THYROID
Volume 17, Number 4, 2007

DOI: 10.1089/thy.2006.0150

Images in Thyroidology*

Section Editor: Yaron Tomer

Marine–Lenhart Syndrome and Radioiodine-131 Treatment

Dimitrios Chatzopoulos,[1] Ioannis Iakovou,[1] and Efstratios Moralidis[2]

A 66-year-old man, with hyperthyroidism diagnosed 6 years ago, was referred for radioiodine-131 therapy. At presentation, the patient was receiving methimazole and propranolol and he was clinically euthyroid, although he complained of palpitations when off the beta-blocker. On clinical examination mild exophthalmos of the right eye was observed (his left eye was lost in an accident) and a left-sided thyroid nodule was palpated. Thyroid function tests were as follows: free thyroxine (FT_4), 1.1 ng/dL (range 0.8–1.9); free triiodothyronine (FT_3), 2.1 pg/mL (range 1.8–4.2); thyrotropin (TSH), 0.18 μIU/mL (range 0.4–4.0); and TSH receptor antibodies, 14.6 IU/dL (range 0–15). On ultrasound the thyroid gland was asymmetrically enlarged at 26 mL, whereas an iso-/hypoechoic nodule with degenerative changes that measured 12 mL was found at the lower part of the left lobe (Fig. 1). There was no cervical lymphadenopathy. A Tc-99m scan showed homogeneously increased uptake throughout the gland and a pyramidal lobe (Fig. 2A). Computed tomography of the head showed enlargement of the right extraocular muscles.

A dose of 740 MBq radioiodine-131 was administered and 5 days later imaging showed homogeneous radioiodine uptake throughout the thyroid parenchyma (Fig. 2B). After a transient hypothyroidism, hyperthyroidism relapsed 4 months later. At that time a Tc-99m scan showed focally intense tracer uptake in the left lobe, corresponding to the palpable nodule (Fig. 2C). Eight months after the first radioactive iodine therapy a second dose of 740 MBq radioiodine-131 was administered to ablate the hyperfunctioning autonomous thyroid tissue (Fig. 2D, imaging 5 days later). Over the next months the

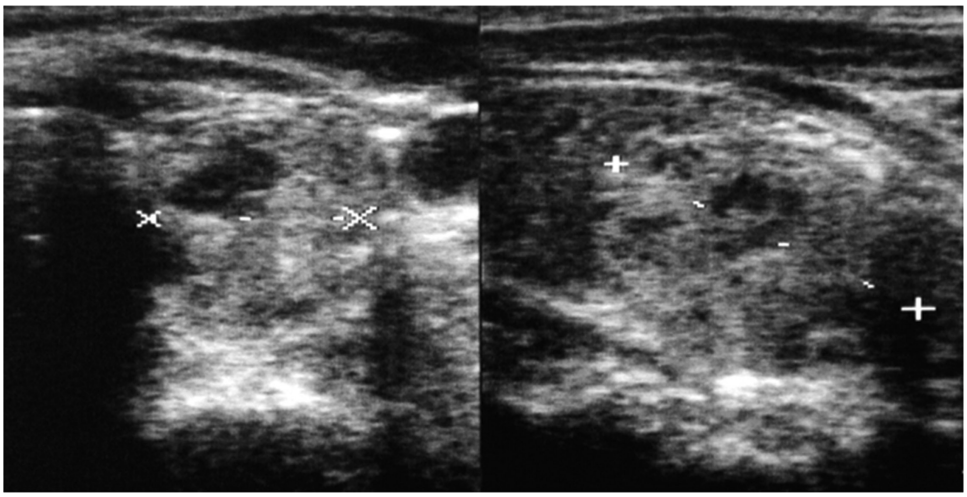

FIG. 1. Initial ultrasound (crosses show the left-sided thyroid nodule).

[1]Department of Nuclear Medicine, Papageorgiou Hospital, Thessaloniki, Greece.
[2]Department of Nuclear Medicine, Hippokration Hospital, Thessaloniki, Greece.

*We invite you to submit to "Images in Thyroidology" via the following URL: **http://mc.manuscriptcentral.com/thyroid**. Images should be in black and white with a short legend. In special circumstances, color figures will be published. Please inquire for details from the Section Editor (**yaron.tomer@mssn.edu**). All material must be original and neither published nor submitted elsewhere. The legend should give relevant clinical information. The entire legend should be no more than 400 words with up to three references.

