A huge amount of pericardial fluid: determining consecutive steps in pulmonary arterial hypertension diagnosis and treatment

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A huge amount of pericardial fluid: determining consecutive steps in pulmonary arterial hypertension diagnosis and treatment

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Short title: A huge amount of pericardial fluid in pulmonary arterial hypertension

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A 41-year-old female with systemic scleroderma (SSc) was admitted to the reference pulmonary hypertension center [1] due to severe fatigue and dyspnea in NYHA class IV that started about 6 months before admission. The transthoracic echocardiography revealed a significant amount of fluid (30 mm) around the right atrium and ventricle. Concurrently, dilatation of the pulmonary artery, the right atrium (RA area 25 cm$^2$), and the right ventricle (RVD1 52 mm) with extremely high estimated right ventricle systolic pressure (RVSP 103 mm Hg) were revealed (Figure 1). Laboratory tests identified an elevated NT-proBNP level (4579 pg/ml). Based on these data, pulmonary arterial hypertension (PAH) in the course of connective tissue disease (CTD) was hypothesized. We assumed that pericardial fluid did not result in tamponade because of elevated right heart pressures. However, it seemed to constitute a contraindication to PAH-specific treatment due to high risk of tamponade after a sudden pressure reduction [2]. Percutaneous pericardiocentesis was unavailable due to extreme obesity (BMI 41 kg/m$^2$) and limited amount of fluid around the apex of the heart (supplementary material Figure S1). The patient was referred to the Cardiac Surgery Department, where surgical drainage was required by a pericardial window placement. The cardiosurgical intervention provided drainage of 1000 ml of serous fluid and hemodynamic stability recurrence. Meanwhile, iloprost and sildenafil were administered during the periprocedural period and mechanical ventilation, which reduced pulmonary artery pressure and allowed extubation on the third day after the procedure. In terms of diagnosis, right heart catheterization (RHC) was performed, and it confirmed severe non-vasoreactivity PAH [mean pulmonary artery pressure (mPAP) 56 mm Hg; pulmonary vascular resistance 9.64 Wood units (mm Hg/l min$^{-1}$); negative vasoreactivity test with iloprost] (Figure 1). The patient received specific medical therapy including sildenafil, bosentan, and treprostinil. Symptoms reduced to II class of WHO after implemented treatment. PAH is a multicausal disease related to significant mortality. The prevalence of pericardial effusion among patients with PAH has
been reported to be 26% [3]. A greater amount of fluid may occur in patients with CTD. However, this rarely exceeds 10–20 mm [4]. The presence of pericardial effusion has been identified as a risk factor for cardiac death [5]. Patients with a small pericardial effusion had similar survival to those without effusion, but patients with PAH who had a moderate to large pericardial effusion had a significantly lower survival [5]. In our patient, we observed large one with the characteristics of a transudative effusion. The etiology of effusion was combined and superposed on PAH with SSc. We were aware that medical therapy, including endothelin receptor antagonists, phosphodiesterase type 5 inhibitors, and prostacyclin derivatives, might have improved the prognosis of the patient. However, crucial decisions made to ensure safety and effectiveness were related to the proper order of diagnostics and treatment. First, cardiosurgical intervention along with life-saving PAH treatment and then RHC and PAH-specific multiagent therapy. Gradually administered drugs helped to avoid a sudden decrease in mPAP, which could have caused hemodynamic instability.

References


Figure 1 Flow-chart: consecutive steps of the diagnosis and treatment. A, B. Transthoracic echocardiography (TTE) at admission; C, D. TTE at 1-month follow up. E. Right heart catheterization; RVSP - right ventricular systolic pressure; PA - systolic and diastolic pulmonary artery pressure; mPAP - mean pulmonary artery pressure; RA - right atrium