INTERVENTIONAL CARDIOLOGY PERSPECTIVES

Inter Cardio Pers

DOI: 10.4274/intercardiopers.2025.2025-9-2

CASE REPORT

Constrictive Pericarditis as a Rare Cause of Recurrent Miscarriage

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ABSTRACT

Constrictive pericarditis, a rare cause of recurrent pregnancy loss, is a clinical entity characterized by a rigid, fibrotic, thickened pericardium and causes both right and left ventricular diastolic filling deterioration. The underlying etiology is mostly idiopathic, followed by pericardial injury and metabolic and connective tissue diseases. It may follow any pericardial inflammation or effusion, leading to the ultimate development of chronic fibrotic scar tissue and calcification. Endometriosis is a clinical condition defined as functional endometrial glands and stroma outside the uterine cavity. We presented a case of constrictive pericarditis that developed one year after the clinical diagnosis of a pericarditis attack in a 32-year-old woman with recurrent pregnancy loss and endometrioma cyst surgery.

Keywords: Constrictive pericarditis, heart failure, miscarriage

INTRODUCTION

Constrictive pericarditis is characterized by rigid, fibrous, or calcific constrictive thickening of the pericardium, which leads to heart failure. The underlying etiology is often idiopathic (presumably viral), followed by causes such as cardiothoracic surgery and radiation therapy.[1] Pericardial effusion is the most common symptom of pericardial disease during pregnancy. Detected pericardial effusion is generally well-tolerated and often resolves spontaneously postpartum. Acute pericarditis is the second most common cardiac disease requiring medical treatment during pregnancy, while constrictive pericarditis is a rare condition and a potential cardiac cause of recurrent pregnancy loss that is often overlooked. Cardiovascular diseases are a significant complication that should not be overlooked during pregnancy.

CASE REPORT

A 32-year-old woman presented to our cardiology outpatient department with dyspnea on exertion, atypical chest pain, and palpitations. Her medical history revealed that a 6 cm endometrioma was removed from her left ovary 1 year prior, followed by an acute pericarditis attack 2 weeks after the operation. The patient experienced recurrent pregnancy loss in the following period. Her white blood cell count (WBC) and C-reactive protein (CRP) values were slightly increased, and minimal pericardial effusion was observed on echocardiogram. The patient stated that she took medications for approximately a week, after which her complaints subsided; however, she had no follow-up visit. On physical examination, her heart rate was 96 beats/min and regular, and her blood pressure was 110/60 mmHg, with a pulsus paradoxus of 20 mmHg. Additionally, a pericardial knock was auscultated. Basic electrocardiogram showed non-specific T-wave changes. Transthoracic echocardiogram revealed a left ventricular systolic ejection fraction of 45% with inferior and posterolateral wall abnormalities, moderate bi-atrial dilatation, and diastolic septal bounce. Pericardial thickness was 19 mm on the apical four-chamber view, with markedly increased echogenicity, particularly in the mitral annular lateral wall (Figures 1A, B). The inferior vena cava measured 25 mm, with <50% collapsibility during inspiration. Mitral inflow demonstrated an early/atrial ratio of 2.13. Respiratory variability was noted in mitral (>25%) inflow on Doppler echocardiography (Figures 2A, B). On tissue Doppler, the mitral annular septal E' velocity was 17 cm/sec, and the lateral E' velocity was 7 cm/sec, indicating a constrictive physiology (Figures 3A, B). Laboratory findings were normal for WBC, erythrocyte sedimentation rate, CRP, and liver, kidney, and thyroid functions. Testing for connective tissue disease was negative, including antinuclear antibody, rheumatoid factor, and other autoimmune antibodies. Urine analysis was unremarkable. Chest radiography showed egg-shell calcification around the heart on the lateral view (Figure 4A). Chest computed tomography revealed prominent calcified pericardium thickening, particularly around the right ventricular

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Cite as: Demir M, Akcan S, Özcan AV. Constrictive pericarditis as a rare cause of recurrent miscarriage. *Inter Cardio Pers.* [Epub Ahead of Print].

