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SUDDEN APPEARANCE OF METASTATIC CANCER ON MAGNETIC RESONANCE IMAGING IN A PATIENT WITH BACK PAIN

Min Ju Kim, DO, Myrna Hanna, DO, and Moorice Caparo, MD

Background: Magnetic resonance imaging (MRI) is highly sensitive and specific for detecting bone metastases. Patients with HIV have an increased risk of certain cancers, and MRI plays an important role in detecting metastatic disease. However, diagnostic accuracy may vary depending on the use of contrast medium and imaging sequences.

Case Report: A 69-year-old woman with HIV presented with an insidious onset of lumbar radiculopathy. She underwent lumbar spine MRI without contrast, which revealed degenerative changes. Despite conservative management, she continued to have intractable pain and developed new upper extremityweakness. Repeat MRI 2 months later revealed innumerable metastases throughout herspine, ribs, and pelvic bones.

Conclusions: This case highlights a potential limitation of MRI in detecting metastatic lesions.

Pain physicians should individualize treatment according to the patient's presentation, consider contrast-enhanced MRI and appropriate imaging sequences to optimize diagnostic accuracy, and repeat diagnostic testing when clinically indicated.

Key words: MRI; metastatic cancer; metastases; lung cancer; HIV; AIDS; non-AIDS; contrast; diffusion-weighted imaging

BACKGROUND

Contrast-enhanced magnetic resonance imaging (MRI) is widely used to detect cancer metastases. It offers excellent soft-tissue resolution and is particularly effective in identifying early bone marrow involvement before cortical destruction becomes radiographically apparent (1). Recent studies suggest that whole-body MRI may have high diagnostic sensitivity for metastatic disease (2). However, this is not a standard-of-care diagnostic measure at this time. MRI is highly sensitive and specific for bone metastases, with reported sensitivity and specificity of 95% and 90%, respectively (3). Despite these advantages, MRI can still miss metastases. For instance, MRI is effective for detecting marrow disease but is less effective for cortical bone and may miss small foci of metastases in early stages (3). Other limitations include contraindications to contrast medium, cost, availability, and examination duration (4).

Individuals with human immunodeficiency virus (HIV) represent a vulnerable population with respect to malignancy risk. While HIV does not directly cause cancer, chronic immunosuppression, persistent inflammation, and coexisting behavioral and environmental risk factors increase susceptibility to both AIDS-defining and non-AIDS-defining cancers. These include Kaposi sarcoma, anal cancer, cervical cancer, and lung cancer (5). Lung cancer is the most prevalent non-AIDS-defining malignancy in the highly active antiretroviral therapy era (6).

From: Montefiore Medical Center, Bronx, NY

Corresponding Author: Min Ju Kim, DO, E-mail: mkim5@montefiore.org
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Because patients with HIV have a higher risk of developing certain cancers, MRI can play an important role in evaluating possible metastatic disease. However, it is important to recognize the limitations of MRI and that a normal or minimally abnormal MRI does not necessarily exclude early metastatic cancer.

CASE PRESENTATION

We present the case of a 69-year-old woman with a history of HIV and hemorrhagic stroke who initially presented with several months of progressively worsening low back pain. The pain began without an inciting event or trauma and had progressed since onset. It radiated into both legs and was exacerbated by sitting, standing, and walking. The pain was rated 10/10 at its worst and significantly limited her activities of daily living. Because of the pain, she visited the emergency department multiple times, where dexamethasone injections provided some relief.

The patient had previously seen other specialists, including a physiatrist, for her intractable back pain. An initial lumbar spine MRI in June 2024 revealed a mild diffuse disc bulge causing mild compression of the ventral aspect of the thecal sac at L1-2, mild to moderate bilateral foraminal narrowing that was worse on the left at L1-2, and a mild diffuse disc bulge at L2-3. At that time, no evidence of cancer was reported on the imaging (Fig. 1).

She was managed conservatively by physiatry, completed a methylprednisolone dose pack, and started gabapentin 300 mg 3 times daily. Physical therapy was prescribed; however, she was unable to tolerate it because of significant pain. At follow-up, she continued to have intractable low back pain and developed new bilateral upper extremity weakness despite conservative treatment, prompting referral to pain medicine. At the initial pain-management evaluation, additional physical therapy was prescribed, with plans to continue gabapentin and acetaminophen as needed for pain. A repeat MRI without contrast was ordered because of the intractable pain and weakness. Repeat lumbar spine MRI in August 2024, 2 months after the initial MRI, showed innumerable marrow-replacing lesions throughout the thoracic and lumbar spine, iliac bones, sacrum, and ribs that were compatible with metastatic disease (Fig. 2). The patient was subsequently found to have metastatic lung adenocarcinoma.

