

## What's Your Diagnosis?

# Radioactive Iodine Scintiphotos of a Man With Thyroid Cancer

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Images of a man with thyroid cancer indicated abnormal iodine localization.  
Can you guess the cause?

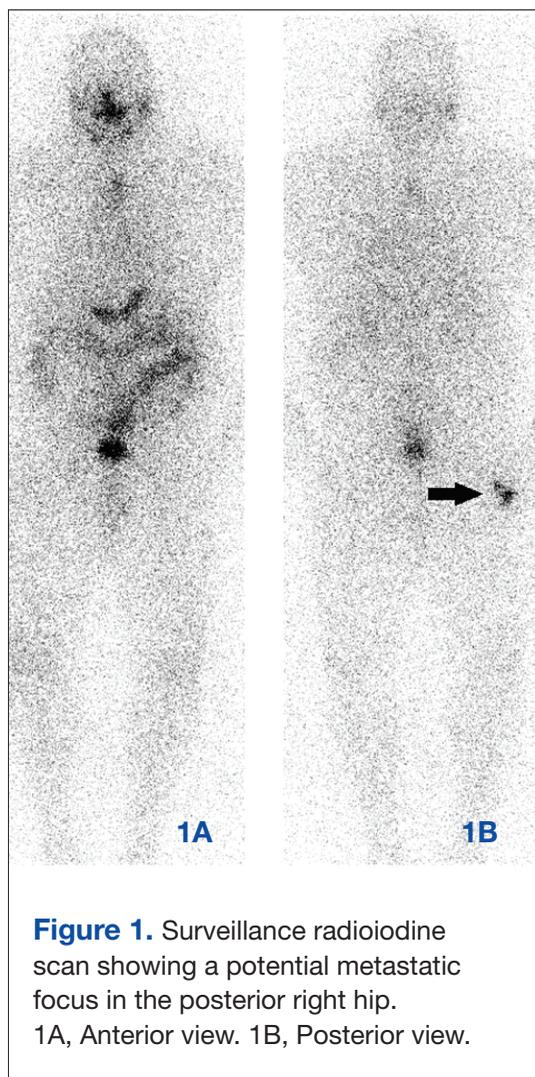
**T**he contemporary management of differentiated thyroid cancer includes posttreatment monitoring for recurrence or metastasis.<sup>1</sup> This monitoring includes clinical, biochemical, and imaging evaluation. Follow-up treatment can then be tailored based on the results of this monitoring.

Our patient was a 61-year-old man with a history of papillary thyroid carcinoma, including lymph node involvement and an extension of the primary focus into skeletal muscle (pT3N1bMX, stage IVa). The patient's status was post-total thyroidectomy and radioiodine ablation therapy (196.2 mCi iodine-131) in April 2009. The patient underwent follow-up thyrotropin alpha stimulated whole-body radioiodine surveillance scanning in May 2010.

Images demonstrated residual thyroid tissue/carcinoma regional to the thyroid bed, corresponding to prior posttherapy

images. Whole body scintiphotos also demonstrated abnormal iodine localization that raised the possibility of distant bony metastasis in the region of the right hip (see Figures 1A and 1B). Current treatment standards for isolated bony metastases recommend repeated radioactive iodine therapy and potential external beam radiation. Imaging is required for accurate verification.<sup>1</sup> This abnormal osseous finding was questionable on initial review, as it was present on the posterior, not anterior, view. The patient was instructed to continue hydration and return for additional delayed scintiphotos for further evaluation.

The patient returned 4 days later for delayed scintiphotos, which again demonstrated abnormal iodine localization near the right hip. However, iodine distribution was different, including now being visible on both the anterior and posterior views (see Figures 2A and 2B).



**Figure 1.** Surveillance radioiodine scan showing a potential metastatic focus in the posterior right hip. 1A, Anterior view. 1B, Posterior view.

