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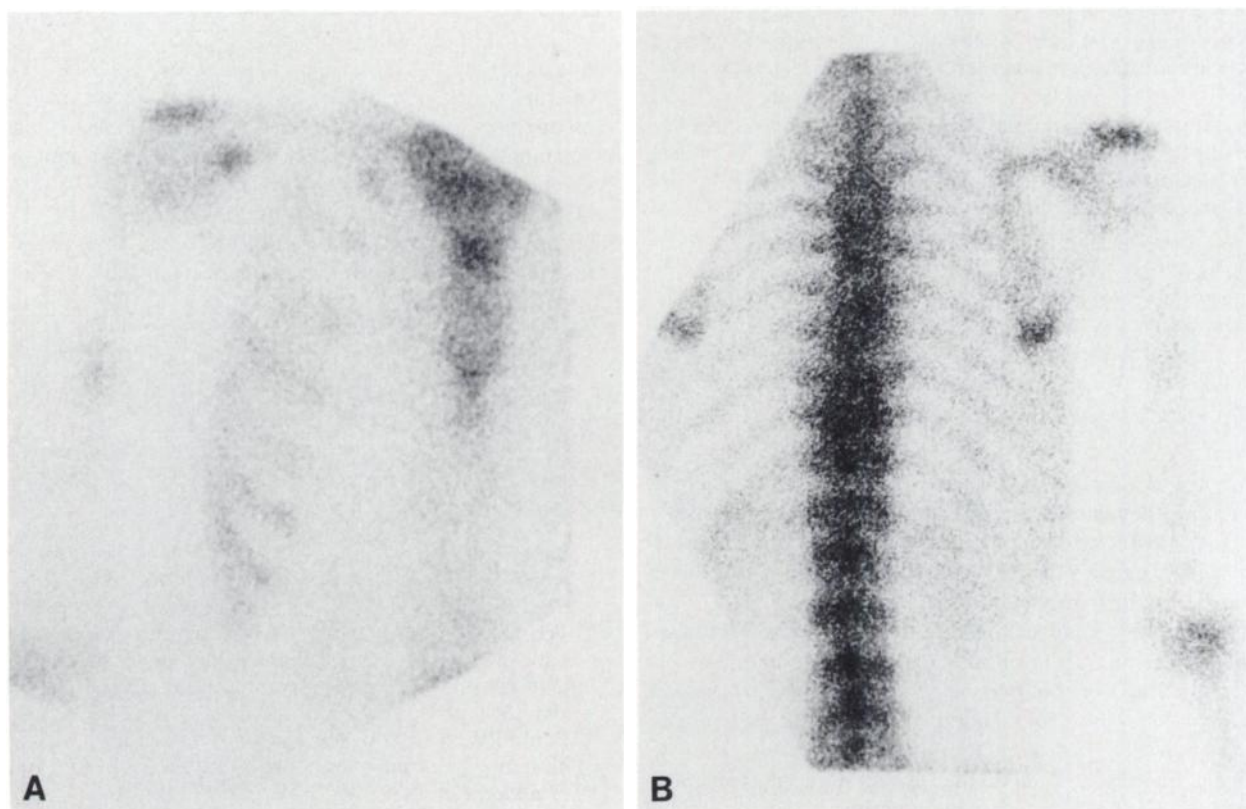
### "Delta Sign" in Bone Scan Interpretation—A Cautionary Note

**TO THE EDITOR:** The "delta sign" has been described by Fink-Bennett and Vicuna-Rios (1) as a normal bone scan variant, representing the site of deltoid muscle insertion in the upper humerus. We recommend a degree of caution, however, in ascribing a focal increase in tracer activity to this normal variant, particularly in the presence of a known primary tumour which has the propensity for spread to bone, even if this is usually to the axial skeleton. We report the case of a 58-yr-old woman with a history of carcinoma of the cervix 13 yr previously, which had been treated by total abdominal hysterectomy preceded by radium insertion. She re-presented with a 2-mo history of a lump in the left breast. On examination a 5-cm mass was palpable in the upper outer quadrant

