

## Pericardial Effusion with Cardiac Tamponade Revealing Primary Hypothyroidism about 3 Cases

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### Abstract

### Case Report

Cardiac tamponade revealing hypothyroidism was reported in our department in 3 cases. Clinical, electrocardiographic, echocardiographic and biological data were examined. These patients were characterized by a cardiovascular risk factor of smoking, clinically by polypneic dyspnea (25, 30 cycles/min) vs. 19 cycles/min respectively, low blood pressure (70/50, 90/60) vs. 100/75 mmHg, significantly higher heart rate (120, 135) vs. 87 beats/min, normal sinus rhythm, microvoltage, flat T wave, and clear yellowish pericardial fluid (2 of 3). Biologically, anemia with hb respectively (6g, 9g and 9.8g); Tsh (15.9 $\mu$ UI, 90 $\mu$ UI, 110 $\mu$ UI); T3 (0.17; 0.20; 0.26) One patient (33%) had echocardiographic evidence of tamponade without a paradoxical pulse and was successfully treated with thyroxine without pericardial drainage. Tamponade with sinus tachycardia, hypothyroidism should be strongly suspected, although an urgent pericardiocentesis should be performed.

**Keywords:** Hypothyroid cardiac tamponade, Hypothyroidism, Pericardial effusion.

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## INTRODUCTION

Hypothyroidism and early diagnosis can prevent pericardial effusion. However, sporadic case reports of hypothyroidism with massive pericardial effusion with cardiac tamponade have been reported [1-6]. To our knowledge, no studies have investigated the characteristics of pericardial effusion due to hypothyroidism and have compared cardiac tamponade due to hypothyroidism with that due to other causative factors. In addition, few studies have proposed options for managing pericardial effusion [7]. In this study, we review clinical data, electrocardiographic (ECG) characteristics, echocardiographic, and biological parameters.

### Case Report 1

A 30-year-old chronic active smoker since 2015 and kiff user, admitted to the cardiology emergency room with a presentation of dyspnea, chest pain. Vital signs on admission were: temperature 38°C; blood pressure 70/50 mmHg; regular heart rate 120 beats/min; respiratory rate 30/min.

Physical examination revealed coarse hair, dry skin, turgid jugular veins, muffled heart sounds, bilateral decreased vesicular murmurs, nontender

hepatomegaly, and mild bilateral leg edema. Chest radiograph showed decanter-like cardiomegaly (fig. 1). An electrocardiogram revealed a P wave and low QRS complexes. The echocardiogram showed a heart of normal size but with massive pericardial (fig. 2) effusion and evidence of early right atrial (RA) systolic and early right ventricular (RV) diastolic collapse.

Cardiac tamponade was diagnosed and a pericardiocentesis was performed on 12/29/2021 via a subcutaneous approach using a central catheter that was left in situ. 1500 ml of golden brown fluid was drained. After the procedure, his heart rate decreased (80-90 beats/min) and blood pressure remained around 90/60 mm Hg. His hematology, biochemistry, and other reports are mentioned in Tables 1 and 2, respectively. Bacterial culture of pericardial fluid and real-time tuberculosis/non-tuberculosis (TB/NTB) PCR were negative. Blood, urine, and pericardial fluid cultures, serologies, and TM were negative. All other causes of cardiac tamponade, regarding thyroid function test, TSH was above 103uIU/ml (normal range 0.4 \_ 4.3), T3 0.17ng/ml (normal range 0.79 \_ 1.58) and T4 0.19ug/dl (normal range 4.9 \_ 11), lipid profile revealed elevated cholesterol level.



Figure 1: Chest X-ray showed increased cardiothoracic ratio

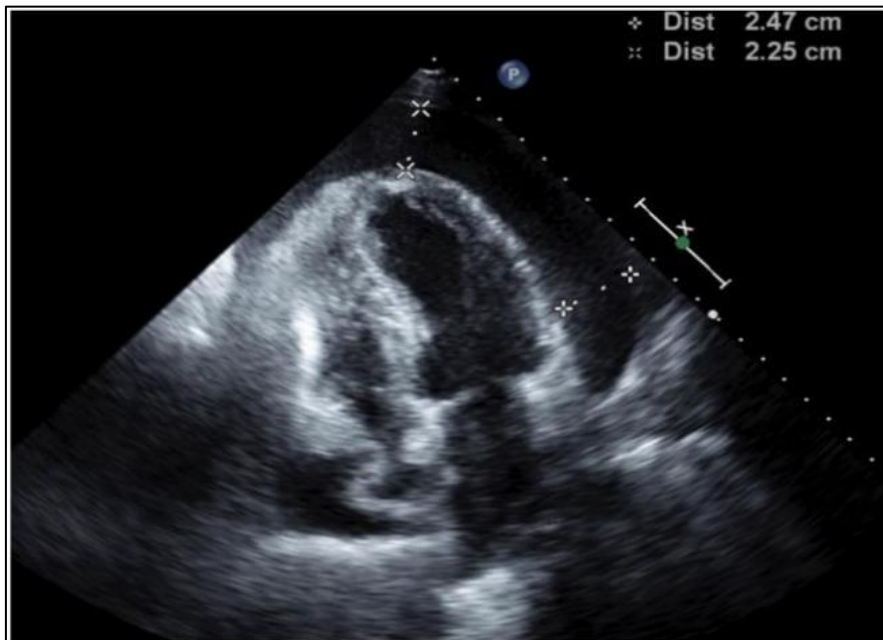


Figure 2: Cardiac tamponade, with late diastolic RA (A) and early diastolic RV collapse

