

Hair Artifact on the Left Side of Head Mimicking Metastasis of Thyroid Carcinoma in a Woman after I-131 Therapy

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ABSTRACT

Accurate interpretation of radioiodine whole body scan is extremely crucial to avoid unwarranted radioiodine ablative therapy in patients with differentiated thyroid carcinoma. We reported a rare case of special hair artifact in a 32-year-old woman on post-therapeutic scans which showed a crescent intense activity on the left lateral head, like neo-appeared metastasis. Additional projections after the hair was moved aside demonstrated that the activity was caused by hair contamination, likely from sialorrhea during sleep. The report enriches artifacts on radioiodine scans.

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Key words: Thyroid carcinoma; Radioiodine; Whole body scan; Hair artifact; Metastasis

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INTRODUCTION

Radioiodine (I-131) whole body scan (WBS) plays an important role in the management of differentiated papillary and follicular thyroid carcinoma. The presence of I-131 uptake outside the areas of physiologic elimination is suggestive of functional metastasis and always triggers I-131 treatment, as it is a consensus that patients with I-131 concentrated metastasis should receive a certain dose of I-131 therapy. It is important to properly distinguish false-positive site of I-131 uptake to avoid unnecessary I-131 intervention therapy.

WBS after I-131 therapy for differentiated thyroid carcinoma is requested routinely as it has been reported that post therapeutic WBS can detect additional metastasis invisible on diagnostic scan^[1]. In our department, post therapeutic WBS is performed 5-7 days after administration of therapeutic dose of I-131 and diagnostic WBS is performed 24 or 48 hours after administration of 74-185 MBq (2-5mCi) I-131. Patients are placed in a supine position between large-field-of-view dual-head gamma-cameras equipped with high-energy parallel hole collimators (GE Corporation, Millennium TMVG8, Hawkeye). Additional projections or regional SPECT plus integrated low-dose CT is performed if necessary to provide more diagnostic information. Here we reported a special case of hair contamination on post-therapeutic WBS.

CASE REPORT

A 32-year-old woman with papillary thyroid carcinoma in the right lobe, who was treated with surgery and postoperative I-131 of 3700 MBq (100mCi), returned 5 months later for WBS as her serum level of thyroglobulin increased from 1.0 to 2.58pmol/L in the recent two months. She had had a history of left thyroid lobectomy for follicular thyroid carcinoma 5 years previously. Except the normal physiological I-131 accumulations in gastro-intestine and bladder, the

diagnostic WBS revealed focal thyroid bed activity (Figure 1, arrow) for which she received a second 3700 MBq (100mCi) I-131 ablative therapy. Post therapeutic WBS was performed routinely, which showed an additional crescent intense activity on left lateral head (Figure 2, arrow). At first glance, we considered it as new metastasis. However, on inquiry and physical examination, we doubted initial consideration of metastasis as the patient had no pain and palpable mass. So, head SPECT plus integrated low-dose CT was performed, demonstrating that the uptake was outside the head contour (Figure 3, arrow). Hair contamination was speculated, likely from sialorrhea during sleep. Additional anterior and posterior projections after moving the hair aside (Figure 4) were performed to differentiate real metastasis from contamination. Shape of the activity changed (Figure 4, arrow), demonstrating hair contamination.

DISCUSSION

Accurate interpretation of I-131 WBS is extremely crucial as unidentified false positive results might trigger unwarranted I-131 ablative therapy in patients with differentiated thyroid carcinoma. It has been reported and discussed in literatures^[2-8] that non-physiological extra-thyroidal I-131 accumulation on I-131 WBS does not always imply thyroid cancer metastasis. We reported a rare case of special hair artifact with the form of a patch of crescent intense activity on left side of head. To our knowledge, it has not been reported in English literatures.

