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Radioactive Iodine Uptake by Breasts

TO THE EDITOR: In the March issue of the *Journal of Nuclear Medicine*, Ramos-Gabatin and Pretorius state that

ectopic thyroid tissue in the breasts, which produced hyperthyroidism several weeks postpartum has been described (1). The reference cited for this statement was the article "I-123 Breast Uptake in a Young Primipara with Postpartum Transient Thyrotoxicosis" by Duong et al. (2). In the article, a 22-yr-old female presented 3 wk postpartum with signs, symptoms, and laboratory findings of hyperthyroidism. Her 24-hr iodine-123 (^{123}I) thyroid uptake was less than 1%. Considerable accumulation of ^{123}I was localized in the patient's breasts. She was treated with propylthiouracil for 6 wk and became asymptomatic. At that time, her 24-hr ^{123}I uptake was normal at 23% and no accumulation of ^{123}I was noted in her breasts. The authors did not state that the patient's hyperthyroidism caused by or related to uptake of ^{123}I by her breasts nor was there any mention of ectopic thyroid tissue in the breasts.

We feel this patient most likely has subacute lymphocytic thyroiditis occurring in the postpartum period (3) accounting for her clinical findings of hyperthyroidism and the low 24-hour ^{123}I thyroid uptake. Furthermore, we do not concur as stated by Ramos-Gabatin and Pretorius that ectopic thyroid tissue in the breasts produced hyperthyroidism in this 3-wk postpartum patient.

