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## CASE REPORT

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# False-positive Iodine-131 Scan Caused by Scab Tissue Uptake

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### ABSTRACT

*Whole-body Iodine-131 scintigraphy (I-131 WBS) is a common and useful method to detect residual thyroid tissue, local recurrence, or distant metastasis in differentiated thyroid cancer. However, radioiodine uptake is not only seen in thyroid tissue or tumours. Various false-positive findings in I-131 WBS due to physiological and pathological causes have been reported. This report describes an unusual cause of false-positive I-131 WBS due to radioiodine uptake in scab tissue.*

*Key Words: Diagnostic imaging; Iodine radioisotopes; Radionuclide imaging; Thyroid neoplasms*

## 中文摘要

### 因傷口結痂引致在碘-131全身掃描出現假陽性結果

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碘-131全身掃描是一個常用於患有分化型甲狀腺癌病人的檢查，用以偵測殘餘甲狀腺組織、局部復發和遠端轉移。然而，碘-131不只積聚於甲狀腺組織或腫瘤中。不少文獻已發表因不同生理或病理原因，導致碘-131全身掃描出現假陽性結果。本文報告因傷口結痂引致在碘-131全身掃描時出現假陽性結果的病例。

### INTRODUCTION

Thyroid cancer is one of the common endocrine cancers among adults and the incidence of thyroid cancer continues to rise.<sup>1</sup> Diagnostic or therapeutic whole-body iodine-131 scintigraphy (I-131 WBS) is a common imaging modality for detecting the presence of remnant thyroid tissue, local recurrence, or distant metastasis in differentiated thyroid cancer (DTC). However, false-positive findings in I-131 WBS have been reported. We describe a false-positive I-131 WBS scan caused

by scab tissue iodine uptake in a woman treated for papillary thyroid carcinoma.

### CASE PRESENTATION

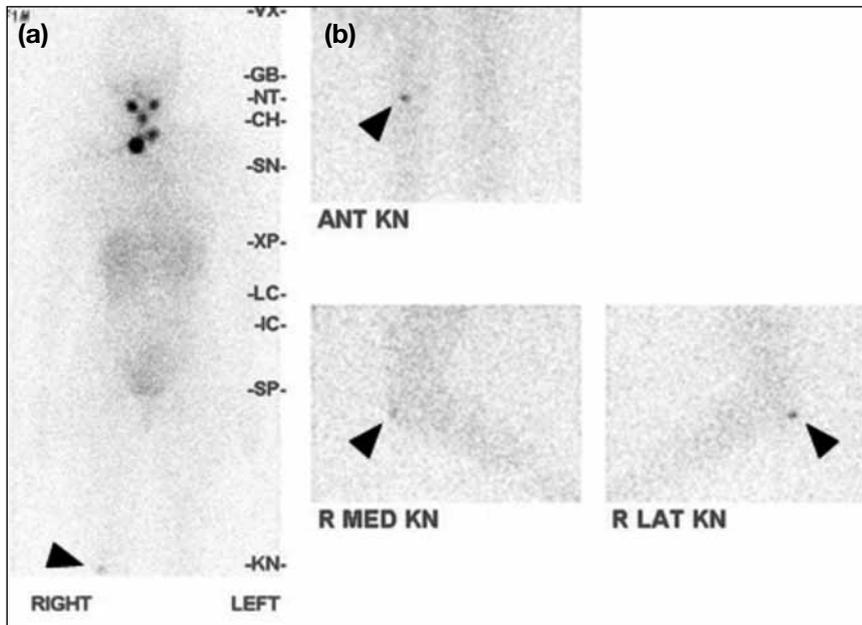
A 34-year-old woman was diagnosed with papillary thyroid carcinoma following fine-needle aspiration of a right thyroid nodule. She then underwent total thyroidectomy. Six months later, the woman was given a 3 GBq therapeutic dose of I-131 for ablation of residual thyroid tissue with prior intramuscular injection

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**Figure 1.** Initial post-therapeutic iodine-131 whole-body scintigraphy. (a) Anterior planar image from head to knee and (b) localised anterior, medial and lateral images of the right knee. Uptake foci at the neck are compatible with residual thyroid tissue or iodine-avid tumours. Faint superficial uptake at the anterior aspect of the right knee is seen (arrowheads).

Abbreviations: ANT = anterior; CH = chin; GB = glabella; IC = iliac crest; KN = knee; LAT = lateral; LC = lower costal margin; MED = medial; NT = nasal tip; SN = sternal notch; SP = symphysis pubis; VX = xiphoid; XP = xiphoid.

of thyrogen for 2 consecutive days. Thyroglobulin level on the day of I-131 administration was 5.9 ug/l. A post-therapeutic I-131 WBS scan 7 days later revealed uptake foci at the neck, compatible with residual thyroid tissue or iodine-avid tumours. A faint uptake was also noticed at the anterior aspect of the right knee (Figure 1). The patient reported a history of right knee injury a week before the I-131 WBS scan, with formation of superficial scab tissue on the anterior right knee due to the injury (Figure 2).

A follow-up diagnostic I-131 WBS scan 7 months later showed resolution of the right knee uptake and reduced uptake at the neck (Figure 3).