This case highlights a striking contrast between an initial MRI without evidence of metastatic disease and the subsequent identification of widespread metastatic disease within a relatively short timeframe.

DISCUSSION

MRI remains highly sensitive and specific for metastatic disease, especially in bone, and is more sensitive than computed tomography and bone scintigraphy for some marrow lesions (3). However, not all MRI examinations detect these lesions. MRI without contrast is commonly used as an initial study for degenerative spine disease and disc herniation. To improve characterization of suspected bone metastases, physicians may consider contrast medium and diffusion-weighted imaging when clinically appropriate (7).

Contrast medium may improve tumor enhancement and characterization of some bone masses or lesions, particularly small lesions. Gadolinium-enhanced MRI may therefore be useful when evaluating suspected tumor or infection. The potential diagnostic benefit must be weighed against patient-specific risks and costs. The manuscript states that contrast agents can be nephrotoxic and are contraindicated in patients with severe renal disease (8).

Diffusion-weighted imaging can increase sensitivity for bone metastases; however, benign marrow changes and inflammatory processes may reduce specificity (9). Accurate interpretation requires specialized expertise, which may limit accessibility and consistency across institutions.

Another limitation of MRI is its limited assessment of cortical bone and mineralization; therefore, CT may provide superior characterization of cortical destruction and sclerotic or mineralized lesions (10). In addition, microscopic metastases below the spatial resolution of MRI may not be detected (11).

Furthermore, the National Comprehensive Cancer Network and American Society of Clinical Oncology publications cited by the authors discuss imaging considerations in cancer care (12). When metastatic disease remains a concern despite nondiagnostic imaging, the imaging strategy should be individualized to the clinical scenario.

CONCLUSIONS

In this patient, the initial lumbar spine MRI did not show metastatic lesions, whereas repeat MRI 2 months later demonstrated widespread osseous metastases. At this time, it is unclear if patient had rapid disease progression or missed metastases on the initial imag-

ing, which led to the revelation of widespread metastases on repeat MRI. Regardless, this case emphasizes that imaging findings should be interpreted in the context of the patient's evolving clinical presentation, and when concern for malignancy remains high, physicians may consider appropriate contrast-enhanced or diffusion-weighted sequences and repeat diagnostic testing when clinically indicated.

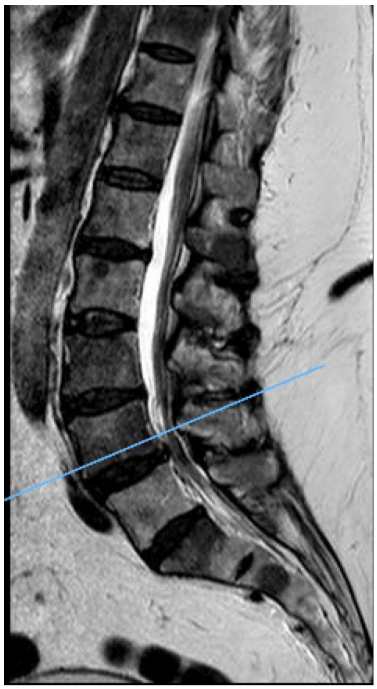

Fig. 1. Lumbar spine MRI without contrast in June 2024.

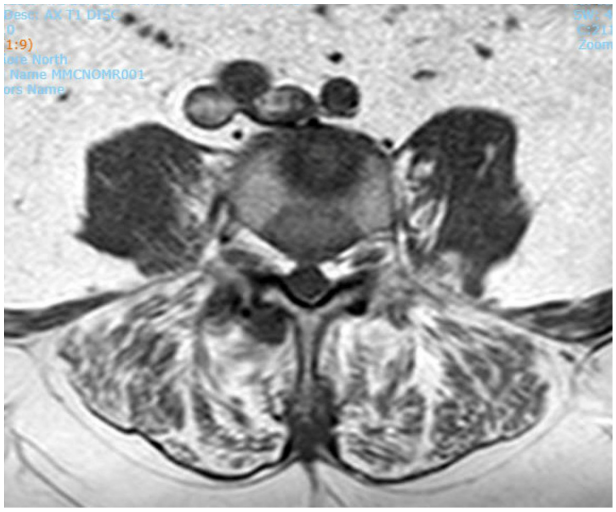

Fig. 2. Lumbar spine MRI without contrast in August 2024.

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