



Unusual Uptake of [¹³¹I] in a Tenosynovial Giant Cell Tumour Relapse in a Patient with Differentiated Thyroid Cancer

Diferansiye Tiroid Kanserli Bir Hastada Tenosinovyal Dev Hücreli Tümör Nüksünde Olağandışı [¹³¹I] Tutulumu

Francisco Manuel Cañete Sánchez, Leonardo Gabriel Romero Robles, Xavier Louis Boulevard Chollet, María Mangas Losada, Puy Garrastachu, Antonio Cabrera Villegas, Rafael Ramírez Lasanta, Roberto Delgado Bolton

University Hospital San Pedro and Centre for Biomedical Research of La Rioja (CIBIR), Department of Nuclear Medicine, Logroño, Spain

Abstract

A 77-year-old woman with follicular thyroid cancer underwent total thyroidectomy and subsequent Iodine-131 remnant ablation. She had a history of a wide tenosynovial giant cell tumor (TGCT) of the right wrist and hand that had been resected thirteen years ago. Post-therapeutic scintigraphy and single photon emission computed tomography showed mild uptake on the distal right forearm, wrist and hand. Magnetic resonance imaging and posterior histopathology confirmed a relapse of TGCT. No radioiodine adverse effects were reported after a one-year follow-up. As far as we know, this report is the first in the literature to a TGCT visualized on post-therapy radioiodine scan.

Keywords: Giant cell tumor of tendon sheath, thyroid neoplasms, scintigraphy, magnetic resonance imaging

Öz

Foliküler tiroid kanserli 77 yaşında bir kadına total tiroidektomi ve ardından İyot-131 remnant ablasyonu uygulandı. On üç yıl önce rezeke edilmiş sağ el bileği ve elde geniş tenosinovyal dev hücreli tümör (TGCT) öyküsü vardı. Tedavi sonrası sintigrafi ve tek foton emisyon tomografisi distal sağ önkol, el bileği ve elde hafif tutulum gösterdi. manyetik rezonans görüntüleme ve posterior histopatoloji, TGCT'nin relapsını doğruladı. Bir yıllık takipten sonra hiçbir radyoyodin yan etkisi bildirilmemiştir. Bildiğimiz kadarıyla bu rapor, tedavi sonrası radyoyot taramasında görüntülenen bir TGCT'nin literatürdeki ilk raporudur.

Anahtar kelimeler: Tendon kılıfının dev hücreli tümörü, tiroid neoplazmaları, sintigrafi, manyetik rezonans görüntüleme

Address for Correspondence: Francisco Manuel Cañete Sánchez MD, University Hospital Puerta del Mar, Department of Nuclear Medicine, Cádiz, Andalucía, Spain

Phone: +34-956-003-008 **E-mail:** francisco.canete.sanchez.sspa@juntadeandalucia.es ORCID ID: orcid.org/0000-0001-7282-8534

Received: 16.10.2020 **Accepted:** 01.04.2021

©Copyright 2022 by Turkish Society of Nuclear Medicine
Molecular Imaging and Radionuclide Therapy published by Galenos Yayınevi.

