

## UNCOMMON MANIFESTATION OF PRIMARY HYPOTHYROIDISM: CONSTRICTIVE PERICARDITIS

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### *Abstract*

#### **Keywords:**

*Constrictive Pericarditis; Hypothyroidism; Heart Failure*

Constrictive Pericarditis is a condition where a thickened, scarred and non-compliant pericardium impairs adequate diastolic filling of the ventricles, resulting in features of diastolic heart failure.

#### **Key Message:**

*Timely diagnosis of pericardial disease and ruling out treatable causes is necessary to prevent mortality from chronic complications like pericardial tamponade and constriction.*

Untreated hypothyroidism is a common cause of small pericardial effusion. However severe manifestations such as massive effusion, tamponade and pericardial constriction are exceedingly rare.

We report a case of a female who presented with features of heart failure and fluid retention, and was subsequently diagnosed to have constrictive pericarditis associated with hypothyroidism.

## INTRODUCTION

Untreated hypothyroidism can have profound effects on the heart and cardiovascular system<sup>1</sup>. It results in alteration of myocardial contractility, oxygen consumption, blood pressure, cardiac output and systemic vascular resistance<sup>2</sup>. The most common cardiovascular features associated with hypothyroidism include bradycardia, narrowed pulse pressure, diastolic hypertension, and increased risk of atherosclerosis and coronary artery disease<sup>3</sup>. Occurrence of small pericardial effusion is common in hypothyroidism but massive pericardial effusion, pericardial constriction or tamponade occur very rarely<sup>4</sup> and is generally a complication of severe hypothyroidism or myxoedema.

Constrictive Pericarditis is a cause of diastolic heart failure caused by rigid, inelastic and occasionally calcified pericardium that impairs diastolic filling<sup>5</sup>. The common causes of constrictive pericarditis include Tuberculosis (commonest in developing & underdeveloped nations<sup>6</sup>), cardiac surgery, connective tissue disorders, malignancy, medications and uremic pericarditis. Patients present with features of elevated systemic venous pressures and low cardiac output<sup>7</sup>. The diagnosis is made on clinical grounds, with demonstration of a thickened pericardium by echocardiography, CT and MRI<sup>8</sup>. Acute onset constriction usually responds to medical therapy, while chronic constriction requires surgical pericardial decortication, which in itself is associated with substantial mortality<sup>9</sup>.

## CASE SUMMARY

A 33 year old female presented to the emergency department with complaints of insidious onset, gradually progressive breathlessness, along with swelling of bilateral feet. On examination, JVP was raised (6cm) with a prominent 'X' descent during inspiration. Chest auscultation revealed bilateral basilar crepitations, and there was mild tenderness in right upper quadrant of the abdomen. SpO<sub>2</sub> was 95%, and other vitals were stable. A provisional diagnosis of congestive heart failure was made, and treatment was initiated with diuretics and other supportive measures.

Investigations revealed elevated Pro BNP levels (> 1000 pg/ml). Renal functions were slightly deranged (Creatinine 1.6mg/dl, BUN = 30mg/dl) with normal electrolytes. Liver functions showed elevated transaminases (SGOT =140 IU/L, SGPT = 80 IU/L). We ordered a thyroid profile, which revealed TSH = 300 mIU/L (N= 0.5-4.2 mIU/L), T<sub>4</sub> (total) = 3µg/dl (N=5.01-12.45 µg/dl), consistent with hypothyroid state. Serum Anti TPO antibody 448.70 U/ml (N= <65). Ultrasound study of the abdomen showed presence of mild hepatosplenomegaly, minimal ascites and evidence of increased systemic venous pressure. Echocardiography with Doppler studies revealed presence of thickened and calcified posterior pericardium, (**Figure 1, 2**) dilated atria (both right and left), reduced left ventricular ejection fraction (50%) with dilated IVC and hepatic veins, suggestive of Constrictive Pericarditis. (**Figure 3**)

Thyroxine replacement was started and cardiac catheterisation was planned to confirm Constrictive Pericarditis. Unfortunately the patient's condition deteriorated after 3 days. She went into a state of refractory shock, unresponsive to fluids and vasopressors. We suspected an adrenal crisis, and gave her i/v Hydrocortisone (100mg T.I.D.). However she couldn't be resuscitated and expired on the 4<sup>th</sup> day of admission.

