

Cardiac tamponade associated with hypothyroidism in Rwandan child

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ABSTRACT

The author reports the case of a child who presented with huge pericardial effusion complicated to cardiac tamponade secondary to primary hypothyroidism. The most known etiologies of cardiac tamponade were not confirmed, and hypothyroidism was an exclusion diagnosis. Due to the severity of cardiac tamponade, pericardiocentesis was performed to relieve the compression effect. The child improved with Levothyroxine treatment.

Hypothyroidism is a rare cause of pericardial effusion in children. If the pericardial effusion increases in volume, cardiac tamponade with clinical manifestations can result. The pericardial fluids may be rich in proteins and cholesterol. Treatment with thyroxine therapy can improve outcomes.

Keywords: Cardiac tamponade; hypothyroidism, pericardiocentesis

CASE REPORT

A three-year old male presented to University Teaching Hospital of Butare (CHU Butare), Rwanda with a one-month history of shortness of breath and lower limb edema. The physical examination revealed an acutely ill child in respiratory distress with tachypnea of 52 cycles per minute. Suprasternal, intercostal, and subcostal recessions were also observed. Crackles and distant heart sounds were heard on auscultation. The child presented hepatomegaly of 3 cm below costal margin. Both weight and height were in normal age ranges. The differential diagnoses included congenital non-cyanotic heart disease, pericardial effusion, dilated cardiomyopathy with congestive heart failure, and pneumonia.

Heart ultrasound revealed huge pericardial effusion (4.1 cm) with tamponade effect. Treatment consisted of pericardiocentesis, oxygen therapy, corticosteroid, and diuretics (Furosemide). Pericardiocentesis yielded 550 ml of gold-brown fluid. Fluid bacteriology was negative. Fluid cyto-chemistry was also normal. After 2 days, the child's condition improved. At this

point, treatment was continued with Furosemide and Prednisolone only, thinking about pericardial effusion of unknown origin. After 3 weeks, the condition worsened and heart ultrasound was performed. This again revealed a huge pericardial effusion. Pericardiocentesis was again performed and 470 ml of gold-brown fluid was removed. As a result, hypothyroidism was suspected. Thyroid function revealed low T3: 1 pg/ml (normal range (1.4-4.98pg/ml) and high TSH: 15.857 microIU/ml (normal range: 0.4-7.0 microIU/ml). The child was given Levothyroxine at 25 mcg per day increased to 50 mcg per day after two weeks. After 3 months, the child had normal thyroid function. T3 was 4.711pg/ml, T4 was 0.576 ng/dl, and TSH was 1.117 microIU/ml. Heart ultrasound revealed moderate pericardial effusion without heart function compromise.

DISCUSSION

Hypothyroidism can cause poor albumin synthesis and decreased oncotic pressure. The resulting increased capillary permeability leads to leakage of albumin into the extravascular space and decreased plasma volume. If this occurs, there will be an increase in the volume of interstitial fluid and a decrease in lymphatic drainage

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[1,5,7]. This mechanism can result in an accumulation of fluids in the pericardial space far beyond the normal levels of 10-50 ml. Without intervention, this excess fluid (known as a pericardial effusion) can lead to cardiac tamponade.

Hypothyroidism can manifest in many different ways including fatigue, cold intolerance, dry skin, edema, weight gain, muscular weakness, and decreased deep tendon reflexes [5,6]. In addition, hypothyroidism can present with a range of cardiovascular manifestations commonly including increased afterload, reduced heart contractility, coronary diseases, and reduced cardiac output. Less frequent manifestations include atherosclerosis and conduction disorders [1,3,5].

Usually, primary hypothyroidism will present with low serum free thyroxine (T4) and elevated thyroid stimulating hormone (TSH). The thyroid gland presents with pathological condition [1,2]. The risk of pericardial effusion is correlated with the severity of the hypothyroidism. Pericardial effusion resulting from mild hypothyroidism is observed in only 3-6% of people with the condition. In severe hypothyroidism, however, the risk of pericardial effusion increases to the range 30% to 80% [3,4].

In general, management of the pericardial effusion depends on its size and effects. If there is no hemodynamic effect, conservative treatment with thyroxine drug and close monitoring

of pericardial effusion may be sufficient [1,5]. However, if cardiac tamponade is observed, pericardiocentesis followed with thyroxine therapy is imperative. The pericardial fluid will have gold brown paint appearance secondary to shimmering satin cholesterol crystals [6].

In adults, cardiac tamponade typically manifests with decreased blood pressure, jugular vein distention, and distant (muffled) heart sounds (known as the Beck triad). In children, however, this is not usually the case [2,3]. Children may instead present with respiratory distress and signs of right heart failure, as was observed in this case study. Pericardial effusion due to hypothyroidism can present even without clinical manifestations. If cardiac tamponade is observed, pericardiocentesis is indicated to avoid cardiac collapse [2,8].

CONCLUSION

Hypothyroidism is an overlooked etiology of pericardial effusion and cardiac tamponade. Hypothyroidism should be considered in case of massive pericardial effusion without other common causes. Conservative management with thyroxine and thorough monitoring of effusion leads to excellent results. However, emergent pericardiocentesis should be considered in severe cardiac tamponade.

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