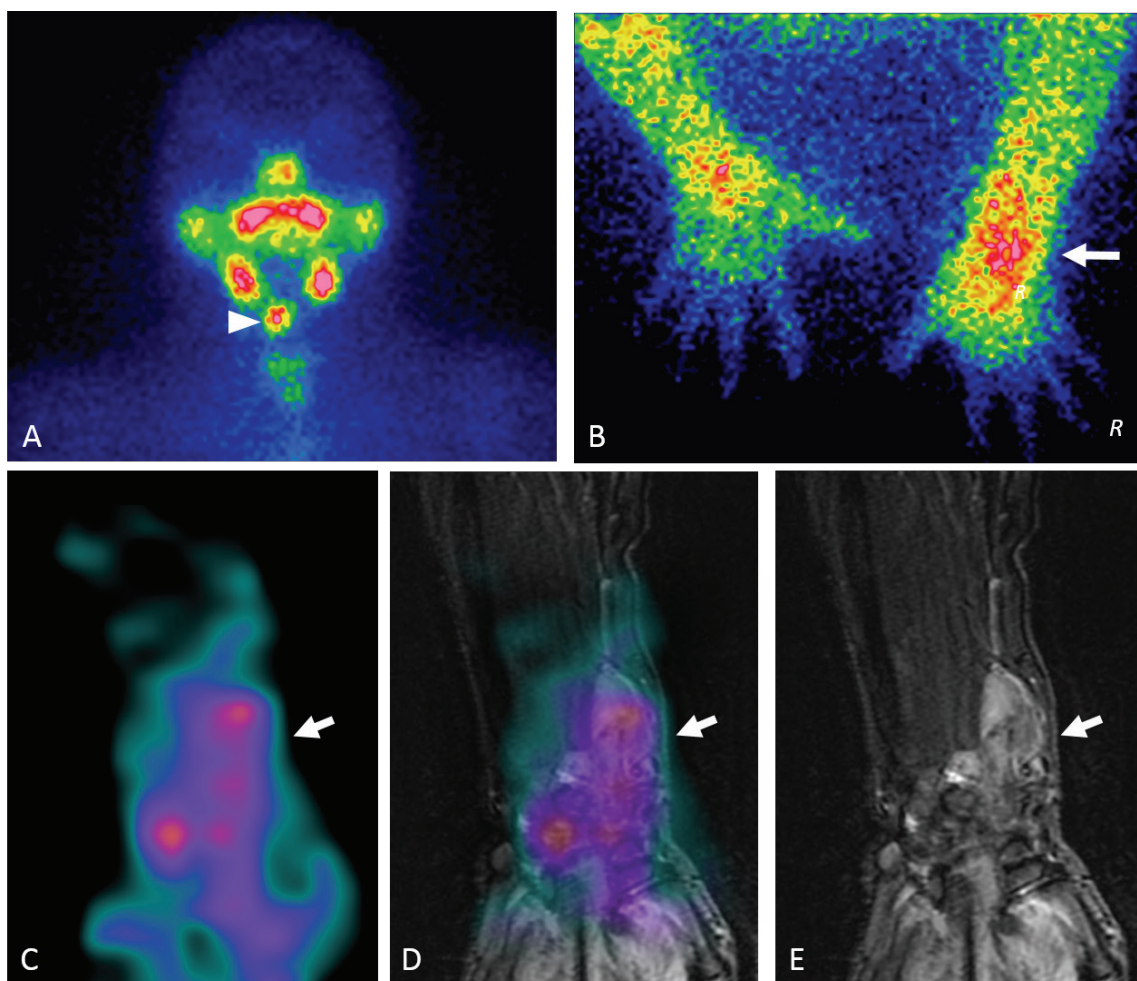


Figure 1. Seventy seven year-old woman with a history of wide tenosynovial giant cell tumor (TGCT) of the right wrist and hand that had been resected thirteen years ago, who did not follow the surveillance for this tumour. Following the diagnosis of a well-differentiated follicular thyroid carcinoma, the patient underwent total thyroidectomy and subsequent Iodine-131 [¹³¹I] remnant ablation, receiving an activity of 3.7 GBq. Five days after [¹³¹I] administration, the post-therapy scan showed mild uptake in the thyroid remnant and a more intense focus of uptake, probably secondary to a thyroglossal duct remnant (A, arrowhead). To assess the possibility of a TGCT relapse, we did a palmar planar image of both forearms, wrists and hands (B), which showed mildly increased uptake in the distal third of the radial forearm, wrist and metacarpal spaces (B, arrow) a more evident in the single photon emission computed tomography (SPECT) images (C, arrow). Subsequent magnetic resonance imaging (MRI) and fused SPECT/MRI images (D: Coronal SPECT-MRI; E: Coronal MRI) revealed increased signal on fat suppression with short-time inversion recovery (STIR) coronal sequence concordant with the increased uptake in SPECT (arrows in D and E). The histological examination was consistent with the TGCT. The patient did not present with any clinical side effect secondary to radioiodine treatment, or any clinical sign or symptom in the right upper limb after one-year follow-up. TGCT is an orphan, mono-articular and potentially locally aggressive disease that occurs in a localized form, which involves a discrete section of the synovium, or in a diffuse form, which involves the entire synovium (1,2,3). The diffuse type has high recurrence rates and poor functional outcomes (1,2,4). TGCT is characterized by hypervascular neoplastic proliferation of the synovium with deposition of macrophages, multinucleated giant cells and hemosiderin (3). The proposed reasons for iodine increased uptake in non-thyroid tumors are an expression of sodium iodide symporter, augmented vascularity and enhanced capillary permeability, which can be caused by inflammation secondary to the tumor (5,6,7). MRI is the most distinctive imaging technique in diagnosing and treating TGCT (1,2,3,8). It reflects the existence of hemosiderin-laden tissue that applies a paramagnetic effect decreasing T1 and T2 relaxation times, leading to low to intermediate signal intensity in T1 and T2 weighted spin-echo sequences. On STIR sequences, the effect is overstated because of increased magnetic susceptibility deriving in areas of very high signal intensity (3,8). The main treatment modality is