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Visual Diagnosis in Emergency Medicine

HYPOTHYROID CARDIAC TAMPONADE

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CASE REPORT

A 65-year-old man presented with a 5-year history of gradually progressive dyspnea and pedal edema. The physical examination revealed that he had a pulse rate of 80 beats/min and that his blood pressure was 112/70 mm Hg without pulsus paradoxus or jugular venous distension. Cardiac auscultation revealed distant heart sounds. Electrocardiography (ECG) revealed a heart rate of 79 beats/min, prolonged QTc (459 ms; normal upper limit 440 ms), reduced P wave amplitude, low QRS voltages (≤5 mm in the limb leads or ≤10 mm in the chest leads), and flattened ST segment and T wave (Figure 1). A chest radiograph revealed money bag

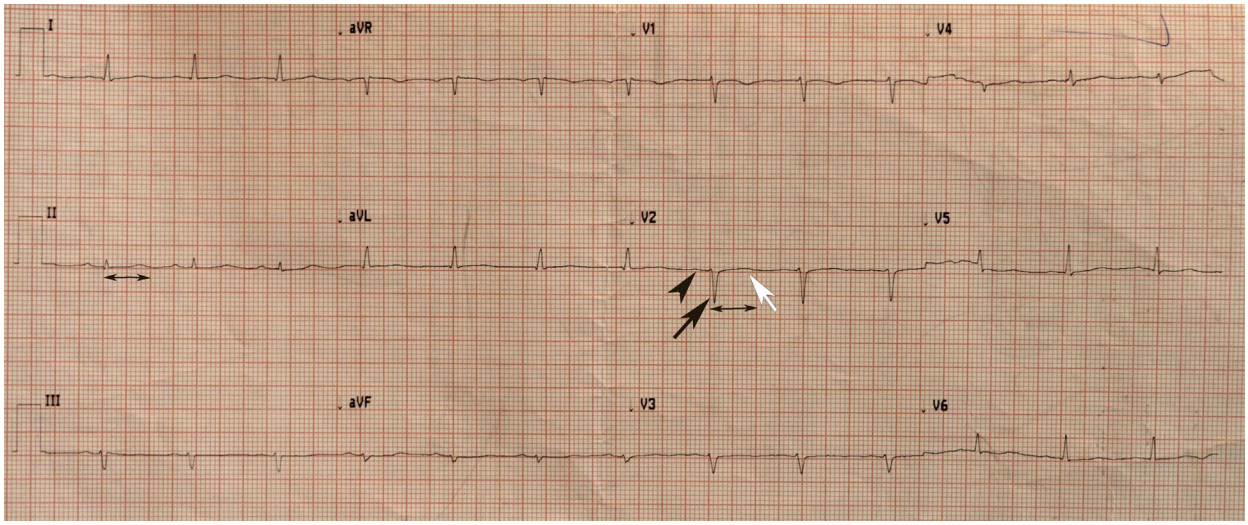

Figure 1. Electrocardiogram showing a heart rate of 79 beats/min, prolonged QTc (double horizontal arrow), reduced P wave amplitude (arrow head), low QRS voltages (black arrow), and flattening of ST segment and T wave (white arrow).

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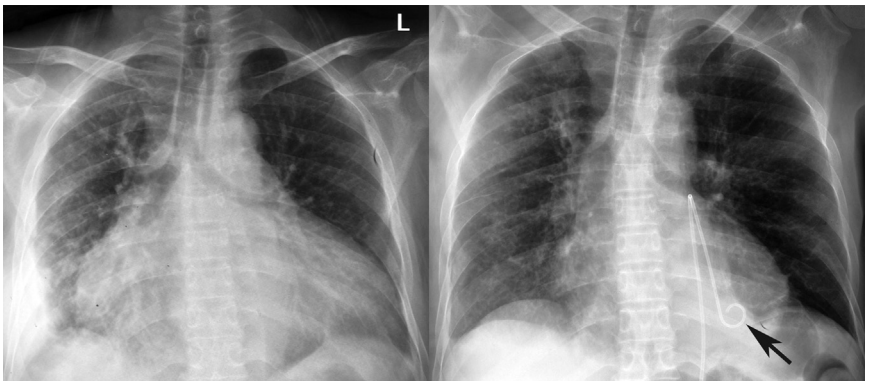

Figure 2. Chest radiographs showing increased cardiothoracic ratio with money bag appearance of heart suggesting a large pericardial effusion (left), which improved after therapeutic pericardiocentesis by a pigtail catheter (arrow, right).

appearance of the heart (Figure 2). Subsequently, 2-dimensional echocardiography revealed massive pericardial effusion with tamponade and an ejection fraction of 20% to 25%. The patient underwent therapeutic pericardiocentesis. Pericardial fluid analysis revealed 60 cells with neutrophil predominance, protein 4 g/dL and sugar 86 mg/dL. Gram stain was negative, and the culture was sterile. The adenosine deaminase level (9 IU/L) was normal, and a negative nucleic acid amplification test (Xpert MTB/RIF) for *Mycobacterium tuberculosis* ruled out tuberculosis. Three 50-mL samples of pericardial fluid did not reveal any malignant cells. Renal and liver functions were normal. HIV serology and antinuclear antibodies were negative. Computed tomography scans of the chest and abdomen also did not reveal any specific etiology.

The patient had dry skin, thin sparse hairs (Figure 3), diminished ankle reflexes, and a normal heart rate despite having cardiac tamponade, and therefore the possibility of hypothyroidism remained. The thyroid hormone levels were low (T4 0.42 μg/dL [reference 4.8–12.7 μg/dL] and T3 0.23 ng/mL [reference 0.8–2.0 ng/mL]), with high thyrotropin level (TSH, 105.1 mIU/L [reference 0.27–4.2 mIU/L]). Thyroxin replacement therapy was started. At 3 months follow-up, the patient was asymptomatic, and repeat echocardiography was normal.

Figure 3. The patient's dry, coarse skin and thin sparse hairs.

DISCUSSION

Small to moderate pericardial effusion can be seen in ≤30% of cases of overt hypothyroidism; however, large effusions are uncommon and cardiac tamponade is extremely rare (1). Moreover, cardiac tamponade in patients with hypothyroid usually is not associated with hemodynamic compromise, because the fluid accumulates at such a slow rate that the compliant pericardium compensates for increased volume and intrapericardial pressure (1,2). The amount of pericardial effusion depends on the severity and duration of hypothyroidism (2).

Hypothyroid patients usually have slower heart rates than other causes of significant pericardial effusion (3). Other ECG findings of hypothyroidism include prolongation of PR and QTc intervals, low amplitude of P wave and QRS complexes, alterations of the ST segment, and flattening or inversion of T waves. Electrical alternans, a specific ECG finding, occurs in tamponade with severe hemodynamic compromise and is therefore associated with malignancies and not seen in hypothyroidism (4).

Echocardiography abnormalities of hypothyroidism, such as cardiac chamber dilatation, systole dysfunction, and enlarged thickness of the interventricular septum may also accompany the pericardial effusion (3). Restoration of a euthyroid state reverses these findings along with clinical improvement.

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