Table 1: Hematology and biochemistry

Date	Hb (gm/dl)	Platelet (x10 <sup>9</sup> /cmm)	TLC (x10 <sup>9</sup> /cmm)	Créat (mg/dl)	AST/ALT (IU/ml)	Prot/Alb (gm/dl)	ESR/CRP
12/29/2021	9	161	7.3	1.18	37/16	8.3/3.6	120/20.46
12/31/2021	9,7	188	8.2	0.60	30/19	6.67/3.03	55/1.23
01/02/2022	11,9	203	9.1	0.58	30/40		15/0.35

Table 2: Investigations (Special)

Date	Test	Result
29/12/2021	TSH	15.9µIU/ml
	Thyroid Function Test	FT3 0.17 FT4 0.19
29/12/2021	Pericardial fluid analysis	Total cells 400/cmm, differential P10% L90%, total proteins 6.67gm/dl, albumin 3.6gm/dl, glucose 96.6 mg/dl, cholesterol 47 mg/dl, ADA 7.6 U/L, LDH 131 U/L Stains (Grams., AFB and KOH) negative; TB/NTM real time PCR not detected; Cytology smears show low cellularity

### Case Report 2

A 38-year-old woman presented to our emergency department complaining of worsening dyspnea for one week. Transthoracic echocardiography revealed a massive pericardial effusion. Laboratory examination revealed elevated thyroid stimulating hormone (TSH) and decreased thyroxine (T4) and triiodothyronine (T3) levels. The patient was diagnosed as a case of primary hypothyroidism. Complete blood count showed a hemoglobin level of 9.8g/dl, microcytic and hypochromic (MCV 71.7 fl, MCH 16.4pg, MCHC 23.1g/dl). Sedimentation rate, electrolytes, renal and liver function tests were normal, regarding thyroid function test, TSH was above 90uIU/ml (normal range 0.4 – 4.3), T3 0.20ng/ml (normal range 0.79– 1). The lipid profile revealed an elevated cholesterol level. The patient was therefore diagnosed as a case of primary hypothyroidism complicated by massive pericardial effusion, anemia and hyperlipidemia. Treatment with 100 mcg L-thyroxine and 20mg atorvastatin was initiated by pericardial effusion and treated with L-thyroxine replacement therapy.

### Case Report 3

A 42 year old woman with a smoking habit complaining of dyspnoea on exertion and oedema of the lower limbs for one week, not orthopnoea.

Muscle and joint pain and irregular cycle. On examination, the patient was ill, clinically anaemic, heart sounds muffled, eupneic. No murmur, gallop rhythm, turgid jugular veins. Chest X-ray showed increased cardiothoracic ratio. The ejection fraction on echocardiography was 66%, with a pericardial effusion of 22 mm anteriorly and 34 mm posteriorly, the diagnosis of massive pericardial effusion was made.

The complete blood count showed a haemoglobin of 6 g/dl, microcytic and hypochromic. The patient was given 3 units of blood. Renal and liver tests were normal, and the thyroid function test showed TSH 110uIU/ml, T3 0.26ng/ml the lipid profile revealed an elevated cholesterol level; the patient was diagnosed as a case of primary hypothyroidism complicated by a massive pericardial effusion pericardial effusion, anaemia and hyperlipidaemia. Treatment with 100 mcg L-thyroxine and 20mg simvastatin was initiated. The patient showed clinical improvement and was discharged.

One month later, the TST was repeated and was normal, TSH: 0.37mIU/L, T4: 6.1nmol/L normal T3: 0.98nmol/L.

## DISCUSSION

Pericardial effusion (PE) as a clinical presentation suggestive of hypothyroidism has been reported in the literature [1, 2]. Our patients had severe hypothyroidism with very low T3 and T4 and markedly elevated TSH. As discussed, they had massive PE with

features of cardiac tamponade, and the fluid had a high protein concentration and was an exudate. The pathophysiological changes responsible are capillary dysfunction, leakage of albumin into the interstitial and extracellular space, reduced lymphatic clearance probably due to poor lymphatic tone, and disturbances in electrolyte metabolism. The term "golden paint effusion" has been used to describe the golden brown appearance of the pericardial fluid due to glistening satiny cholesterol crystals. Changes in lipid metabolism are probably responsible for the high cholesterol content of the fluid. The cases discussed had high total cholesterol levels (44 and 53 mg/dl) in the pericardial fluid, respectively.

A churning action of the heart may play a role in the precipitation of cholesterol from the pericardial fluid, or the low absorption capacity of the pericardium may be a major factor [1, 4]. Mercedes Camprubi *et al.*, [5] reported a case of cholesterol pericarditis with hypothyroidism. However, no such crystal could be demonstrated in the pericardial biopsy of our patients, although the fluid had a golden brown appearance. In our cases, the diagnoses were based on clinical, biological, and echocardiographic findings, and hypothyroidism as a cause of pericardial effusion and tamponade was diagnosed by an exclusion criterion.

Management varies depending on the size of the effusion and the hemodynamic stability of the patient. The management strategy ranges from conservative treatment with close monitoring and initiation of thyroxine to pericardiocentesis or even creation of a pericardial window. The advantages of the pericardial window are the possibility of tissue biopsy and the prevention of recurrence. A literature search found only one case report of cardiac tamponade secondary to surgically treated hypothyroidism [6].

## CONCLUSION

Hypothyroidism presenting with massive pericardial effusion and cardiac tamponade is an uncommon and rare presentation as in the present case report. Mild pericardial effusion respond to thyroxine supplementation over a long period. Pericardiocentesis is necessary only when it is massive and tamponade develops. Very rarely in recurrent PE surgical management such as pericardiectomy and/or pericardial pleural window is required.

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