Recently, we scanned a 26-yr-old woman who was 4 mo

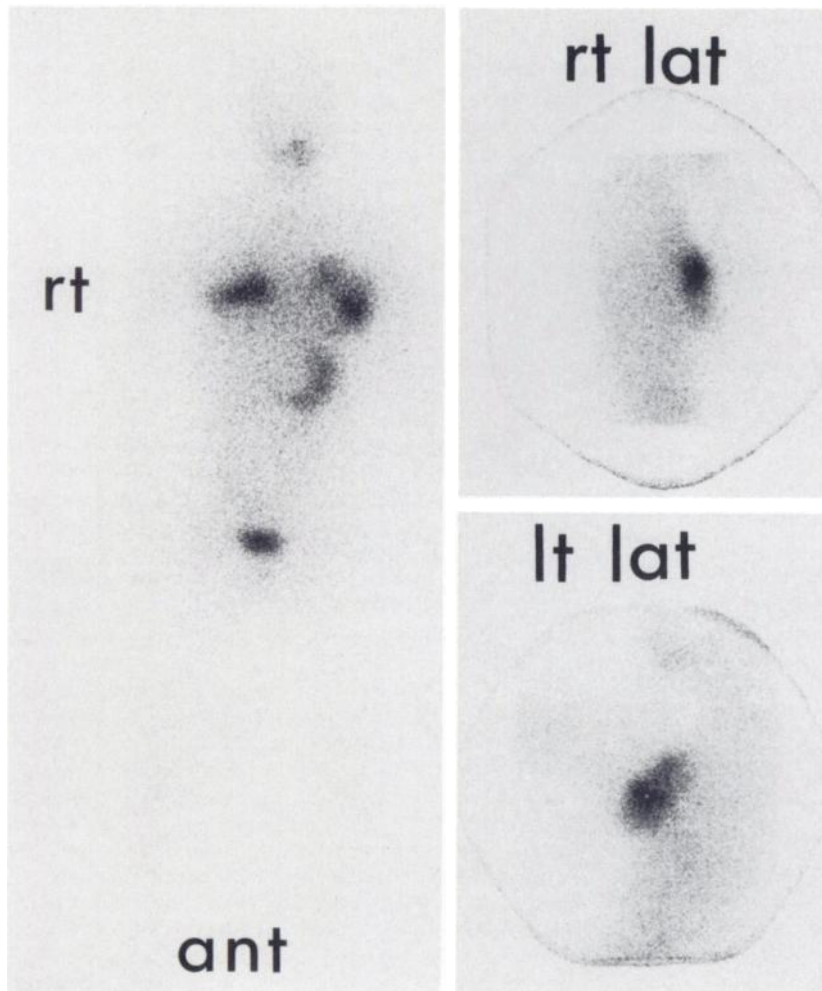


FIGURE 1
Marked accumulation of ^{131}I by lactating breasts

postpartum and was breast feeding her infant prior to the scanning dose. Her private physician took her off of thyroid replacement therapy 5 wk prior, anticipating the scanning procedure. Two years earlier she had a total thyroidectomy for papillary carcinoma of the thyroid gland. A tiny focus of thyroid tissue in the right thyroid bed with 0.2% uptake at 72 hr was ablated with 29 mCi of ¹³¹I. Since we would not administer ¹³¹I for scanning while the patient was breast feeding, she elected to stop breast feeding since she and her physician did not want to delay the whole-body scan. A 5 mCi of ¹³¹I dose was given orally, and whole-body scans were performed at 72 hr. At this time no uptake was noted in the anterior neck. However, marked accumulation of the radioiodine was noted in both breasts (Fig. 1).

Besides the thyroid gland, iodide is also trapped by the salivary glands, gastric mucosa, the choroid plexus, the ciliary body of the eye and the mammary glands (4). The mammary gland is the only one of these tissues which binds iodine; diiodotyrosine is formed in the mammary gland, but thyroxine and triiodothyronine are not. We feel uptake of radioiodine by breasts in the postpartum and/or lactating breasts is a physiologic function and does not represent ectopic thyroid tissue in the breasts.

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REPLY: We were fortunate to have the opportunity to review the case report of Dr. G.R. Baeumler and Dr K.G. Joo and their comments regarding the discussion of our recent report on ectopic thyroid (1). Of particular interest is their observation of prominent bilateral breast uptake of radioiodide in a thyroidectomized patient who had taken prior ablative radioiodide therapy for thyroid carcinoma. In this patient, who is 4 mo postpartum, and who had stopped breast feeding prior to radioiodide, as the authors state, much of the uptake demonstrated is caused by the well known capacity of the breast to concentrate and secrete radioiodide in milk (2-6). The differential diagnosis would certainly include metastatic thyroid carcinoma as pointed out in a similar case (5). The considerable asymmetry of the uptake projecting over the chest on the right and on the left and also clearly seen on the

left lateral view raises the question of pulmonary as well as pericardial metastases. The therapy dose of ≤ 30 mCi iodine-131 (¹³¹I) as this patient received (29 mCi ¹³¹I) is typically insufficient to ablate extracervical metastases (7).

There are several other points about the mammary uptake of radioiodide that may aid in the differential diagnosis of iodide accumulation over the thorax. If the individual anatomy is suitable, use of breast binder or different positioning of the patient would demonstrate shift of breast activities (5). Another method is detection and quantitation of the radioiodine in the breast secretions where its persistence is rather brief (4,6). Advantage may be made of this rapid release from the physiologic areas in comparison to other thyroidal tissues by performing serial scans or uptakes.

With reference to Duongs' case (8), we must admit that evidence in favor of our statement that the ectopic thyroid tissue in the breasts produced hyperthyroidism, is quite inconclusive. We were struck by the high breast uptake of radioiodide which could be explained if she was lactating but one could only assume that she was. The disappearance of the breast uptake with the concomitant demonstration of normal uptake of the thyroid is very interesting. Though not mentioned, one can guess that the patient probably discontinued breastfeeding. There is diversion of administered radioactive iodine from the thyroid gland to the milk in lactating women (9). Potter and Chaikoff had presented experimental evidence of lowered thyroidal uptake by diversion of the radioiodide (¹³¹I) into milk in their studies with lactating compared to nonlactating rats (10).

The organic binding of radioiodine appears to occur after the milk has been secreted by the alveolar cells during autoincubation in the gland. In certain species, that is, man and cow, there is very little if any organic binding of iodine in the mammary glands; if present, very little mono-iodotyrosines are produced (11,12). Surveying the literature, we are not aware of diiodotyrosines being produced in human milk.

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