CASE REPORT

The Facilitation of Pericardiocentesis Using Imaging Techniques. A Case Report

Ioan Manițiu, Iulia Cobârje, Ionuț Bitea, Radu Cojan, Andra-Maria Bebeșelea

Center for Invasive and Noninvasive Cardiovascular Research in Adult Pathology, Emergency County Hospital, Sibiu, Romania

ABSTRACT

Introduction: Pericardiocentesis is a procedure performed for diagnostic and therapeutic purposes, and it consists in draining the pericardial effusion liquid in sterile conditions. The accumulation of fluid in the pericardial space may be caused by several systemic conditions, including viral or bacterial infections, autoimmune disease, cancer, as well as thyroid malfunction. A rapidly growing pericardial effusion can lead to cardiac tamponade, and consequently to acute hypodiastolic heart failure. **Case report:** We report the case of a 79-year-old female, without previously known cardiovascular pathologies, who presented to the Emergency Room due to a gradual deterioration in her health status. Imaging procedures included a chest X-ray and an echocardiography that confirmed the diagnosis of pericardial effusion. Pericardiocentesis was performed using cardiac ultrasound guidance, resulting in the draining of a small quantity of yellowish, partly haemorrhagic fluid. The patient's general condition did not improve, thus another pericardiocentesis was carried out, this time with fluoroscopic and cardiac ultrasound guidance, and 1200 milliliters of sero-haemorrhagic fluid was drained. The laboratory analysis revealed that the patient had hypothyroidism, and the cytological analysis of the drained pericardial fluid excluded a neoplastic origin, tuberculosis, and other infectious etiologies. The particularity of the case consists in a pericardial effusion evolving into cardiac tamponade, for which the pericardiocentesis was guided using echocardiographic, fluoroscopic and radiologic methods, because simple ultrasound-guided drainage was not efficient. **Conclusion:** The superiority of a combined imaging-guided approach in cases of pericardial effusion recommends it as an alternative to a surgical procedure, guided solely by echocardiography, which is often used in cases of unsuccessful drainage of pericardial effusion fluid.

Keywords: pericardiocentesis, cardiac tamponade, myxedema

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CORRESPONDENCE

Ioan Manițiu

Bd. Corneliu Coposu Nr. 2-4,

550245 Sibiu, Romania

Tel: +40 269 215 050

E-mail: ioanmanitiu@yahoo.com

INTRODUCTION

Pericardiocentesis is a medical procedure that is performed for diagnostic or therapeutic purposes, and it consists in draining the pericardial effusion liquid in sterile

conditions.¹ Pericardial effusion is defined as the accumulation of abnormal fluid in the pericardial sac, and it may be caused by several systemic or local diseases. The fluid that accumulates within the pericardial cavity can be clas-

Iulia Cobârje: Bd. Corneliu Coposu Nr. 2-4, 550245 Sibiu, Romania. Tel: +40 269 215 050

Ionuț Bitea: Bd. Corneliu Coposu Nr. 2-4, 550245 Sibiu, Romania. Tel: +40 269 215 050

Radu Cojan: Bd. Corneliu Coposu Nr. 2-4, 550245 Sibiu, Romania. Tel: +40 269 215 050

Andra-Maria Bebeșelea: Bd. Corneliu Coposu Nr. 2-4, 550245 Sibiu, Romania. Tel: +40 269 215 050

FIGURE 1. ECG: Sinus Rhythm, HR = 70 beats per minute, low QRS voltage, left anterior hemi-block, T-wave flattening in the lateral leads.

sified as transudative, exudative, or haemorrhagic.² Massive pericardial effusions that lead to cardiac tamponade are generally caused by tuberculosis, malignant conditions, myxedema, uremia or parasitic infections.

CASE REPORT

We report the case of a 79-year-old female, without any previously known cardiovascular pathology or medications, who presented to the Emergency Room due to a gradual deterioration in her health status. The patient was uncooperative, and anamnesis was undertaken with difficulty. The initial clinical examination revealed a weakened general health condition, cachexia, general pallor of the skin, multiple bruises mainly on the upper and lower limbs, signs of dehydration, generalized muscular hypotonia and a post-traumatic amputation of the 4th and 5th fingers of the right hand. Thoracic examination showed kyphoscoliosis, decreased respiratory movements, the absence of bronchovesicular sounds in the right lower third pulmonary region, and the presence of bilateral, disseminated crepitations. On cardiovascular examination muffled but rhythmic cardiovascular sounds, pericardial friction rub, a heart rate of 70 beats per minute, and blood pressure of 90/50 mmHg were recorded.

The electrocardiogram (ECG), taken at the initial examination, is shown in Figure 1. A postero-anterior thoracic X-ray was performed to assess the origin of the pulmonary clinical findings, and the results showed the presence of a right pleural collection, associated with an

increased cardiac silhouette, indicative of a pericardial effusion (Figure 2).

FIGURE 2. Chest X-ray: Cardiomegaly, illustrating a typical pear-shaped heart, with diffuse outlines, associated with medium right pleural effusion

TABLE 1. Laboratory analyses

Amylase	65 U/L
Total bilirubin	0.45 mg/dl
Creatinine	0.95 mg/dl
Urea	45 mg/dl
Glycemia	88 mg/dl
ASAT	28 U/L
ALAT	12 U/L
INR	0.95
Na	140 mEq/L
K	4.27 mEq/L
Hb	11.1 g/dl
Htc	33.4 %
MCHC	87 fl
MCV	33.2 pg

ASAT – aspartat aminotransferase, ALAT – alanin aminotransferase, INR – international normalized ratio, Hb – Haemoglobin, Htc – Haematocrit, MCHC – medium corpuscular Hb concentration, MCV – medium corpuscular volume

Laboratory blood analyses are shown in Table 1. The results did not reveal any specific modifications, except the presence of a mild anemic condition.