## DISCUSSION

Constrictive Pericarditis is a condition resulting from a scarred, inelastic and thickened pericardium that impairs diastolic cardiac filling<sup>5</sup>, resulting in diastolic heart failure. The most common aetiology in developing and underdeveloped countries is Tuberculosis<sup>6</sup>, followed by cardiac surgery, trauma, connective tissue disorders and malignancy. Untreated hypothyroidism is generally associated with small pericardial effusion, while chronic complications like pericardial tamponade and constriction occurring very rarely<sup>4</sup> as a complication of severe hypothyroidism.

Patients usually present with features of systemic venous congestion and low cardiac output<sup>7</sup>. There occurs prominent jugular venous distention, hepatic congestion, ascites and peripheral oedema, along with exercise intolerance, dyspnoea and fatigue. The jugular veins show prominent X and Y descents, associated with a rise of venous pressure with inspiration (Kussmaul's Sign). The 'Pericardial Knock' is a high pitched, diastolic sound caused by sudden interruption of diastolic filling of the ventricles, and if present is a specific indicator of pericardial constriction. Cardiac catheterisation reveals an early, prominent fall of diastolic pressures in both right and left ventricles, followed by a plateau ("Square-Root sign").

The diagnosis of Constrictive Pericarditis is usually made on clinical grounds, with the demonstration of a thickened pericardium by echocardiography, CT or MRI<sup>8</sup>. Transesophageal echocardiography is a more sensitive method to detect pericardial thickening than the transthoracic approach<sup>10</sup>. Doppler echocardiography can also distinguish between constrictive and restrictive pericardial disease, right heart failure due to tricuspid valve disease and associated pulmonary hypertension.

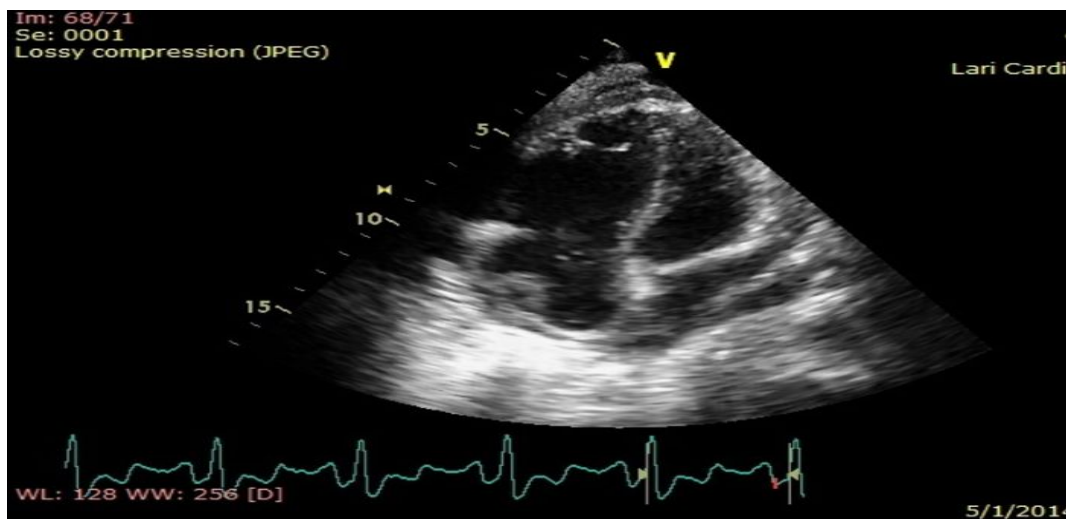
Patients with acute onset, transient constrictive pericarditis can be treated by medical therapy. However in chronic constrictive pericarditis, surgical decortication of the pericardium is the only available option. This procedure is itself associated with substantial mortality<sup>9</sup> (> 6% at most experienced centres).

Hence, we should have a high index of suspicion in patients presenting with symptoms of congestive heart failure to rule out pericardial disease in the early stages. All treatable causes of pericardial disease, including suspicion of

hypothyroidism in female patients, should be looked for and treated at the earliest to prevent mortality from the subsequent chronic conditions, namely pericardial tamponade and constriction.

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**Figure legend 1: an apical four chamber transthoracic echocardiography view shows thickened pericardium (more obvious in PLAX view)**