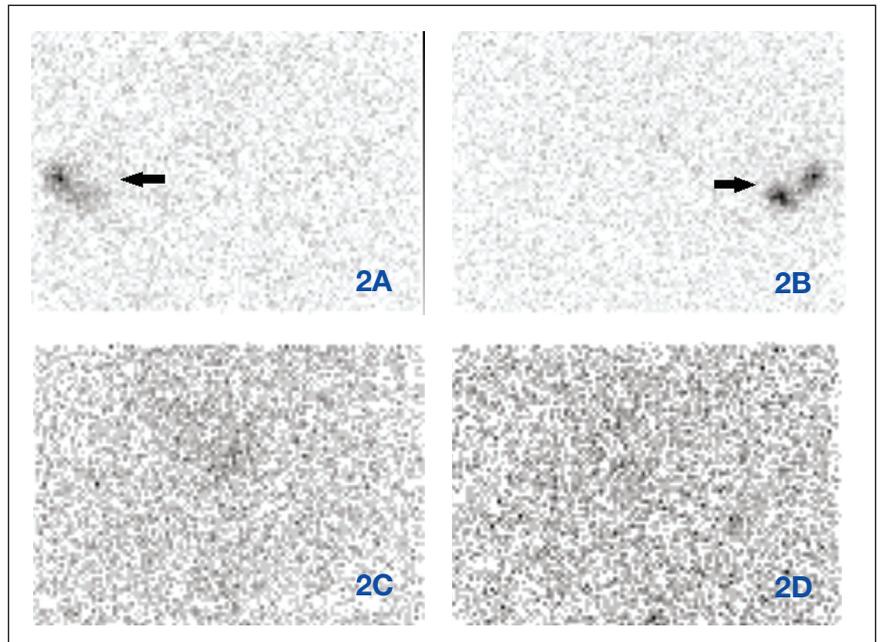
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- What is your diagnosis?
- How would you treat this patient?

## OUR TREATMENT

The patient had no pain in the area and, upon further questioning, reported that he returned wearing the same athletic shorts. Given that radioiodine is excreted in the urine, this atypical distribution was thought to reflect urinary contamination. When images were taken again with the shorts removed, no abnormal radioiodine activity was present (see Figures 2C and 2D). Additional findings with thyrotropin alfa stimulation included increased quantitative thyroglobulin values of 20.2 ng/mL with antithyroglobulin antibody < 20.0 U/mL. Radioiodine ablation therapy using thyrotropin alfa was repeated. Iodine localization also was not present in the hip on posttherapy imaging (not shown).

Despite advances in imaging techniques, radioiodine scanning remains an imperfect science. Artifacts and pitfalls have been identified; in part, these are related to the accumulation of iodide in organs other than the thyroid, such as the nasopharynx and stomach, as well as the apparent accumulation due to excretion in the gut and bladder.<sup>2-4</sup> These variations can be divided into ectopic normal thyroid tissue, physiologic accumulation in nonthyroidal tissue, and contamination by physiologic secretions. Recent case reports have confirmed this classification. Abnormal radioiodine uptake has been described in vertebral hemanangioma,<sup>5</sup> liver abscess<sup>6</sup> and hydatid cyst,<sup>7</sup> bronchiectasis,<sup>8</sup> bronchogenic cyst and mucinous cystadenoma



**Figure 2.** Four-day follow-up pelvic images with and without pants on, confirming urinary contamination. 2A, Anterior pelvis with athletic shorts on. 2B, Posterior pelvis with athletic shorts on. 2C, Anterior pelvis, shorts removed. 2D, Posterior pelvis, shorts removed.

(2 fluid-filled cavities),<sup>9</sup> chronic submandibular sialadenitis,<sup>10</sup> esophageal diverticulum,<sup>11</sup> hiatal hernia,<sup>12</sup> appendix,<sup>13</sup> indwelling Hickman catheter,<sup>14</sup> renal cyst,<sup>15</sup> and, similar to this case, contamination of the hair.<sup>16</sup>

Contaminated clothing is not uncommon; however, a persistent abnormality from contaminated clothing on repeat follow-up is unusual and could easily be misinterpreted.<sup>2</sup> It would be valuable for all providers to be aware of the pitfalls of imaging before embarking on an unnecessary and potentially hazardous—not to mention costly—treatment course. ●

### Acknowledgments

The authors acknowledge the assistance of Richard Cacciato, MLIS, Medical Librarian, who assisted in the literature review.

### Author disclosures

The authors report no actual or potential conflicts of interest with regard to this article.

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