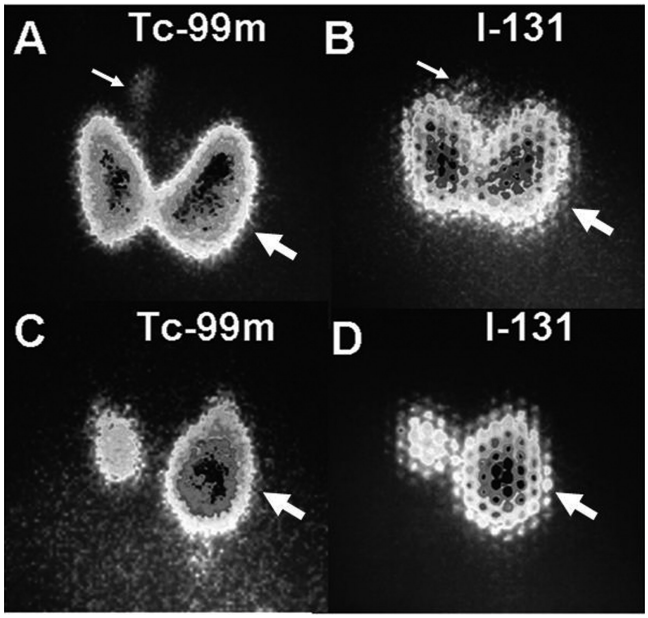

FIG. 2. (**A**) Initial Tc-99m scan. (**B**) Imaging 5 days after the first therapeutic radioiodine-131 dose. (**C**) Tc-99m scan 4 months after the first radioiodine-131 treatment. (**D**) Imaging 5 days after the second ablative radioiodine-131 dose. Thin arrows show a right-sided pyramidal lobe and thick arrows point at the left-sided palpable nodule.

patient became hypothyroid and 1 year after the last treatment he is on replacement therapy with thyroxine 150 μg daily, he has no clinical or biochemical evidence of thyroid dysfunction and his ophthalmopathy has not deteriorated. An ultrasound verified gland volume reduction to 3.4 mL with the left-sided nodule measured 2.8 mL (Fig. 3).

The eponym Marine–Lenhart syndrome was used to describe the rare condition of Graves' disease with concomitant functioning nodules (1). Different mechanisms are implicated in the pathogenesis of Graves' disease and in the nodular formation of thyroid tissue with functional autonomy (2,3). In a unifying hypothesis it has been suggested that the preferential development of diffuse or nodular folicullar hyperplasia may depend on the intrinsic function and concentration of TSH receptor antibodies (and TSH) (4).

There are data supporting that patients with the Marine–Lenhart syndrome generally require a greater amount of radiation for treatment compared to patients with Graves' disease and without functional adenomas (1). This has been associated with the observation that functional nodules may be more resistant to radioiodine-131 therapy than the extranodular tissue. In our patient, tracer uptake in the palpable nodule initially was similar to that of the extranodular parenchyma. A high radioactive iodine dose was administered, in agreement with previous recommendations (5). However, after radioiodine-131 treatment hyperthyroidism relapsed and autonomy became scintigraphically apparent, both of them reflecting a markedly low radiosensitivity of the unifocal autonomous tissue (Fig. 2). A second radioactive iodine therapy was required to definitely ablate the functioning nodule and prevent patient's referral for thyroidectomy.

References

1. Charkes ND 1972 Graves' disease with functioning nodules (Marine–Lenhart Syndrome). J Nucl Med **13:**885–892.
2. McKenna TJ 2001 Graves' disease. Lancet **357:**1793–1796.
3. Krohn K, Paschke R 2001 Progress in understanding the etiology of thyroid autonomy. J Clin Endocrinol Metab **86:**3336–3345.
4. Studer H, Huber G, Derwahl M, Frey P 1989 Die Umwandlung von Basedowstrumen in Knotenkroepfe. Schweiz Med Wochenschr **119:**203–208.
5. Braga-Basaria M, Basaria S 2003 Marine–Lenhart Syndrome. Thyroid **13:**991.

Address reprint requests to:
Efstratios Moralidis
Department of Nuclear Medicine
Hippokration Hospital
42 Konstantinoupoleos Street
546 42 Thessaloniki
Greece

E-mail: emoral@hol.gr

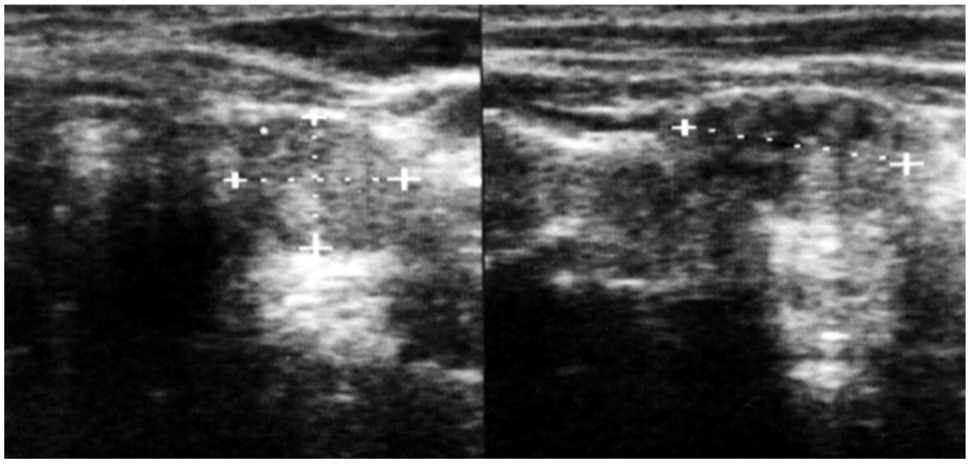

FIG. 3. Ultrasound 1 year after the last radioiodine-131 treatment (crosses show the thyroid nodule).