




Images in Hospital Medicine

Hypertrophic Pulmonary Osteoarthropathy - An Overlooked Clue of Lung Cancer

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Abstract

Hypertrophic osteoarthropathy (HOA) is a syndrome that presents with classic findings of digital clubbing, arthralgia, and periostosis of tubular bones. When HOA is associated with pulmonary pathologies such as lung malignancies, it is referred to as hypertrophic pulmonary osteoarthropathy (HPOA). We present a case of an elderly woman who presents with significant pain in both hands and was eventually diagnosed with lung malignancy. This case is of interest to hospital-based internists to ensure timely diagnosis of HPOA so a brief overview of the presentation, laboratory findings, and treatment of HPOA is discussed.

A 72-year-old woman with a past medical history significant for chronic obstructive pulmonary disease (COPD) and tobacco use disorder presented to the emergency department due to significant bilateral hand and lower extremity swelling and pain for the past several months. The symptoms gradually worsened with no known triggers or changes in her diet, daily routine, or medications. Other symptoms included difficulty rising from a chair and diffuse joint and back pain. She denied respiratory symptoms, radicular pain, tingling, or weakness of her upper and lower extremities, as well as constitutional symptoms, recent weight loss, or urinary and bowel incontinence.

Examination of the lower extremities revealed trace edema over the distal limb and ankles with pain out of proportion to the physical exam on palpation. Her hands and fingers revealed swelling and digital clubbing bilaterally ([Figure 1a](#)). Of note was that she had a ring on her left third finger, which could not be removed even with sterile lubricating jelly ([Figure 1b](#)). Initial laboratory findings were remarkable for hypokalemia 2.4 mmol/L (3.5-4.5 mmol/L), an elevated alkaline phosphatase (ALP) 190 U/L (40-150 U/L), and normocytic normochromic anemia. Her chest radiograph revealed a new focal consolidation within the right lower lung field, prompting a follow-up computed tomography (CT) without contrast. CT findings revealed a solid 2.5 cm right lower lobe pulmonary nodule with spiculated margins concerning for malignancy. Given the limb swelling and pain, a magnetic resonance imaging (MRI) of the thoracic and lumbar spine with and without contrast was obtained to rule out compressive myelopathy secondary to spinal metastasis from primary pulmonary malignancy. No metastasis was noted. Radiographs of the bilat-



Figure 1a. Dorsal view of hands demonstrating bilateral digital clubbing, a classic clinical finding of hypertrophic pulmonary osteoarthropathy (HPOA).

eral hands revealed periosteal reactions of the distal ulna, radius, and hand and finger bones ([Figure 2](#)). Biopsy results confirmed the diagnosis of non-small cell lung carcinoma (adenocarcinoma). She was discharged with a pain regimen and close follow-up as an outpatient with rheumatology and oncology, where they planned for chemoradiation therapy given that the malignancy was deemed unresectable at this time.

Hypertrophic pulmonary osteoarthropathy (HPOA) is characterized by the enlargement of the distal ends of the extremities due to the proliferation of skin and osseous tissue, leading to painful joints and clubbing of the fingers. It is often due to secondary causes such as cyanotic heart disease, inflammatory bowel disease, primary biliary cirrhosis, and primary sclerosing cholangitis



Figure 1b. Unable to safely remove a ring from her left middle finger due to excessive swelling.

or pulmonary etiologies such as malignancies.^{1,2} Symptoms consist of digital clubbing, arthralgia, and joint effusions. Increased antinuclear antibodies, anti-Sm antibodies, and ALP can also be seen.³ While the exact pathophysiology of HPOA is not fully understood, current literature suggests that the presence of certain fibroblast growth factors that fail to be removed by the lung due

to intrapulmonary shunting or dissemination of platelet fragments can induce collagen deposition, interstitial edema, and periostosis of tubular bones.⁴⁻⁶ Additionally, there is limited current research on the epidemiology of HPOA, but several studies report an incidence of lung malignancy between 0.8% and 17% in patients.⁷

The clinical relevance of the presence of digital clubbing and hypertrophic osteoarthropathy, even in the absence of respiratory symptoms or constitutional weight loss, is its association with pulmonary tumors ranging from bronchial carcinoid malignancies to small cell carcinoma.⁸ Symptoms can range from asymptomatic to a triad of periostitis, digital clubbing, and painful arthropathy, most notably over the lower limbs.^{4,9} Clinicians can evaluate for an angle of over 180° of the nailbed as it extends out from the proximal nailbed (Lovibond's angle) or the absence of a diamond-shaped window when the nailbeds of two fingers on opposite hands are opposed (Schamroth sign). However, the clinical utility of this finding currently remains ambiguous.¹⁰