of the left breast, with associated mobile axillary lymphadenopathy. As part of the staging procedure for the carcinoma technetium-99m methylene diphosphonate whole-body scintigraphy was performed. Only a single metabolically active lesion was noted which was in the upper third of the right humerus (Fig. 1). In the absence of lesions at other sites and the presence of a corresponding prominent deltoid tuberosity on the plain radiograph, the active lesion was ascribed to the "delta sign". A simple left mastectomy with axillary clearance was performed. At histology four of five lymph nodes in the upper axilla were involved with tumor and five of seven lymph nodes in the lower axilla were also infiltrated. In the presence of a negative bone scan the carcinoma was graded on clinicopathological grounds as a stage II tumor. A 6-wk course of radiotherapy was therefore given to the left chest wall and axilla 1 mo postoperatively.

Six months after her operation, the patient presented with an 8-wk history of tenderness in the right arm. A plain radiograph now showed a permeative bone lesion in the proximal third of the right humerus, suggestive of a metastasis. A repeat bone scan at this stage demonstrated a fusiform increase in tracer uptake in the upper third of the right humerus consistent with a metastasis (Fig. 2); the remainder of the skeleton being normal. The patient is currently receiving local radiotherapy with good relief of her symptoms.

The "delta sign" was described in 1980 and attributed to "the greater affinity of methylene diphosphonate for the cortically thickened site of insertion of the deltoid muscle". It was cited as a cause of localized increased tracer uptake in 7%



**FIGURE 1**

A: Anterior view of the right humerus. B: Posterior view of the right humerus. Note the focus of increased activity in the upper third of the right humerus, corresponding to the deltoid tuberosity on plain radiography.



**FIGURE 2**  
Bone scintigram demonstrating a fusiform focal increase in the upper third of the right humerus consistent with a bony metastasis, and corresponding to a permeative bone lesion on plain radiography.

of cases reviewed, and it was emphasized that recognition of the sign was important to prevent bone scan misinterpretation. In the present case, attributing the initial scan appearance to the "delta sign" may have caused incorrect staging of the breast tumor, as the focal uptake of tracer could have been the earliest manifestation of a bony metastasis. We would therefore advise caution in describing a solitary focal lesion as a normal variant in patients with proven malignancy, especially where the primary tumor has a predilection for bony spread.

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#### Failure of Iodine-131 MIBG Imaging in Small Cell Lung Carcinoma

Iodine-131-labeled MIBG metaiodobenzylguanidine ( $^{131}\text{I}$  MIBG), an analog of nor-adrenalin, has been successfully

employed as an imaging agent for the adrenal medulla (1) and its neoplasms including neuroblastoma and pheochromocytoma (2,3). It also localizes in some other APUD tumors including paraganglioma (4), thyroid medullary carcinoma (5), and carcinoid tumors (6).

Small cell lung cancer (SCLC) has some similar APUD properties including neurosecretory ("dense core") granules and the enzymes dopa-decarboxylase and neurone-specific enolase (7). We have therefore evaluated  $^{131}\text{I}$ MIBG as a diagnostic imaging and potential therapeutic agent in this tumor, with negative results.

Between August and October 1986, ten SCLC patients (age 48–69 yr; eight untreated, two relapsed; four limited disease, six extensive—liver, node, brain, skin, and adrenal metastases) underwent  $^{131}\text{I}$ MIBG imaging, using a gamma camera. Each patient was given a 0.5 mCi dose of  $^{131}\text{I}$ MIBG, with Lugol's iodine before and after to prevent thyroid uptake. Planar, anterior, and posterior images of the chest were obtained 24 and 48 hr following i.v. injection of the radiopharmaceutical using a data acquisition time of 20 min. In patients with known disease in other areas, such as the liver, additional selected anterior and posterior planar views were obtained.

Physiological activity was seen in the liver, spleen, urinary bladder, heart and to a lesser extent in the lung fields, but no tumor concentration of the radiopharmaceutical was seen in any patient. Unlike other tumors with similar APUD characteristics,  $^{131}\text{I}$ MIBG does not appear to be taken up selectively by small cell lung carcinoma using current imaging techniques.

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#### Thallium-201 Imaging of Auto-Transplanted Parathyroid Glands

**TO THE EDITOR:** We wish to offer a short addendum to an otherwise comprehensive yet succinct review of noninva-