consistent with degenerative spondylosis and VH at these levels, respectively (Figure 1). The general practitioner then prescribed celecoxib and etoricoxib, which had a negligible effect on her pain. She completed rehabilitative exercises, which improved her symptoms, and visited her general practitioner, being initially treated with acetaminophen and referred for physical therapy, where she completed rehabilitative exercises. After her worsening of symptoms 1 month prior, the general practitioner ordered lumbar radiographs, the report of which noted disc space narrowing at L4/5 and L5/S1 and a coarse bony texture of the L4 and L5 vertebral bodies with vertical trabeculation, findings which a board-certified medical radiologist interpreted as consistent with degenerative spondylosis and VH at these levels, respectively (Figure 1). The general practitioner then prescribed celecoxib and etoricoxib, which had a negligible effect on the patient’s pain. The patient sought a chiropractor for a second opinion due to her progressive symptoms.

Clinical Findings

On physical examination by the chiropractor, the patient was noted to have a flat back posture with reduced thoracic and lumbar curves. Active lumbar extension and weight bearing on the right lower extremity provoked her radiating low back pain, while passive lumbar extension was also limited and painful. On motion palpation, the chiropractor noted restriction and tenderness at the L1/2, L4/5, and L5/S1 levels and tenderness of both sacroiliac joints. The paraspinal muscles from L2 to L5, right quadratus lumborum, left gluteus medius and minimus, and bilateral hamstrings were hypertonic. Sensory, motor, and muscle stretch reflex testing was normal bilaterally.
diffuse marrow replacement, which was suggestive of malignancy (Figure 2). The L5 vertebra had diffuse marrow infiltration, with a significant paravertebral soft tissue component extending into the epidural space, causing severe spinal canal stenosis and cauda equina compression. The L5 vertebra also demonstrated thickened vertical trabeculae, findings that the interpreting board-certified medical radiologist considered typical for VH (Figure 3). In addition, there was a pathological compression fracture of L3 and moderate bilateral L4 through S1 foraminal stenosis related to disc bulging and disc height loss.

Given the concern for malignancy, the chiropractor referred the patient to an oncologist for additional testing and treatment. The oncologist ordered a PET/CT which was completed 11 days after her lumbar MRI, which suggested a recurrence of the patient’s right-sided breast cancer, with right axillary lymphadenopathy and multifocal hypermetabolic uptake noted diffusely throughout the bilateral axial and appendicular skeleton, suggestive of diffuse marrow metastases (Figure 4). These lesions appeared mixed lytic and sclerotic.

After PET/CT, a diagnosis of spinal metastasis from recurrent breast cancer was suspected. In addition, metastasis within a pre-existing VH (ie, collision tumor) could explain the appearance of the L5 vertebra, given the typical VH features on radiograph and MRI; yet, concurrent epidural extension on MRI and hypermetabolic uptake on PET/CT were suggestive of malignancy. An atypical or aggressive VH of L5 was not favored, given the overall MRI and PET findings. However, without histopathological examination of the L5 vertebra, it was not completely clear if the radiological appearance of the L5 vertebra resulted from metastasis combined with an underlying VH.

Given the patient’s imaging findings and history of breast cancer, the oncologist provided a written presumptive diagnosis of metastatic breast cancer. Although less than 2 weeks had elapsed since first seeing the chiropractor, the oncologist noted that the patient had developed overt clinical signs of cauda equina compression including lower extremity weakness and a broader distribution of sensory symptoms. Accordingly, the oncologist determined that the patient needed urgent operative treatment to decompress the cauda equina, which was most feasible upon referral to an outside hospital and direct the patient there for care. There were no further tests, such as laboratory investigations, biopsy, or imaging, completed by the oncologist. Given the lack of available histopathology and other follow-up testing and long interval since her first diagnosis of breast cancer (20 years), it was unclear whether the patient had developed any other malignancy responsible for these imaging findings. Written informed consent was obtained from the patient to publish this case report and any accompanying images. The patient was subsequently lost to follow-up.
Figure 2. Lumbar magnetic resonance imaging, mid-sagittal T1-weighted (A) and T2-weighted images (B). Diffuse bone marrow replacement evident as T1-weighted hypointense and heterogeneous T2-weighted hyperintense signal is seen throughout the axial spine and sacrum, suggestive of bone metastases (arrowheads).