resection for naïve and relapsed TGCT. Radiation therapy and targeted therapies, mainly with monoclonal antibody inhibiting colony-stimulating factor 1 receptor (pexidartinib) are promising, and both should be considered especially in case of relapse (1,2,3,4,8). However, in our patient's case, watchful waiting was finally decided, mostly because of age, relative good mobility, and the stability of the tumor on serial MRI. A considerable number of cases of unexpected radioiodine uptake have been reported and some of which were in the limbs (6). To our knowledge, this report is the first in the literature of a TGCT visualized in the post-therapy radioiodine scan.

Ethics

Informed Consent: Consent form was filled out by the patient.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: F.M.C.S., L.G.R.R., R.D.B., Design: F.M.C.S., L.G.R.R., X.L.B.C., R.D.B., Data Collection or Processing: F.M.C.S., L.G.R.R., R.D.B., Literature Search: F.M.C.S., L.G.R.R., X.L.B.C., R.D.B., Writing: F.M.C.S., L.G.R.R., X.L.B.C., M.M.L., P.G., A.C.V., R.R.L., R.D.B.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Gouin F, Noailles T. Localized and diffuse forms of tenosynovial giant cell tumor (formerly giant cell tumor of the tendon sheath and pigmented villonodular synovitis). *Orthop Traumatol Surg Res* 2017;103:S91-S97.
2. Mastboom MJL, Verspoor FGM, Hanff DF, Gademan MGJ, Dijkstra PDS, Schreuder HWB, Bloem JL, van der Wal RJP, van de Sande MAJ. Severity classification of tenosynovial giant cell tumours on MR imaging. *Surg Oncol* 2018;27:544-550.
3. Jain JK, Vidyasagar JV, Sagar R, Patel H, Chetan ML, Bajaj A. Arthroscopic synovectomy in pigmented villonodular synovitis of the knee: clinical series and outcome. *Int Orthop* 2013;37:2363-2369.
4. Mastboom MJL, Palmerini E, Verspoor FGM, Rueten-Budde AJ, Stacchiotti S, Staals EL, Schaap GR, Jutte PC, Aston WJ, Gelderblom H, Leithner A, Dammerer D, Takeuchi A, Thio Q, Niu X, Wunder JS; TGCT Study Group, van de Sande MAJ. Surgical outcomes of patients with diffuse-type tenosynovial giant-cell tumours: an international, retrospective, cohort study. *Lancet Oncol* 2019;20:877-886.
5. Liu Z, Xing M. Induction of sodium/iodide symporter (NIS) expression and radioiodine uptake in non-thyroid cancer cells. *PLoS One* 2012;7:e31729.
6. Oh JR, Ahn BC. False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. *Am J Nucl Med Mol Imaging* 2012;2:362-385.
7. Ahn BC. Physiologic and false positive pathologic uptakes on radioiodine whole body scan. 12 Chapters on Nuclear Medicine. InTech; 2011.
8. Bassetti E, Candreva R, Santucci E. Giant cell tumor of the flexor tendon of the wrist: US and MRI evaluation. Case report. *J Ultrasound* 2011;14:37-39.