Asymmetric Septal Hypertrophy Associated With “Subclinical Hypothyroidism”

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We report a case of hypothyroid cardiomyopathy manifested as reversible asymmetric septal hypertrophy in a 61-year-old white woman diagnosed 20 years previously with primary hypothyroidism.

Key words: Hypothyroidism. Myocardial hypertrophy. Cardiomyopathy.

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INTRODUCTION

Hypothyroidism can lead to well-known and classic cardiovascular abnormalities such as a reduced cardiac output, arterial hypertension, sinus bradycardia, prolonged QT interval, and pericardial effusion. Hypothyroid cardiomyopathy is an uncommon manifestation of hypothyroidism that can take the form of dilated cardiomyopathy1,2 or, more unusually, asymmetric septal hypertrophy. This latter condition was first described in 1980 by Santos et al.3 Here, we present the case of a patient with primary hypothyroidism who was being treated by hormone-replacement therapy and who presented with a relapse characterized by myxedema and global myocardial hypertrophy, predominantly septal, that remitted after the patient attained an euthyroid state.

CASE REPORT

A 61-year-old woman was admitted with symptoms of severe asthenia and anorexia of several weeks of duration. There were no specific symptoms of heart failure. During the previous 48 hours, these symptoms had been accompanied by fever and joint pain. Her medical history included arterial hypertension, depression, and regular constipation. She had undergone three cesarean sections and had been diagnosed with hypothyroidism 20 years previously. Since then, she had been treated with L-thyroxine, 100 µg/day. At the last check-up, 2 years previously, her thyroid function was normal.

Physical examination showed slight obesity, cold sallow skin, and pallor, but no goiter. The remainder of her physical examination was normal: temperature, 35.5°C; arterial pressure, 120/80 mm Hg, and heart rate, 80 beats/min.

Laboratory studies showed: hemoglobin, 11.6 g/dL; mean corpuscular volume, 78 fL; mean corpuscular hemoglobin, 26 pg; total cholesterol, 148 mg/dL (high-density lipoprotein cholesterol, 23 mg/dL; low-density lipoprotein cholesterol, 58 mg/dL), and triglycerides, 333 mg/dL. Iron metabolism studies gave normal results and arterial gas measurements were normal. In addition, the total protein level was 5.2 g/dL and the albumin level was slightly below normal, at 47.3%. Other measurements were: creatine kinase, 286 U/L (normal values: under 180 U/L); creatine kinase MB fraction, 26 U/L; sodium, 127 mEq/L; thyrotropin (thyroid-stimulating hormone or TSH), 23.52 U/mL (normal values: 0.30–4.20 U/mL); and free thy-
roxine (T₄), 1.11 ng/dL (normal values: 0.90-1.70 ng/dL). Testing for antithyroid antibodies was negative.

An electrocardiogram (ECG) demonstrated sinus rhythm and there was a general reduction in voltage level (Figure 1). Chest radiography revealed slight cardiomegaly. Transthoracic echocardiography detected generalized hypertrophy of both ventricles, with a septal thickness of 18 mm and a left ventricular posterior wall thickness of 15 mm. There was no outflow obstruction. In addition, the myocardium had a hyperdense mottled appearance. Both the ejection fraction and mitral filling rate indicated normal systolic and diastolic function (Figure 2). Abdominal echocardiography showed only hepatic steatosis. A rectal biopsy was carried out but no amyloid deposits were found.

After the L-thyroxine dose was increased to 125 µg/day, the patient experienced a general improvement in her symptoms of asthenia and anorexia, and laboratory results also improved. Hormone measurements carried out 3 months after admission were normal:
pertrophy, predominantly septal, which was accompa-
nied by a general reduction in the voltage level of the
electrocardiographic QRS complex. These findings re-
turned to normal once the patient achieved a euthyroid
state.

Myocardial hypertrophy, manifesting as reversible
asymmetric septal hypertrophy, was first described by
Santos et al3 in 1980. In their series of 19 patients with
myxedema, 17 presented with this type of reversible
cardiomyopathy. Since then, seven more publications
have been added to the literature,4-10 giving a total of
74 patients, of whom four were children.4,5

Intercellular and intracellular deposition of myxedem-
matous material leads to structural alterations, which
partially account for the abnormalities observed on the
ECG (i.e., the low signal voltage).11,12

In our patient, the observation of a hormone profi-
le that was characteristic of subclinical hypothyroi-
dism (an elevated TSH level with a T4 level at the lo-
wer limit) was paradoxical given the presenting
clinical symptoms. To date, only alterations in systo-
lic and diastolic function have been reported in sub-
clinical hypothyroidism; structural alterations in the
heart have not.13,14 It is possible that this phenome-
non is due to a direct biological effect of TSH, as
has been suggested by some authors,14,15 or perhaps
the TSH concentration more accurately reflects the
actual peripheral level of thyroid hormone activity.
Whatever the explanation, it is surprising that a
small fluctuation in hormonal state can induce clear
clinical manifestations, not least structural alte-
rations in the heart.

We believe this case report is of interest because it is
unusual and because it serves as a reminder that there
is a form of reversible myocardial hypertrophy that
can be caused by hypothyroidism.

REFERENCES

1. García Martínez M, Rodrigo Jarque I, Zuazola Martínez MP. La
insuficiencia cardíaca como primera manifestación del hipotiroidismo
2. Kasper EK, Agema WR, Hutchins GM, Deckers JW, Hare JM,
Baughman KL. The causes of dilated cardiomyopathy: a clinico-
pathologic review of 673 consecutive patients. J Am Coll Cardiol
3. Santos AD, Miller RP, Mathew PK, Wallace WA, Cave WT Jr,
Hinojosa L. Echocardiographic characterization of the reversible
4. Farooki ZQ, Hoffman WH, Perry BL, Green EW. Myocardial
dysfunction in hypothyroid children. Am J Dis Child 1983;137:
65-8.
5. Altman DI, Murray J, Milner S, Dansky R, Levin SE. Asymmetric

Fig. 4. Transthoracic echocardiography carried out 2 years after the
patient returned to a euthyroid state. The upper and lower views are
the same as those in Figure 2.

TSH, 0.19 U/mL, and free T4, 1.29 ng/dL. An ECG
made 5 months after discharge showed clear changes,
with a recovery in the voltage level in all leads (Figure
3). In the 2 echocardiography check-ups carried out
within the 2 years following admission, it was possible
to observe regression of the ventricular hypertrophy,
with normalization of the myocardial thickness.
However, a slight hyperdense mottle appearance re-
mained (Figure 4).

Clinical, electrocardiographic and echocardiograp-
hic observations in our patient suggested a diagnosis of
hypothyroid cardiomyopathy that manifested as re-
versible asymmetric septal hypertrophy.

DISCUSSION

Here, we have described the case of a patient with
primary hypothyroidism who was receiving hormone-
replacement therapy and presented with a relapse cha-
acterized by myxedema. In this patient, we were able
to demonstrate the presence of global myocardial hy-