A Woman Post Mastectomy and Radiation Therapy With Chest Pain

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HISTORY

This was the third UCLA hospital admission for this 66-year-old female. Twenty-seven years ago the patient had breast cancer and underwent a left radical mastectomy without chemotherapy, and/or total-body bone scanning. She then had recurrence in the left supraclavicular fossa involving the lymph nodes and the brachial plexus. She was treated with telecobalt beam over a single anterior dogleg-shaped portal. The field was shaped with modified lead bricks. A dose of 4000 rads (1 rad = 0.01 gy) was delivered over 5 weeks.

PHYSICAL EXAMINATION

On admission the following were revealed: blood pressure, right arm, 150/90 mm Hg; pulse, 82; temperature, 98.6ºF; and labored respiration rate, 24 beats per minute. She had pain, numbness and tingling, tenderness with soft swelling, and recurrent cellulitis over the resected site of the left breast. Percussion dullness was detected over the left upper lung and a draining sinus tract over the mid-left clavicle. Thereafter, she underwent resection of the left clavicle.

LABORATORY RESULTS

Hemoglobin was 13. Hematocrit, 32, normal differential. Urinalysis was normal.

RADIOLOGICAL FINDINGS

Posterior-anterior radiograph of the shoulders (Figure 1) displayed the elevated right shoulder as compared to the laxity of left shoulder; asymmetric anterior rotated heads over the posterior fourth ribs; trachea deviated to the right of mid-line; bilateral increased density apices of both lungs, left greater than right, reflecting radiation fibrosis obscuring the dense left first rib and the complete fracture of the left clavicle over the posterior third to fifth ribs. The trabecular matrix of the left clavicle is obscured as it crosses the spine of the left scapulae. The hazy dense soft tissues over left scapula inferior to the coracoid process reflected swelling of the soft tissues.

A cone down anterior-posterior radiograph (Figure 2) displayed the hazy dense margins of the apex of the left lung over the lytic destruction of the left clavicle down over the aorta, pulmonary artery, and left breast implant reflecting radiation fibrosis.

A linear tomogram (Figure 3) displayed the amorphous fracture of the mid-left clavicle enhancing the dense fibrous tissue replacement of the medial and lateral margins of the left clavicle.

Figure 4 is a negative image of Figure 3 that displays the loss of the trabecular pattern of the clavicle reflecting osteoradionecrosis.

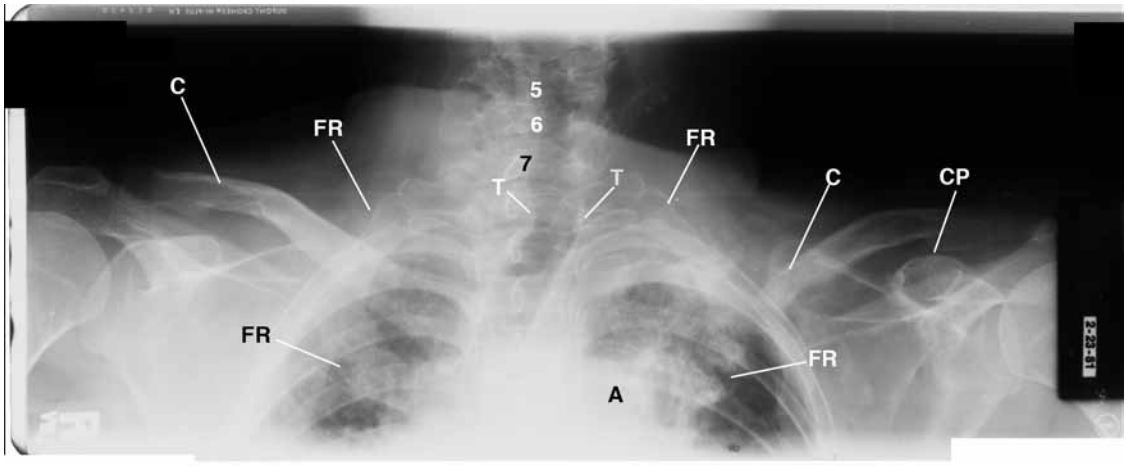
IMPRESSION

- Osteoradionecrosis left clavicle
- Radiation fibrosis.
- Cellulitis.
- Brachial plexopathy.

