Superior sulcus tumor disguised as cervical radiculopathy with metastasis to brachial plexus

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ABSTRACT

A 74-year-old man presented to an orthopedic spine surgeon with signs and symptoms consistent with cervical radiculopathy. Investigation revealed metastasis of a Pancoast tumor to the patient's brachial plexus. A year after initial diagnosis, the patient achieved full neurological function of his left arm. Pancoast tumors are rare in the orthopedic population. Thorough physical examination, imaging, and nerve conduction studies ultimately led to the patient's diagnosis.

KEYWORDS Brachial plexus; Pancoast tumor; radiculopathy; spine

Pancoast tumors, also recognized as superior sulcus tumors given their location in the lungs, are challenging to diagnose. Pancoast syndrome, as explained originally by Henry Pancoast (1875–1939), is usually described in association with lung cancers and is characterized by pain, Horner's syndrome, destruction of bone, and atrophy of the intrinsic hand muscles, though it may present with symptoms similar to cervical radiculopathy.^{1,2} Generally speaking, cervical radiculopathy is a common disorder seen and managed by spine surgeons. The pathophysiology of cervical radiculopathy stems from nerve root dysfunction or irritation, which is often due to mechanical compression.³ This case demonstrates the challenging, and often confusing, diagnosis of atypical Pancoast syndrome.

CASE REPORT

A 74-year-old man, a former smoker, was referred to a spinal orthopedic surgeon for evaluation of his neck pain that frequently radiated down into his left arm, with maximal pain in the axilla, arm, and forearm. The pain was chronic, had progressively worsened, and was described as intermittent, moderate, stabbing, throbbing, and aching. Resting the limb, acetaminophen, and topical anti-inflammatory gel provided minimal relief. The patient was known to have arthritis, atrial fibrillation, previous hernia surgeries,

and left rotator cuff injury. Other orthopedic surgeons told him that he had cubital tunnel syndrome, and he underwent an ulnar release on the left side in an attempt to alleviate his symptoms, without success.

On examination, he was alert, oriented, and appeared his stated age. There was no palpable tenderness over the posterior cervical, thoracic, or lumbar spinal areas. The patient had full range of motion of the cervical spine, with flexion, extension, and rotation. He had full strength in the biceps, triceps, wrists, hands, and legs. His sensation was intact bilaterally in the upper and lower extremities. Reflexes were within normal limits. There was no clonus; Hoffman's test and Spurling's test were negative. He walked with a normal heel-to-toe reciprocal gait with no apparent imbalances during mobilization. Magnetic resonance imaging (MRI) of his cervical spine showed mainly degenerative changes and no pathology consistent with his physical exam (*Figure 1a*). After electrodiagnostic studies did not elucidate a cause for the patient's symptoms, revealing bilateral upper-extremity motor/sensor primary demyelinating polyneuropathy likely secondary to his amiodarone medication, an MRI evaluating his brachial plexus was ordered, which confirmed a lower brachial plexus lesion caused by malignant spread of a Pancoast tumor (*Figure 1b*).

The patient underwent an upper endoscopy to biopsy the left-sided lesion to confirm the diagnosis of a Pancoast

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Figure 1. T2-weighted MRI. (a) Sagittal view of the cervical spine revealing a mild disk protrusion present at C6-C7. The image also showed multilevel, multifactorial cervical degenerative changes contributing to multilevel foraminal stenosis, with foraminal narrowing most advanced on the right at C3-C4 and C6-C7. (b) Coronal view of the chest revealing a hyperintense lesion at the left thoracic inlet in the expected location of the exiting C8 and T1 nerve roots, as well as the inferior-most aspect of the brachial plexus with spindles stemming from the superior aspect of the left lung.

tumor. Though it is possible to successfully resect tumor off the brachial plexus with some success, the cardiothoracic surgeon determined that this procedure would be high risk with potential injury to the plexus.⁴ The patient subsequently completed 35 radiation sessions and six rounds of chemotherapy. One year after initial diagnosis and upon completion of the radiation sessions, the patient had no neurological limitations in his left upper extremity, with no pain on physical examination.

DISCUSSION

Though documented in literature, the spread of carcinoma and sarcoma to peripheral nerve cells is exceedingly rare.⁵ More specifically, metastasis of a Pancoast tumor to the brachial plexus, causing the initial presentation of the tumor, is extremely rare and has only been described in a handful of cases. This case report describes a rare clinical presentation of a Pancoast tumor that may easily be confused with cervical radiculopathy. In this case, physical examination remained critically important in the diagnosis. The patient's brachial plexus lesions were missed by previous orthopedic surgeons and resulted in an unsuccessful and unnecessary cubital tunnel release in an attempt to resolve his symptoms. A thorough history and physical examination painted a picture of symptoms that was not fully conclusive on MRI. The patient's vague distributions of pain with inconsistencies with nerve distribution complicated the diagnostic picture. As stated by Woods et al,³ often the MRI findings reveal nearly universal degenerative changes within the spine and may cloud a diagnostician's

clinical picture if a thorough physical examination is not performed. With a physical exam that did not perfectly match MRI findings, additional studies were needed. This was the initial presentation of this patient's Pancoast tumor and, without additional workup, may have been missed altogether.

In conclusion, although Pancoast tumors infiltrating the brachial plexus are rare, orthopedic spinal surgeons may be the first clinician to encounter such patients. Therefore, early diagnosis and referral to the treating clinician can greatly aid in a patient's overall prognosis.

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