Trans-thoracic echocardiography was carried out in the Emergency Room. The presence of a 19 mm circumferential echo-free space, indicative of pericardial fluid, was recorded at the level of the left ventricular apex at the posterior wall – 25 mm, anterior wall – 12 mm and lateral wall – 10 mm. A second-degree aortic regurgitation and a partial diastolic collapse of the right ventricle and right atrium was also present (Figure 3).

Pericardiocentesis was performed using cardiac ultrasound guidance, resulting in the draining of a small quantity of yellowish, partly haemorrhagic fluid. The patient's general condition did not improve after this procedure. Therefore, pericardiocentesis was undertaken for a second time, on this occasion using fluoroscopic guidance and cardiac ultrasound. One-thousand two-hundred milliliters of sero-haemorrhagic fluid was drained from the pericar-

TABLE 2. Repeated laboratory analyses

Cholesterol	386 mg/dl
Creatinine	0.86 mg/dl
HDL-col	28 mg/dl
LDL-col	303.2 mg/dl
Triglycerides	274 mg/dl
Free T4	0.350 ng/dl
TSH	65.7 U/l
Total proteins	5,9 g/dl
ASAT	95 U/L
ALAT	132 U/L
Hb	8.8 g/dl
Htc	32.1 %
Ac HCV	0,071 coi
Ag HBS	0.385 coi
ESR	23 mm/h
PCR	60 mg/dl
Sputum analysis	Negative
Syphilis	Negative
HIV	Negative

dial space (Figure 4). Fluoroscopic guidance also allowed the positioning of a catheter for continuous drainage of the pericardial fluid, through which another 200 milliliters of sero-haemorrhagic liquid was collected. The patient was stable, both during and after the entire procedure.

A thoracic computed tomography (CT) assessment was performed after the drainage of pericardial fluid. The imaging exposed a minimum quantity of pericardial air and fluid, together with a medium pleural effusion in the right lung, and a small amount of fluid in the basal pleural space of the left lung. Additionally, the proper positioning of the pericardial catheter was confirmed (Figure 5).

Cytological analysis of the pericardial fluid revealed numerous small lymphocytes, and scarcely any neutrophils or mesothelial cells. There was no sign of malignancy. No bacterial growth was observed in any of the bacteriological cultures. Gram staining showed a few mononuclear

FIGURE 3. Transthoracic echocardiography – pericardial effusion, with a "swinging heart" feature.

FIGURE 4. Pericardiocentesis performed by echocardiographic and fluoroscopic guidance

leukocytes and fibrin components, both classified as non-specific.

Later, thoracocentesis was performed, resulting in 400 milliliters of haemorrhagic fluid being drained from the pleural space.

The repeated laboratory analyses are shown in Table 2. The patient had mixed dyslipidemia and an increased level of inflammatory biomarkers. There was an increase in hepatic enzymes, accompanied by an increased severity of the anemic condition. Thyroid hormone levels were suggestive of hypothyroidism. Consequently, an endocrinology consultation was requested, which established the diagnosis of myxedema, and the recommendation of the administration of levothyroxine.

A hematological evaluation of the anemia was also requested, which established the diagnosis of senile vascular purpura and amyloidosis, for which a bone biopsy was recommended, but declined by the patient. The dermatology specialist opined that the cutaneous lesions on the upper and lower limbs were part of Bateman's senile purpura, and concluded that this was caused by an increased vascular fragility.

Later during the hospital stay, the patient showed an improvement of symptoms and a favorable progression with continuing thyroid hormone substitution therapy.

The patient gave informed consent allowing the publication of patient data, and the institution where the patient had been admitted, approved the publication of the case.

DISCUSSION

Pericardial effusion is frequently encountered in myxedema, and it is secondary to increased protein capillary permeability, as well as an altered lymphatic circulation.⁴ The accumulation of myxedema fluid in the pericardial space is a slow process, and can reach critical quantities before the manifestation of clinical signs.⁵ Cardiac tamponade is a rare complication.⁶ Pericardial effusions in myxedema usually evolve silently, without symptoms. Therefore, investigations performed in cases where pericardial fluid accumulates should not rule out an undiagnosed hypothyroidism.^{6,7} Alterations in lipid metabolism that appear in hypothyroidism include a diminished catabolism,

FIGURE 5. Thoracic computed tomography

a reduction in the cholesterol oxidation process, and also a reduced elimination of the cholesterol through the gall bladder. Lipid panel changes are usually an early sign of hypothyroidism. The prognosis of the disease is usually favorable, with a tendency toward remission of the effusions within a few months of the administration of substitution hormone therapy.^{8,9}

Patients should be periodically followed-up clinically, and hormonal and echocardiography tests undertaken to confirm the decrease in the accumulation of pericardial fluid.

The particularity of the present case report is a patient with a pericardial effusion evolving into cardiac tamponade, in which cardiac ultrasound-guided pericardiocentesis was insufficient in achieving fluid drainage. A combination of echocardiographic, fluoroscopic and radiologic methods allowed the guidance and positioning of the needle and the evacuation catheter into the pericardial space. The superiority of a combined imaging approach in cases of pericardial effusion recommends it as an alternative to a surgical procedure, guided solely by echocardiography, which is often used in cases of unsuccessful drainage of pericardial effusion fluid.

CONFLICT OF INTEREST

None declared.

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