Missed Diagnosis in a Woman With Past Malignancy

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CLINICAL HISTORY

This is a 51-year-old right-handed female with a history of porphyria (since she was a youngster) and breast carcinoma treated with bilateral mastectomy/chemotherapy but no radiation. She presented with a 14-month history of progressive right upper extremity weakness; right hand coordination difficulty; nonradiating pain originating from the shoulder; progressive numbness from the first 2 fingers of the hand up to the mid-humerus level; and without headache, speech, or swallowing difficulties.

With the patient's remote history of breast cancer, infiltrative disease at the right brachial plexus needed to be ruled out. An electromyographic (EMG) study revealed denervation at triceps, biceps, deltoid, and brachioradialis muscles. Nerve conduction studies were not performed. The patient was also seen by an orthopedist, who said the patient had cervical radiculopathy/thoracic outlet syndrome.[1,2]

MEDICATIONS

The patient was given synthroid, 125 µg per day, for goiter removed at the time of her mastectomies; Celebrex, 200 mg, once a day; and Fosamax, 1 a day.

PHYSICAL EXAMINATION

Her blood pressure was 158/88; her height, 5 feet 6 inches; weight, 149 pounds; and pulse, 78 and regular. She was positive for edema in the right hand. Weakness in the right upper extremity, especially wrist extensor, finger extensors, biceps, triceps, and latissimus dorsi muscles; and impaired pinprick sensation in the lateral aspect of the right upper extremity; antebrachial and brachial pattern pinprick deficit of right upper extremity were evident, suggestive of plexopathy possibly distal to the upper/middle trunk of right brachial plexus. The possibility of porphyria causing neuropathy was uncertain in view of the course of the disease and anatomical aspect of the motor and sensory deficit.

LABORATORY RESULTS

Lab results were essentially negative. Six months prior to her evaluation, she had a negative technetium bone scan, magnetic resonance imaging (MRI) of the C-spine that showed osteoporosis and mild C5 and C6 neural foramina narrowing but no other pathology.

IMPRESSION

- Thoracic outlet syndrome,
- Possible recurrent carcinoma,
- Hypertension

RECOMMENDATIONS AND PLAN

1. Rule out a plexus lesion in the right upper extremity, especially with a history of bilateral mastectomy due to breast cancer.
2. Bilateral MRI/magnetic resonance angiography and magnetic resonance venography of the brachial plexus.[2]
3. The MRI and EMG are needed of the upper extremities to better delineate the problem in her right arm.

RADIOGRAPHIC AND MRI FINDINGS

The posterior-anterior chest radiograph (Figure 1) displays the asymmetry of the chest wall, density of the breast implants, and tumor infiltration of the right first rib. The lateral chest radiograph (Figure 2) displays the deformity of the chest and kyphosis of the thoracic spine. Figure 3 is an enlarged posterior anterior digitized upper chest radiograph of Figure 1 displaying more clearly the lytic destruction of the right first rib. Figures 4A and 4B are coronal and transverse MRI images that display the tumor infiltration of the right supraclavicular fossa and clavicle. Figure 5 is a coronal MRI abduction external rotation (AER) of the upper extremities that

Figure 1. Posterior anterior chest radiograph that displays the forward rotated low right shoulder; anterior rotated heads of the clavicle (C) over the asymmetric posterior 4th ribs); bilateral asymmetric breast implants increasing the density of lungs, right greater than left; metal clip over the left upper lung unchanged; right hemidiaphragm slightly higher than on the previous examination; increased density over the anterior right first rib and the soft tissues superior to the right clavicle medial to the scapula; bilateral absent axillary folds (axillary tail Spence). Aorta (A), Coracoid Process (CP), First Rib (FR), Left Ventricle (LV), Pulmonary Artery (P), Trachea (T).