Post therapeutic WBS is required routinely to detect additional functional metastasis invisible on diagnostic WBS. In our case, compared to diagnostic WBS, besides common diffuse hepatic uptake^[9] (Figure 2, arrowhead), a patch of crescentic intense activity in left lateral head (Figure 2 arrow) neo-appeared on the scan. At first glance, as there was only one new-appeared accumulation on the scan, we did not think of the probability of contamination at first. We thought it as new discovered metastasis and deduced that the patient needs further I-131 therapy in the future. However, after physical examination and inquiry, we denied initial consideration of metastasis as the patient had no pain and palpable mass. As our SPECT has an integrated low dose CT, we performed a regional SPECT plus integrated low dose CT to help diagnosis. It turned out that the accumulation was outside the head contour, so we realized the probability of hair contamination. We then performed additional projections after changing her hair's position. The shape of the activity changed (Figure 4 arrow), corroborating our speculation of hair contamination.

One of the commonest reasons of false positive uptake was contamination from I-131 body secretions after administration, mainly urine and saliva. Judging from the position and number of the artifact, we deduced that the hair contamination was from saliva instead of urine. Saliva contamination has been reported in hair^[10], neck and thoracic region^[11,12], right buccal area because of chewing gun^[11], base of the neck from contaminated necklace^[13], and so on. Unlike those described previously^[10,11,14-16], hair contamination in our case showed an intense activity on the unilateral head. As no other contamination was found in other parts of the body, we extrapolated it originating from nocturnal drooling, which has been reported to result in contamination in neck^[11] and shoulder^[17]. As the woman had short hair and preferentially slept with head turning left, drooling during sleep induced left-side hair contamination, resulting in an intense activity in left lateral head on the scan, which has been rarely reported.

Traditionally, to distinguish contamination from real metastasis, an easy way is to make the patient have a good shower and repeat the

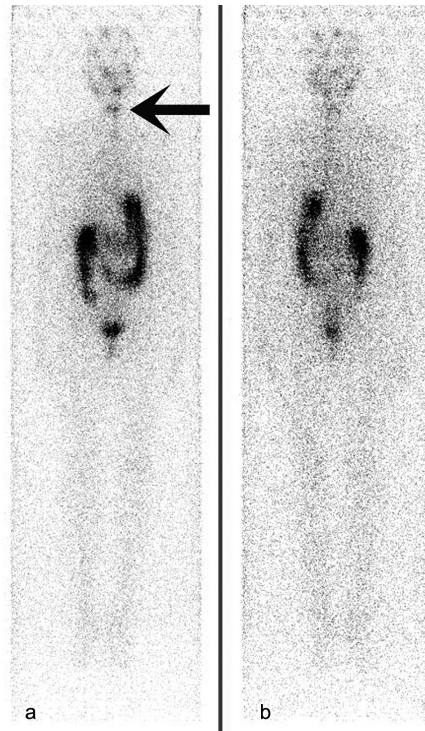


Figure 1 Anterior(a) and posterior(b) view of diagnostic whole body scan (WBS). The images revealed focal thyroid bed activity (arrow) and physiological uptakes.

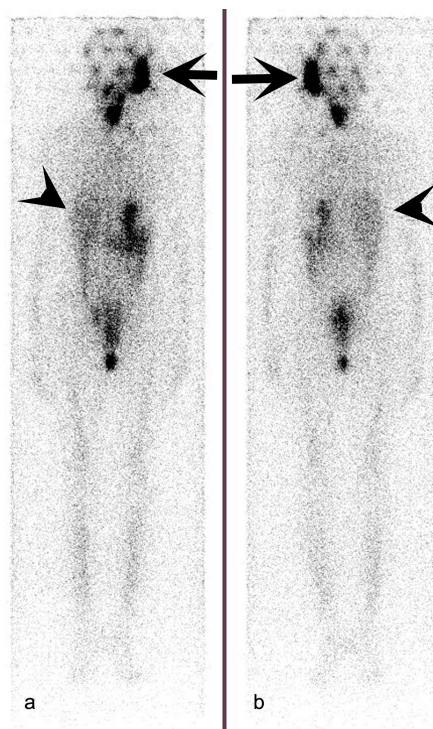


Figure 2 Anterior (a) and posterior (b) view of post-therapeutic whole body scan (WBS). Compared to diagnostic WBS, besides common diffuse hepatic uptake (arrowhead), a crescentic intense activity in left lateral head (arrow) neo-appeared on the scan.