## DISCUSSION

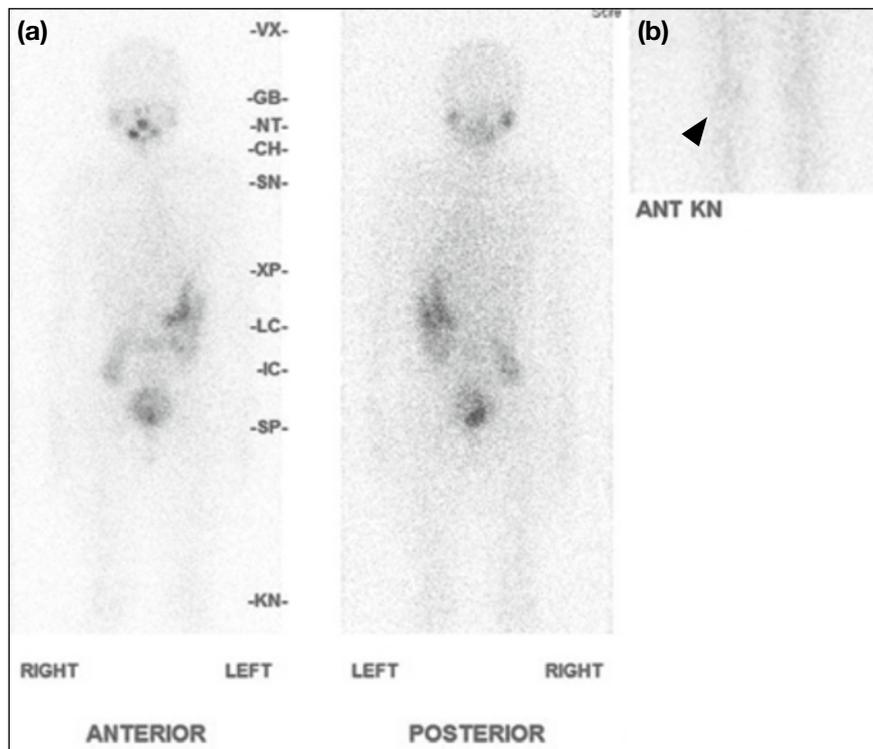
Radioiodine has been introduced since the 1940s for the treatment of well-differentiated thyroid cancer.<sup>2</sup> Post-therapeutic I-131 WBS is performed after treatment with a therapeutic dose of I-131, for detection of recurrence or metastases of DTC. However, various false-positive findings on I-131 WBS have been reported due to both physiological and pathological processes in different tissues and organs, as well as contamination, for example, due to physiologic uptake in the choroid plexus, nasopharynx, salivary glands, oesophagus or breasts.<sup>3</sup> Oh and Ahn<sup>3</sup> provide a summary of differential diagnoses based on the location and nature of radioiodine uptake on I-131 WBS.



**Figure 2.** Superficial scab tissue at right knee (arrowhead).

Our patient had faint radioiodine uptake at the right anterior knee on I-131 WBS, corresponding to the location of a superficial scab. A follow-up diagnostic I-131 WBS scan showed resolution of the right knee radioiodine uptake. The findings suggested that the radioiodine accumulation was due to the superficial scab. To our knowledge, literature on radioiodine accumulation in superficial scab tissue on I-131 WBS has been rarely reported.

Regalbuto et al<sup>4</sup> reported a case series of four patients



**Figure 3.** Follow-up diagnostic iodine-131 whole-body scintigraphy 7 months later. (a) Planar images from head to knee showing improved uptake at the neck. (b) Resolved right knee radioiodine uptake (arrowhead) is seen at the localised anterior image of the right knee.

Abbreviations: ANT = anterior; CH = chin; GB = glabella; IC = iliac crest; KN = knee; LC = lower costal margin; NT = nasal tip; SN = sternal notch; SP = symphysis pubis; VX = vertex; XP = xiphoid.

with abnormal radioiodine accumulation at the site of skin abrasion with superficial scab formation. The authors postulated that radioiodine accumulation was due to the inflammatory reaction at the injured site, specifically iodide organification by myeloperoxidase in leucocytes in the post-traumatic clot.<sup>4</sup> Similar scintigraphic findings have been observed in locally inflamed tissue caused by a mosquito bite. Liu et al<sup>5</sup> reported a case of intense radioiodine activity at the site of a mosquito bite. The authors proposed that biological fluids containing iodine content in the reactive inflammatory exudates may provide the explanation for the elevated iodine activity seen at the site of the inflammation.<sup>5</sup>

Causes of focal superficial radioiodine uptake can be classified into contamination, inflammation, and skin or soft tissue metastasis. Contamination is a common cause of false-positive findings of superficial uptake, usually resulting from body fluid secretions, such as sweat, saliva, nasal discharge, or urine.<sup>3</sup> Removal of contaminated clothing and use of a decontamination procedure can be helpful in differentiating contamination from a genuine lesion.<sup>3</sup> Focal superficial inflammation can be due to a benign dermal lesion,<sup>6</sup> post-surgical causes,<sup>7</sup> or accidental

injuries, as seen in our case. Careful history taking and physical examination are helpful in identifying these potential causes of focal superficial radioiodine uptake. Additional static images or utilisation of single-photon emission computed tomography/computed tomography allows better localisation and improves diagnostic accuracy.<sup>3</sup> Skin or soft tissue metastasis from thyroid carcinoma is extremely rare.<sup>8</sup> Therefore, physicians need to consider other differential diagnoses for superficial radioiodine accumulation before making a diagnosis of skin or soft tissue metastasis.

In conclusion, I-131 WBS is useful in the surveillance of patients with thyroid cancer. Careful history taking and physical examination is valuable in differentiating recurrence or metastasis from physiologic uptake, avoiding misinterpretation, and subsequent overinvestigation and treatment.

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