Figure 3. Lumbar magnetic resonance imaging features of the L5 vertebra. Thickened vertical bone trabeculae (arrowheads) are apparent as small hypointense areas in a salt-and-pepper pattern in the axial T1-weighted image (A) and as vertical hypointense striations in the sagittal T2-weighted image (B), which are both typical imaging findings of a vertebral hemangioma. Also noted is the epidural extension of the tumor (*; images A and B), which causes severe spinal stenosis and cauda equina compression and is more suggestive of malignancy.
Discussion

The present case illustrates the risk in ascribing patient symptoms to innocuous findings on radiographic images, such as suspected VH and degenerative spondylosis, which can delay the diagnosis of underlying spinal metastasis. In one series of 383 patients diagnosed with spinal tumors at a single center, 1.3% of patients had been initially diagnosed with a degenerative spinal disorder, with a diagnostic delay ranging from 2 to 36 months to tumor diagnosis [3].

This case highlights the potential pitfalls in identifying spinal metastasis as a cause of low back pain. Clinicians managing spinal disorders, such as chiropractors, should be aware that...
Degenerative spinal changes are common and can be asymptomatic [19]. VHs are typically asymptomatic, except for rare instances of atypical or aggressive VH [8]. Additionally, in patients with spinal metastasis, the onset of neurological deficits may take months, which can further contribute to diagnostic delay [2].

Chiropractors must be prepared to recognize patients with serious pathology, such as spinal metastasis, by recognizing red flags. They then must order advanced imaging, when appropriate, and refer such patients for appropriate oncologic care. According to a literature search of PubMed, Google Scholar, and the Index to Chiropractic Literature, using the terms “chiropractic”, “chiropractor” and “breast cancer,” and hand-searching previous review articles [18,20,21] on May 17, 2022, only 7 cases of undiagnosed metastasis from breast cancer presenting to a chiropractor have been previously published [22-28]. Although survey data also suggest this is a rare phenomenon [16,17], a more accurate estimate of the rate at which such patients present to chiropractors could be inferred by a large cross-sectional study or chart review.

This case also serves as a reminder of the radiological differential diagnosis of VH and metastasis. The thickened vertical vertebral trabecular pattern is suggestive of VH but is not necessarily conclusive. As illustrated in this case and prior collision tumor cases [7,8,29,30], there rarely may be underlying malignancy that is only evident with advanced imaging. On MRI, VHs are typically hyperintense on both T1-weighted and T2-weighted images [8]. In contrast, vertebral metastasis is hypointense on T1 and hyperintense on T2-weighted images [8]. Although increased fluorodeoxyglucose uptake on PET/CT is typically associated with metastasis [13,14], this can also occur with VH [6]. However, other features can suggest metastasis, as evident in the present case, including epidural extension and involvement of the posterior elements, which is rare in VH [31].

This case is chiefly limited by a lack of histopathological evidence. However, the suggestion of VH was supported by thickened vertical trabeculae on lateral plain radiograph and sagittal MRI and a salt-and-pepper or polka dot appearance of the vertebra seen on axial MRI, findings which have been described as pathognomonic for VH [6]. Further, the patient’s right axillary lymphadenopathy and multifocal hypermetabolic uptake on PET/CT could be considered a specific finding for recurrent breast cancer metastasis [32,33]. Despite this, a lack of biopsy findings precludes our ability to confirm that the source of spinal metastasis was recurrent breast cancer as opposed to an unknown second primary tumor [34], and that L5 contained a VH. Regardless, the present case illustrates that radiographic findings suggestive of VH are insufficient to rule out the presence of spinal metastasis.

Conclusions

This case has shown that a lack of improvement with treatment for low back pain should prompt clinical referral and further investigation to identify possible significant underlying pathology.

Department and Institution Where Work Was Done

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Declaration of Figures’ Authenticity

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