scan. However, regional SPECT is performed routinely nowadays if abnormal accumulation is found as most SPECT is equipped with integrated CT with the development of SPECT equipment, which facilitates the diagnosis, though it is time-consuming and at the

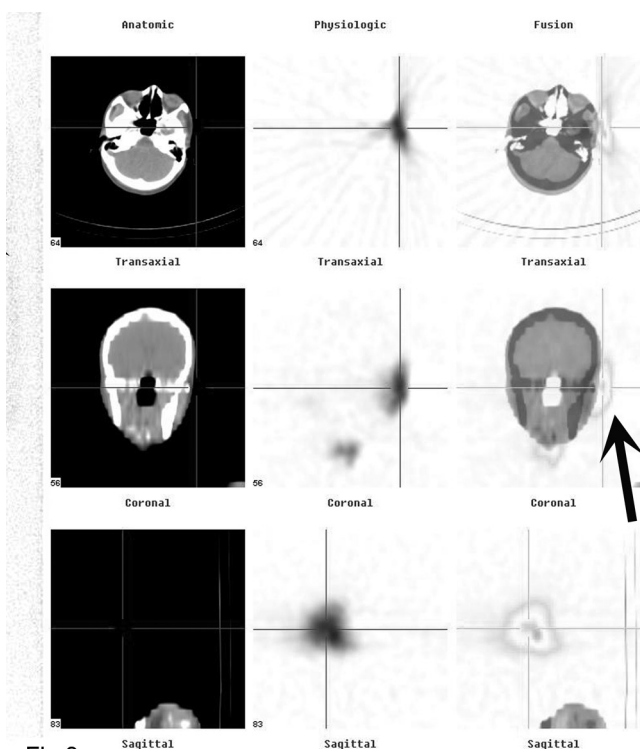


Figure 3 Head SPECT plus integrated low-dose CT. The accumulation was outside the head contour (arrow).

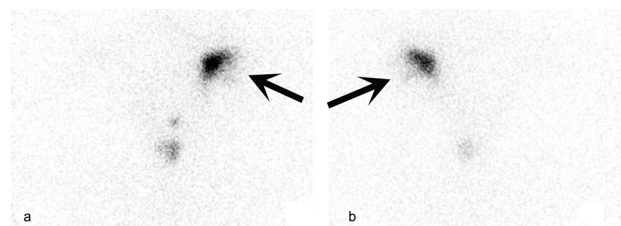


Figure 4 Additional anterior (a) and posterior (b) projections performed after the hair was moved aside. Shape of the activity changed (arrow), corroborating our speculation of hair contamination.

same time leads to patient's additional radiation. From our report, we can see that such an abnormality can also be distinguished simply by additional projections after pulling the hair away, which is more timesaving. However, as we did not think of the probability of contamination at first since we never saw such a kind of artifact before, an unnecessary regional SPECT was performed, leading to a waste of time and the patient's improper radiation. The report reminds the clinicians of the probability of hair contamination in such a condition, which will benefit future practical application.

It also raises the possibility of multi-organs contamination once the patient combs the hair with hands and touches other parts of the body. However, it would be difficult to identify the source of pollution in such a situation. The report enriches artifacts on WBS and helps avoid unnecessary regional SPECT to distinguish hair pollution from real metastasis. It also helps avoid inappropriate ablative I-131 treatment if the situation happens on diagnostic WBS.

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CONFLICT OF INTEREST

There are no conflicts of interest with regard to the present study.

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