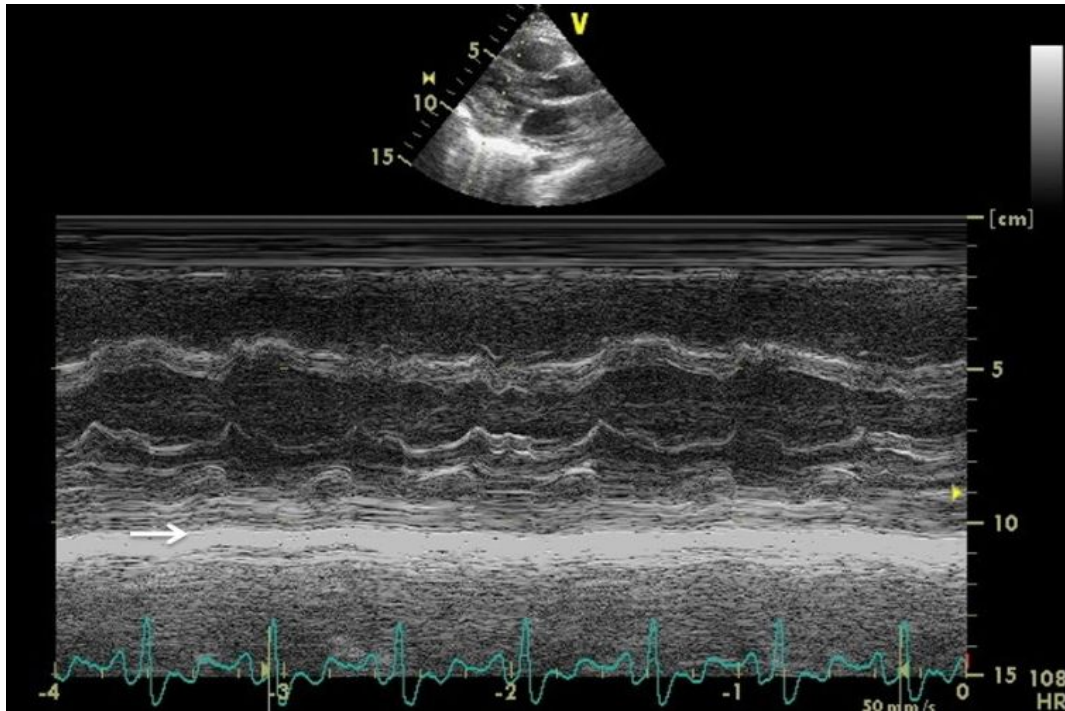


Figure legend 2: M-mode echocardiogram shows echo bright thickened posterior pericardium (white arrow).

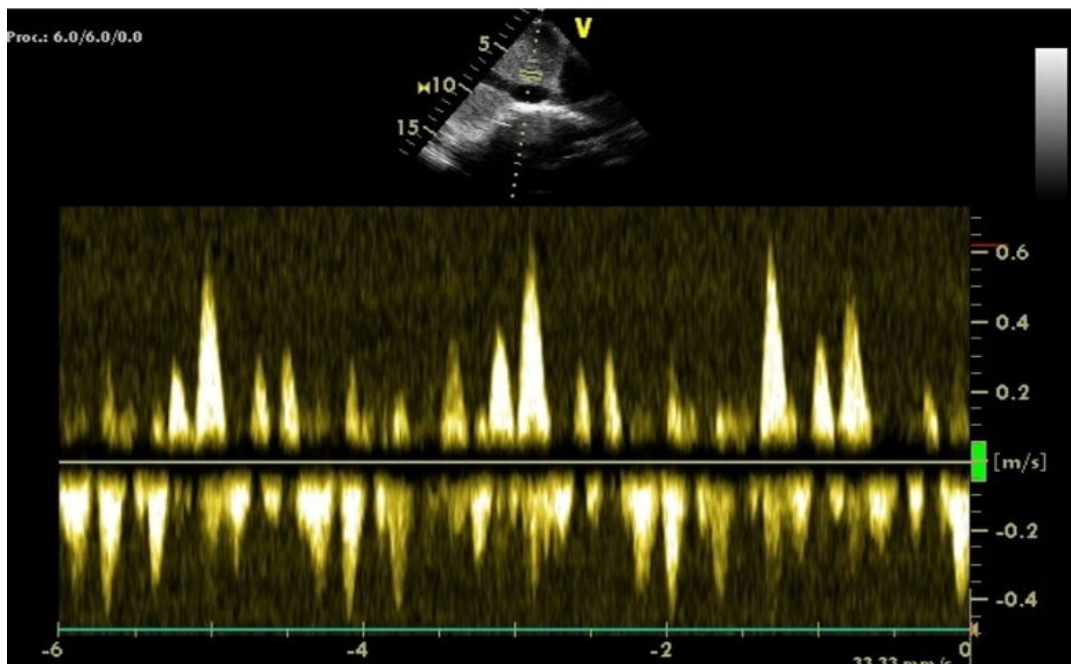


Figure legend 3: Pulse wave doppler flow at hepatic vein shows marked variation in velocities suggestive of interventricular dependence phenomena seen in constrictive pericarditis.