CARDIAC TAMPOONADE - A RARE INITIAL PRESENTATION OF HYPOTHYROIDISM-A CASE REPORT
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Abstract:
Pericardial effusion is frequently found in patients with hypothyroidism, but it is rarely associated with cardiac tamponade. Hypothyroidism complicated by cardiac tamponade is rarely referenced in the medical literature. Here we report an unusual case of a 30-year-old female, who presented with breathlessness and swelling of legs and was found to have hypothyroidism with large pericardial effusion with cardiac tamponade. Treatment included an emergency pericardiocentesis followed by thyroxine hormone replacement.

Keyword: hypothyroidism, Cardiac tamponade, pericardial effusion, pericardiocentesis

INTRODUCTION:
Hypothyroidism is a disease with multi-system involvement, which may present in various forms, one being unusual pericardial effusion. The recent literatures concluded that pericardial effusion is extremely infrequent in hypothyroidism, with an incidence of 3% to 6%. Moderate to large pericardial effusion are rare and associated tamponade is extremely rare. Cardiac tamponade is usually a consequence of increased pericardial pressure with accumulation of pericardial effusion. Pericardial effusion may be caused by acute pericarditis, tumor, uremia, hypothyroidism, trauma, cardiac surgery, or other inflammatory/non-inflammatory conditions. A small pericardial effusion can cause clinically significant cardiac tamponade when it accumulates rapidly. It is important to suspect cardiac tamponade when patients have hemodynamic compromise regardless of the amount of pericardial effusion. Here we report a rare case of hypothyroidism with cardiac tamponade.

CASE REPORT:
A 30 years old female was brought by her husband with history of shortness of breath and swelling of legs for 10 days. Patient was apparently asymptomatic 2 months back; when she gradually started noting tiredness, lethargy, constipation, change in voice, edema of the extremities and face, and progressive weight gain. She also had abdominal distention. There was no history of any medical illness and drug history in the past.

On examination patient was afebrile, tachypnoeic and had mild pallor, puffiness of face, dry skin, engorged veins over neck, face and upper limbs, and non-pitting pedal edema and there was no thyromegaly. Vital signs on admission were recorded [low volume pulse, blood pressure 90/70 mmHg; heart rate 72 beats/min regular, axillary temperature 98 F , respiratory rate 26/min]. Body mass index (BMI) was 26.05 kg/m²(height-152 cm, weight-60kg).Patient was hypothermic with pulsus paradoxus (inspiratory fall in systolic blood pressure >10 mmHg). Oxygen saturation (SpO₂) was 82%. The cardiac apical impulse was not felt. The heart sounds were soft and distantly heard and bilateral crepitations heard in both lung fields and decreased breath sounds in both infraaxillary and infrascapular areas. There was shifting dullness in abdomen. Her neurological examination shows presence of classical pseudomyotonic reflexes. Chest radiogram showing cardiomegaly with globular enlargement of the cardiac silhouette with “water bottle” configuration and bilateral pleural effusion.(figure 1)

Electrocardiogram showed heart rate of 72/min with low voltage complexes. Two-dimensional transthoracic echocardiogram demonstrated small heart size with massive pericardial effusion and signs of early diastolic right ventricular (RV) collapse. There was swinging motion of heart within large effusion, prominent respiratory alteration of RV dimension with right atrial (RA) and RV collapse during diastole. Considering echocardiographic findings and clinical scenario, diagnosis of large pericardial effusion with cardiac tamponade was made.
Two-dimensional transthoracic echocardiography

There was massive pericardial effusion and signs of early diastolic RV collapse. There was swinging motion (apical-4-chamber view) of heart within large effusion; prominent respiratory alteration of RV dimension with RA and RV collapse during diastole (parasternal long axis view) was seen (Figure 2). Pericardial effusion was all around and all cardiac chambers were of small size with predominant diastolic heart failure. Right ventricular diastolic collapse was an echocardiographic hallmark of cardiac tamponade. Left ventricular (LV) systolic function was normal with an overall LV ejection fraction of 55%.

CT chest:

Postpericardiocentesis CT chest showing residual minimal pericardial effusion and bilateral pleural effusion.

Pericardial fluid analysis: appearance, golden yellow in color ("Gold Paint" effusion); lymphocytes, 8–10/mm³; proteins, 3.67g/dl; sugar, 80 mg%/ cholesterol 196 mg%; adenosine deaminase (ADA) level was 12 IU/L-negative, gram stain- no organisms seen, no acid fast bacilli (AFB) were seen, no organisms were grown on culture and no malignant cell was seen.

DISCUSSION:

The occurrence of a pericardial effusion in hypothyroidism seems to be related to the severity and duration of the disease. The incidence is reported to be as 3% in early mild stage to 80% when myxedema is present [1]. Cardiac tamponade in patients diagnosed with hypothyroidism is probably as rare as it is due to pericardial distensibility and the slow accumulation of fluid, allowing significant fluid accumulation without hemodynamic compromise [3,8,10].