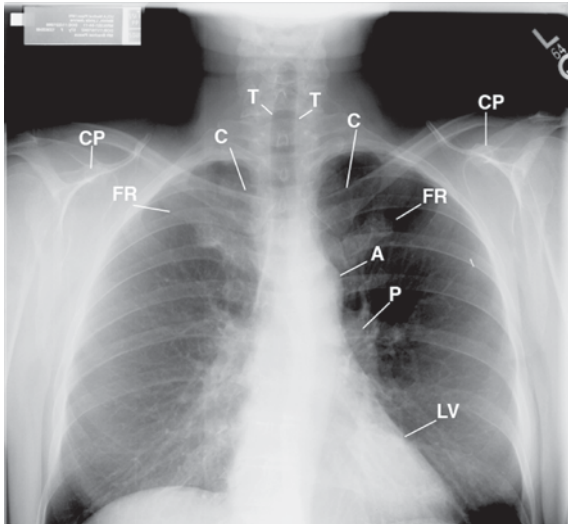
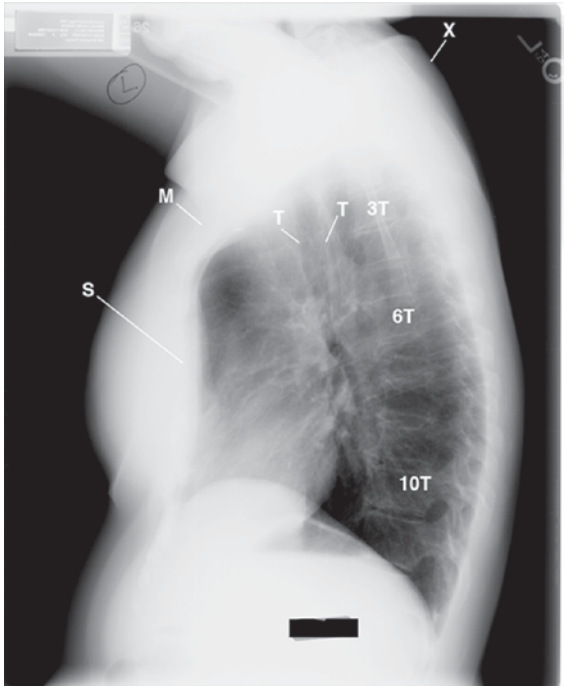
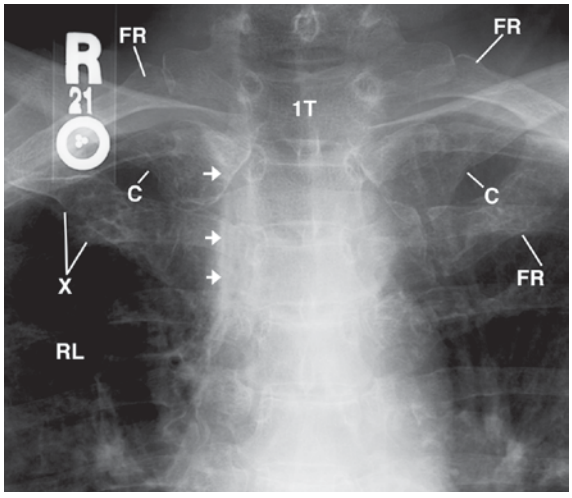


Figure 2. Lateral chest view of the thorax that displays the dense breast implants; anterior concaved sternum (S) backwardly displacing the cardiomediastinal structures; kyphosis of the thoracic spine increasing the slope of the first ribs backwardly displacing the manubrium (M), placing the heads of the clavicles in close proximity to the first ribs and rounding of the shoulders.[7]



Abbreviations: T, trachea; X, round shoulders; 3T, 6T, 10T, thoracic vertebrae.

Figure 3. Upper posterior-anterior view of the thorax that displays the lytic expansile lesion of the right first rib (X), density (3 arrows) marginating the lateral margin of the trachea; clavicle (C), first rib (FR), right (R), right lung (RL), and first thoracic vertebra (1T).



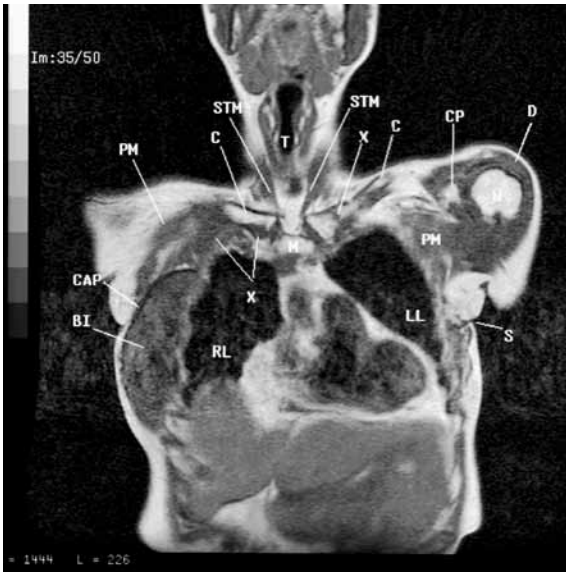
displays the posterior-inferior rotation of the clavicles with the subclavius muscles (AER) and the posterior-anterior medial rotation of the coracoid processes with attached muscles enhancing costoclavicular compression of the tumor in the right supraclavicular fossa obscuring the neurovascular bundle, lymphatics, and venous drainage of the right neck and supraclavicular fossa with costoclavicular compression of the second division of the left subclavian artery at the site of binding nerve roots with density of the silicone breast implants.[1,3-5] The above images were selected because they best display the pathology. A more complete and detailed imaging procedure was performed. Annotated images were provided to the referring physician.