DISCUSSION

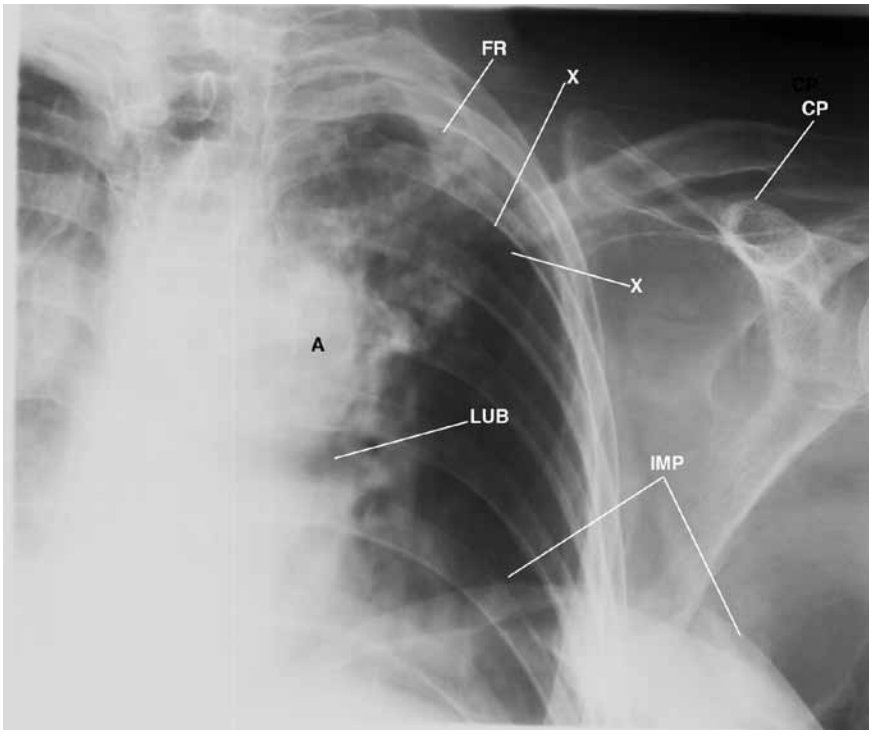
Osteoradionecrosis of bone is necrosis secondary to irradiation and superimposed infection. Osteoradionecrosis is not predictable. External radiation to the bone frequently injures the cellular elements of the marrow. Blood vessels, which supply the bone with nutrients, are frequently damaged. Growing bone at endochondral ossification sites is particularly sensitive to radiation. Radiation damage frequently causes necrosis, retardation of bone growth, osteoporosis, and fractures. Infection may occur due to decreased bone viability. Histologically, bone reacts to radiation by necrosis with subsequent fibrosis. The bone cell lacunae lose osteocytes. The Haversian canals are enlarged. Bone repair is rarely evident. Calcium deposits frequently occur on necrotic segments. Radiographic changes include sequestrum formation, reactive sclerosis, lytic areas of

Figure 1. Posterior-anterior view of the elevated right shoulder as compared to the laxity of left shoulder; asymmetric anterior rotated heads of the clavicles (C) over the posterior fourth ribs; trachea (T) deviated to the right of mid-line; bilateral increased density apices of both lungs, left greater than right, reflecting radiation fibrosis obscuring the dense left first rib (FR) and the complete fracture of the left clavicle over the posterior third to fifth ribs. The trabecular matrix of the left clavicle is obscured as it crosses the spine of the left scapulae. The hazy dense soft tissues over left scapula (CP) inferior to the coracoid process reflected swelling of the soft tissues.