Current literature has elucidated the thyroid effects on the heart. First was a British physician, named C. Parry in 1785, who described heart enlargement secondary to hyperthyroidism. This was followed in 1918 by H. Zondeck from Munich who also described that hypothyroidism can cause cardiac enlargement along with decrease pulsations and low electrocardiographic voltage, which he termed "myxedema heart". Over the ensuing years, hypothyroidism has been associated with premature death from coronary artery occlusion (Fahr 1925) [9]; a low cardiac output state (Amidi 1968), cardiac enlargement (Aber 1968) and cardiomyopathy (Hamilton 1975).

Cardiac tamponade is life-threatening, slow or rapid compression of the heart due to the pericardial accumulation of fluid, pus, blood, clots, or gas, as a result of effusion, trauma, or rupture of the heart. Tamponade is more common in patients with malignant pericarditis. Less common causes include tuberculosis, acute myocardial infarction (MI),

### INVESTIGATION:

- Hemoglobin (Hb), 8.2g%; total leukocyte count, 8500/mm³; N 64 L30 E6, platelet count, 2.8 lakhs/mm³; ESR – 25mm/hour; blood sugar, 87mg; blood urea 26 mg%/ serum creatinine level, 1.1 mg%; liver function test (LFT), within normal limits.
- Thyroid function test:
  - Serum TSH, 109 mU/ml (normal 0.35–5.5 mU/ml);
  - T3, 24 ng/dl (normal 90–209 ng/dl); and
  - T4, 0.9 g/dl (normal 4.6–12.5 g/dl).
- Lipid profile: total cholesterol, 342 mg/dl; high-density lipoprotein cholesterol (HDL-C), 54mg/dl; triglyceride, 235 mg/dl; Serum sodium was 137 mEq/l and serum potassium was 3.9mEq/l. HIV and HBsAg were negative.

### Electrocardiogram

- Electrocardiogram showed heart rate of 72/min with low voltage complexes.
pericarditis, radiation damage, bacterial infection, cardiomyopathy, lupus, dissecting aortic aneurysm, etc. The first one was reported by Martin and Spathis in the British Medical Journal (BMJ) way back 1965. Retnam et al., Chou et al., Chatterji et al., LIN et al., Al-Mahroos et al., Usalan et al and c.patial et al., have reported cases of cardiac tamponade with hypothyroidism, similar to the present case. The rarity of cardiac tamponade in myxedema patients with pericardial effusion is attributed to the slow accumulation of fluid and the remarkable distensibility of the pericardium [8,10,11].

The pathophysiologic derangements responsible for the collection of fluid in the serous cavities of hypothyroid patients are probably increased systemic capillary permeability and disturbances in electrolyte metabolism.[3]

The classical clinical picture in pericardial tamponade includes chest pain, confusion, and dyspnoea associated with hypotension and tachycardia.[4,5,7] The association of hypotension with relative bradycardia in this case was of interest and suggested the possibility of hypothyroidism complicated by pericardial effusion.[5]

Alexander first used the term “Gold Paint Effusion” to describe the golden brown appearance of the pericardial fluid due to the shimmering stained cholesterol crystals.[16] The high cholesterol content of the fluid has been attributed to disturbances in lipid metabolism; possibly, a churning action of the heart plays a role in the precipitation of cholesterol from pericardial fluid or the poor absorptiveness of the pericardium may be a major factor.

Thyroxine replacement alone is sufficient to resolve mild to moderate effusions. Although there is evidence that starting levothyroxine replacement at 1.6-1.8 mcg/day is effective, in most cases it may be prudent to start at a lower dose usually at 25-50mcg per day with gradual up titration especially in cases where an underlying heart disease cannot be ruled out. This is to prevent the possibility of precipitating cardiac ischemia. Onset of resolution often precedes achievement of euthyroidism and ranges up to 1-21 months. Recurrence however can still occur thus close monitoring is imperative.

Pericardial effusion, lipid metabolic abnormalities and abnormal liver function can be easily reversed with thyroid replacement.[6,7,15] Pericardiocentesis is indicated only if cardiac tamponade develops [7,15]. Echo guided pericardiocentesis has an excellent profile in simplicity, safety, efficacy and in emergency. Usage of pericardial catheter drainage reduces the recurrence of effusion. Echo guided pericardiocentesis with extended pigtail catheter drainage can now supplant more invasive surgical procedures as initial strategy for management of hemodynamically significant pericardial effusions.

CONCLUSION:

Hypothyroidism presenting with massive pericardial effusion with cardiac tamponade is a rare presentation as in the present case report. Echocardiography is one of the gold standard investigations to diagnose. For patients diagnosed with cardiac tamponade without sinus tachycardia, hypothyroidism should be highly suspected. Mild pericardial effusion does respond to thyroxine supplementation over a long period and pericardiocentesis is necessary only when tamponade develops.

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