DIAGNOSIS

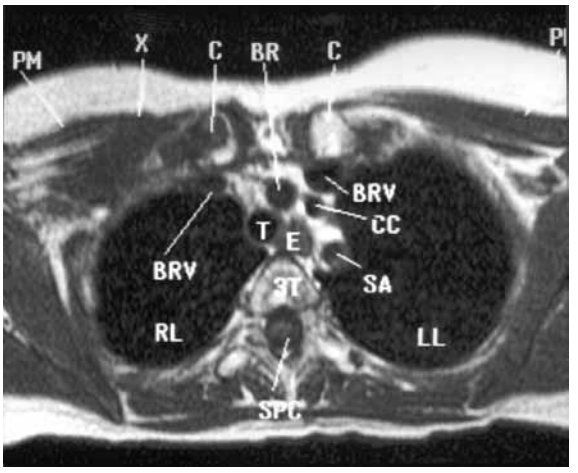
- Postbilateral mastectomy;
- Bilateral silicone breast implants as per history;
- Bilateral round shoulders, right greater than left;
- Kyphosis thoracic spine as described above;
- Metastatic carcinoma to the right first rib and clavicles;

Figure 4. Coronal and Transverse Images That Display the Tumor Infiltration of the Right Supraclavicular Fossa And Clavicle

A. Coronal magnetic resonance imaging (MRI) of the thorax that displays the mass over the right upper thorax and lytic destruction of the right clavicle (X); capsule (CAP) marginating the right silicone breast implant (BI); Tumor (X) infiltrating the left chest wall and clavicles; scarring from right mastectomy (S).



B. Transverse MRI displaying a cross-reference image of the coronal sequence that reflects the importance of multiplanar MRI in patients suspected of having thoracic outlet syndrome. Observe the tumor (X) infiltrating the clavicle (C) and the pectoralis major muscle (PM), and the region of the right brachial plexus.



Abbreviations: BR, brachiocephalic artery; BRV, brachiocephalic vein; C, clavicle; CC, common carotid artery; DM, deltoid muscle; E, esophagus; LL, left lung; PM, pectoralis major muscle; RL, right lung; SA, subclavian artery; SPC, spinal cord; STM, sternocleidomastoid muscle; T, trachea; 3T, third thoracic vertebrae.

- Outside radiographs and MRI cervical spine displayed the lytic destruction of the right first rib and clavicle not recognized by the radiologist.

DISCUSSION

The attending neurologist stated that acute intermittent porphyria usually manifests itself as cranial neuropathies and acute polyneuropathy during attacks. He stressed the need to rule out other possible causes for the patient's cause of her neurological abnormalities, especially with the history of breast cancer in the past. The MRI of the brachial plexus of the upper extremity and the EMG were needed to better delineate the problem in her right arm.

The patient had outside analog chest radiographs and MRI of the cervical spine 6 months prior to her neurological examination. The review of the above radiographic images displayed a mass density in the right supraclavicular fossa and destruction of the anterior right first rib and the adjacent right clavicle not detected by the outside radiologist. The requested MRI displayed the mass over the junction of the right internal jugular and subclavian veins and right thoracic lymph duct confirming metastatic disease to the 4th and 11th thoracic vertebrae. She was informed of our findings. Percutaneous fine-needle biopsy of the right upper lung mass also confirmed metastatic cancer. Thereafter, she was scheduled for radiation therapy and lost to follow-up.

TAKE HOME MESSAGE

The lymph system is contiguous with the vascular system of the lung. The lymph system is a closed system, like the vascular system. The lymph flow is dependent on the elasticity and pumping action of the lung. If the lungs are scarred from chronic infections, radiation therapy, and/or toxic agents, the lymph flow is disrupted, as it was in this patient. Since tumors and infections are spread by the lymph system in the extremities, alternate pathways may occur in the lung when the normal flow is obstructed.[6] Thoracic surgical resections may leave cells within severed lymphatics and thus allow recurrences at the site and/or distal to the surgical resection. Likewise, primary lesions in one lung may spread to the opposite lung by collateral lymph circulation. Lymphatics that are cut will lose lymph fluid into the pleural space.

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Figure 5. Coronal abduction external rotation (AER) of the upper extremities that displays the gray proton-dense edema obscuring the muscles in the resected right axilla. The tumor (X) infiltrates the right brachial plexus.

Abbreviations: A, aorta; BR, brachiocephalic artery; BV, brachiocephalic vein; BI, breast implant, C, clavicle; E, esophagus; H, humerus; L, liver; LL, left lung; LV, left ventricle; P, pulmonary artery and the region of the right brachial plexus; RL, right lung; SA, subclavian artery; SVC, superior vena cava; T, trachea; 2, 3, cervicle vertebrae.

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