Often, painful symptoms can be managed with non-steroidal anti-inflammatory drugs, but treatment of the underlying pathology, such as a lung malignancy, typically leads to complete resolution.^{5,6} Current research also reveals that inhibition of vascular endothelial growth factor (VEGF) with bisphosphonates such as zoledronic acid, octreotide, or other VEGF inhibitors can mitigate joint pain from HPOA.¹¹ Patients with these clinical findings should undergo thorough evaluation for underlying pathologies and malignancies, particularly through imaging, which is the main tool for diagnosing HPOA.⁴

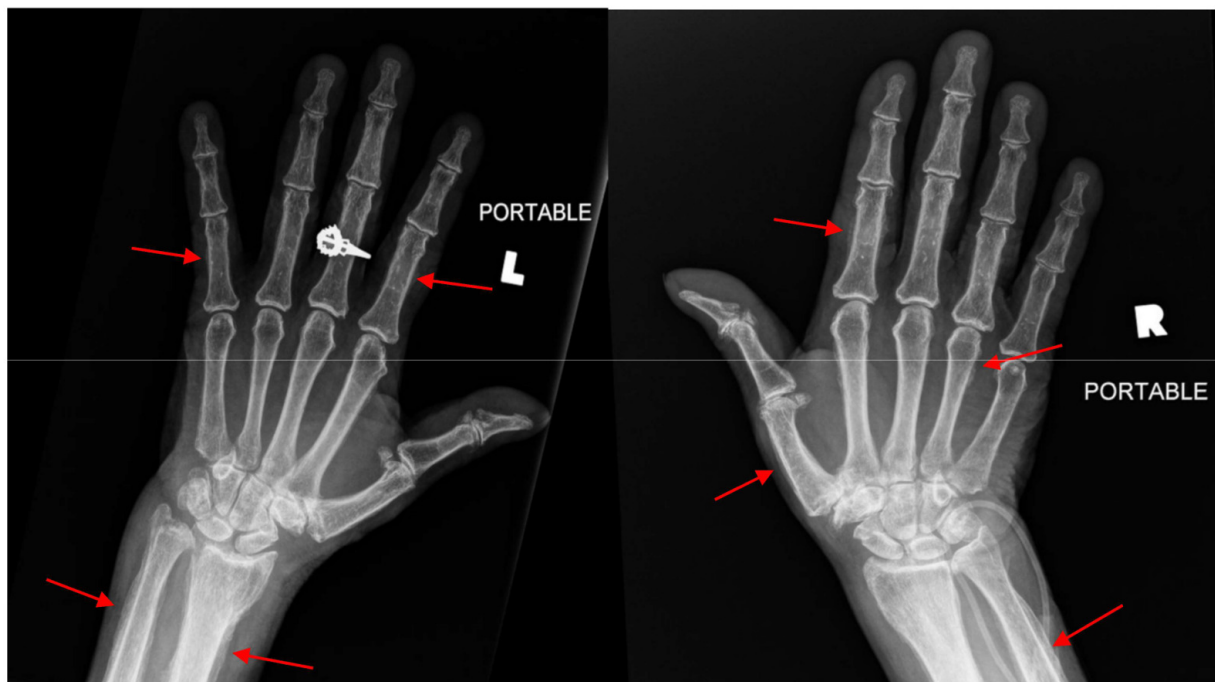


Figure 2. Periosteal reaction (arrows) of the diaphysis, metaphyses, and epiphyses of the long bones of the distal upper extremities, metacarpals, and some phalangeal shafts consistent with advanced hypertrophic osteoarthropathy.

In conclusion, hypertrophic pulmonary osteoarthropathy (HPOA) could be a useful clinical tool for diagnosing pulmonary malignancy. Early detection of lung cancer is crucial because it significantly improves the prognosis and treatment options for patients. Painful joints and digital clubbing of fingers on physical exams, despite minimal symptoms like in our patient, emphasize the need for thorough physical examination and awareness of HPOA, enabling early diagnosis and prompt care.

- Drafting the work or revising it critically for important intellectual content; AND
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Disclosures/Conflicts of Interest

The authors declare they have no conflicts of interest

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- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND

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