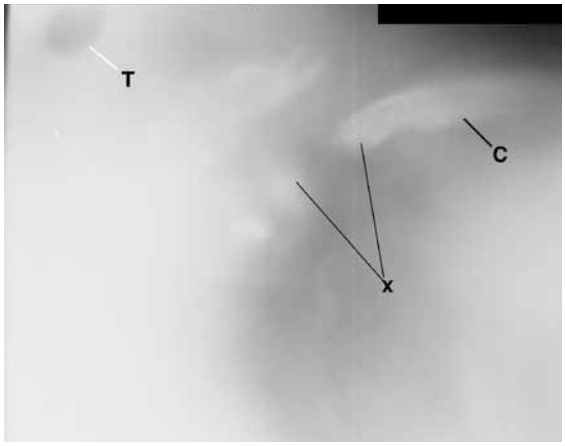
Abbreviations: A, aorta; H, humerus; 7, C 5, 6, 7, cervical vertebrae.

Figure 2. A cone down anterior-posterior view of the hazy dense marginates the apex of the left lung over the lytic destruction of the left clavicle down over the aorta (A), and left breast implant (IMP) reflecting radiation fibrosis.



Abbreviations: CP, coracoid process; FR, first rib; LUB, left upper lobe bronchus; X, lytic fracture left clavicle.

Figure 3. Linear tomogram that displays the amorphous fracture (X) of the mid-left clavicle enhancing the dense fibrous tissue replacement of the medial and lateral margins of the left clavicle (C).



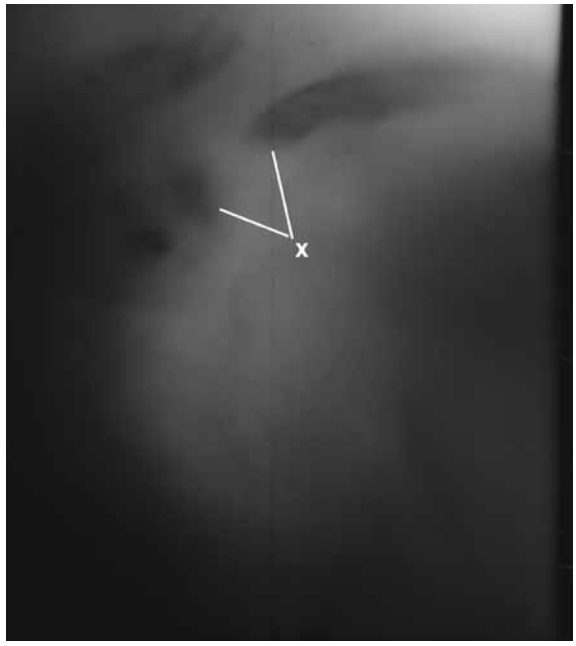
T, trachea

fibrosis tissue replacement, demineralization, hypoplasia, fracture, and scarring of soft tissues.[1-3]

TAKE-HOME MESSAGE

Radiotherapy in carcinoma of the breast is of palliative value. When there is recurrent breast carcinoma, as in this patient, plain radiographs should be obtained as well as a total-body isotope bone scan. Bone scan and computerized imaging were not available to this patient. Magnetic resonance imaging (MRI) demonstrates vivid anatomical detail that cannot be duplicated by any other modality (ie, computed tomography or ultrasound). Faster imaging with MRI and higher resolution of images display greater anatomical detail. Patient management is improved by the anatomic detail that magnetic resonance provides. Obtaining an MRI prior to invasive procedures allows the clinician and radiologist to plan appropriate therapy, improving patient care.[4]

Figure 4. Negative linear tomogram of Figure 3 that displays the loss of the trabecular pattern (not labeled) of the clavicle reflecting osteoradioneurosis and the fracture site (X).



REFERENCES

1. Murray R, Jacobson H. The Radiology of Skeletal Disorders. Williams and Wilkins. 1971:472.

2. Fletcher G. Textbook of Radiotherapy 3rd ed. Lea & Febiger. 1980:234.

3. Moss W. Therapeutic Radiology, 2nd ed. 1965:378-379.

4. Collins JD, Shaver M, Batra P, Brown K, Disher A. Magnetic Resonance Imaging of Chest Wall Lesions. *J Natl Med* Assoc. 1991;83:352-360. ■