



BEYOND TRAUMA: A CASE REPORT ON ATRAUMATIC CARDIAC TAMPONADE

Forensic Medicine

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ABSTRACT

Cardiac tamponade is a medical emergency that happens when enough fluid accumulates in the pericardial sac compressing the heart and leading to a decrease in cardiac output and shock. It is caused by the buildup of pericardial fluid that can accumulate for several reasons. Diagnostic evaluation typically involves echocardiography, which can reveal the presence of fluid in the pericardial space and assess its impact on cardiac function. Management of cardiac tamponade often involves addressing the underlying cause and may include pericardiocentesis or surgical intervention to relieve the pressure. Present case study is that of a 44 years old male who suddenly fell unconscious and declared brought dead. On autopsy, around 200 ml of blood and 150 gm blood clot was present in the pericardial sac. A rupture in the posterior wall of left ventricle situated 2 cm above apex of heart and 1 cm left to midline was present. Old healed multiple scars, whitish in color, present at the apex of heart, inter ventricular septum and left ventricular wall were present. Left anterior descending artery was 80 % blocked. Left circumflex artery was 80 % blocked. All the organs were grossly congested.

KEYWORDS

Tamponade, hypoperfusion, echocardiography, pericardiocentesis, rupture.

INTRODUCTION

Cardiac tamponade is a critical condition characterized by the accumulation of fluid, blood, or other substances in the pericardial space, which surrounds the heart. This buildup of fluid exerts pressure on the heart, particularly affecting its ability to fill properly during diastole thus compromising heart's pumping efficiency, leading to reduced cardiac output and potential circulatory collapse. Symptoms of cardiac tamponade can vary, ranging from subtle signs of discomfort to severe manifestations of shock. Common clinical features include dyspnea, tachycardia, hypotension, and signs of elevated venous pressure. The classic triad of symptoms—known as Beck's triad—involves hypotension, muffled heart sounds, and jugular venous distention, although not all patients present with this triad. Diagnosis typically involves echocardiography, which can visualize the presence of pericardial fluid and assess its impact on cardiac function. Other diagnostic tools might include chest X-ray, CT or MRI to further evaluate the extent and cause of the fluid accumulation. Management often involves pericardiocentesis, a procedure to aspirate the fluid from the pericardial space, or surgical intervention in more severe or recurrent cases. Prompt recognition and intervention are crucial to preventing serious complications and improving patient outcomes.

Case History

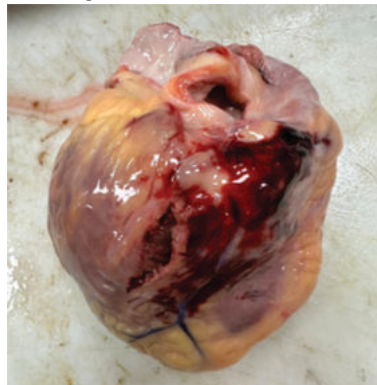
Alleged history of a 44 year old male suddenly falling unconscious in front of UCO Bank, Chawri Bazar, Delhi on 30/08/2023 at around 11:15 AM. He was brought to Lok Nayak Hospital, New Delhi on same day at 11:59 AM where he was declared brought dead after examination by the attending doctor. Body was brought to the mortuary of Maulana Azad Medical College, New Delhi on 30/08/2023 for Post-mortem Examination.

Autopsy Findings

No external injuries were present at the time of examination. Pericardial sac was intact with around 200 ml of blood and 150 gm blood clot present as shown in Fig. 1.

**Fig. 1: Blood And Blood Clots Present In Pericardial Cavity**

Heart weighed 230 gm, On cut section: Right ventricular wall thickness was 0.7 cm, left ventricular wall thickness was 2.1 cm and Interventricular wall thickness was 1.4 cm. A rupture in the posterior wall of left ventricle measuring 3.4 cm x 0.8 cm x chamber deep, situated 2 cm above apex of heart & 1 cm left to interventricular septum as shown in Fig. 2.

**Fig. 2: Rupture In The Posterior Wall Of Left Ventricle**

Right coronary artery was about 40 % blocked, left anterior descending artery was about 80 % blocked. Left circumflex artery was about 80 % blocked. Old healed multiple scars, whitish in color, present at the apex of heart, inter ventricular septum and left ventricular wall. All the internal organs like lungs, liver, spleen, kidney etc. were grossly congested.

Cause Of Death

Circulatory shock due to cardiac tamponade consequent upon rupture of left ventricular wall – a natural cause of death.

DISCUSSION

The pericardial cavity contains approximately 50 mL of fluid, providing a cushion for cardiac activity. While the pericardial cavity can gradually accumulate fluid, a swift buildup (200-300 mL) may result in a fatal outcome.

The accumulated fluid compresses the heart, affecting its movement and causing defective ventricular filling, leading to reduced cardiac output.

Consequently, rising intra-pericardial pressure compromises coronary blood flow to the myocardium, resulting in impaired myocardial function. Elevated intra-pericardial pressure also hampers venous return to the heart. Increased pressure reduces the systemic venous-right atrium pressure gradient culminating in cardiovascular collapse. This case highlights sudden death due to cardiac tamponade, a catastrophic complication of post-myocardial infarction ventricular wall rupture.

The deceased, a male with a history of hypertension on irregular medications, experienced myocardial infarction sometime back due to a subtotal block of left anterior descending artery and left circumflex artery resulting in transmural infarction and ventricular wall rupture ensued causing Cardiac Tamponade. Post-MI rupture includes papillary muscle rupture, ventricular free wall rupture, or septal and para septal area rupture, with risk factors such as age >60 years, female gender, pre-existing hypertension, and left ventricular wall hypertrophy.

In this case, the deceased had all the risk factors for ventricular wall rupture except age and gender.

CONCLUSION

In the present case, the death was sudden due to Cardiac Tamponade secondary to ventricular wall rupture following myocardial infarction, a fatal phenomenon.

Gross findings were diagnostic revealing thrombosis of the right coronary artery, left anterior descending artery, left circumflex artery and ruptured myocardium of the left ventricle.

Cardiac Tamponade is a life-threatening condition and needs early diagnosis and intervention. It presents as sudden death, raising a high index of suspicion about the cause and manner of death.

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