Received: 22.09.2025
Accepted: 25.11.2025
Epub: 15.12.2025

and left ventricular posterior walls (Figures 4B-D). The cardiac team decided to treat the patient with pericardiectomy. The patient underwent off-pump surgery with an uneventful recovery. Video 1 shows the intraoperative view of the calcified pericardium, which felt like a rock. Pathological examination of the surgical specimen revealed a fibrotic, thickened, and calcified pericardium. Our patient, who had a successful pregnancy after the operation, was followed up for 3 years. Informed consent was obtained from the patient.

DISCUSSION

Similar to right heart failure, chronic constrictive pericarditis causes recurrent pregnancy losses, decreased cardiac output, venous congestion, and decreased uteroplacental flow. Constrictive pericarditis is the final stage of pericardial inflammation, characterized by thickening of the pericardium that limits ventricular filling and results in heart failure.[2,3] The most common causes are idiopathic causes, previous cardiac surgery, radiation therapy, and connective tissue disorders.[1,4,5] In developing countries, tuberculosis remains the most common cause of constrictive pericarditis.[6] Recurrent miscarriage (RM) is defined as the loss of three or more consecutive pregnancies before 22 weeks of gestation. This condition affects 0.5–3% of all fertile couples.[7] In patients with heart failure, decreased perfusion and venous congestion are the most crucial determinants of liver and kidney dysfunction.[8,9] Similar hemodynamic interactions may occur between the heart and placenta. The limited autoregulatory capacity of the uteroplacental circulation indicates that placental function is directly dependent on maternal cardiac performance.[10] The relationship between maternal hemodynamics and placental function is well-established, having been studied in pregnant women with heart disease and those with pre-eclampsia and in healthy women.[11] Compared with healthy pregnant women, the association between maternal cardiac dysfunction (particularly right ventricular dysfunction) and impaired uteroplacental circulation is clearly shown in a cohort of women with congenital heart disease (CHD) before and during pregnancy; the association is also evident in those with specific

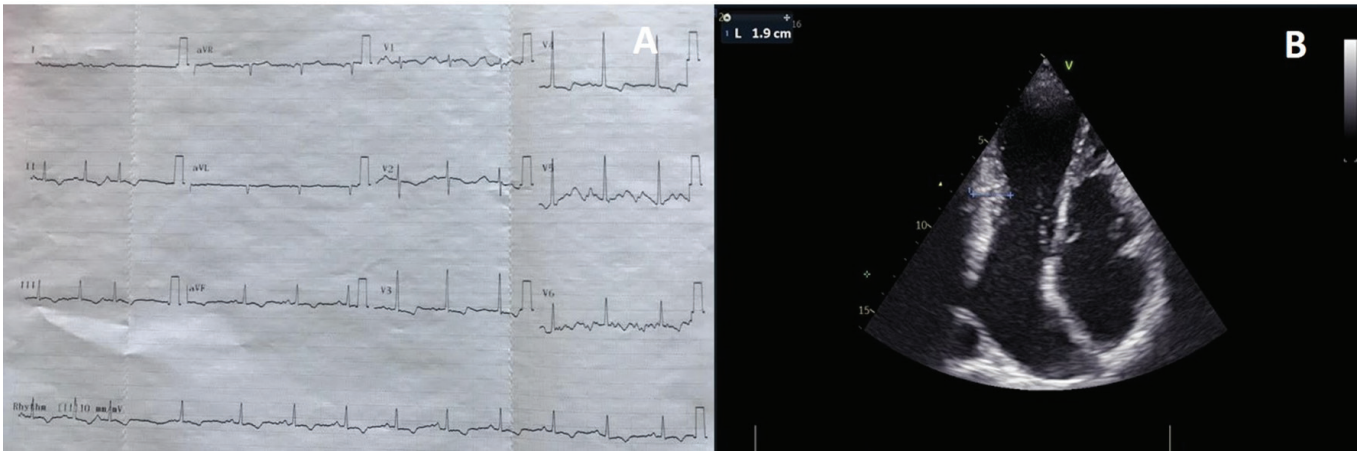

Figure 1. (A) Electrocardiography/electrocardiogram showed non-specific T-wave changes. (B) The pericardial thickness was 19 mm on the apical-4-chamber view

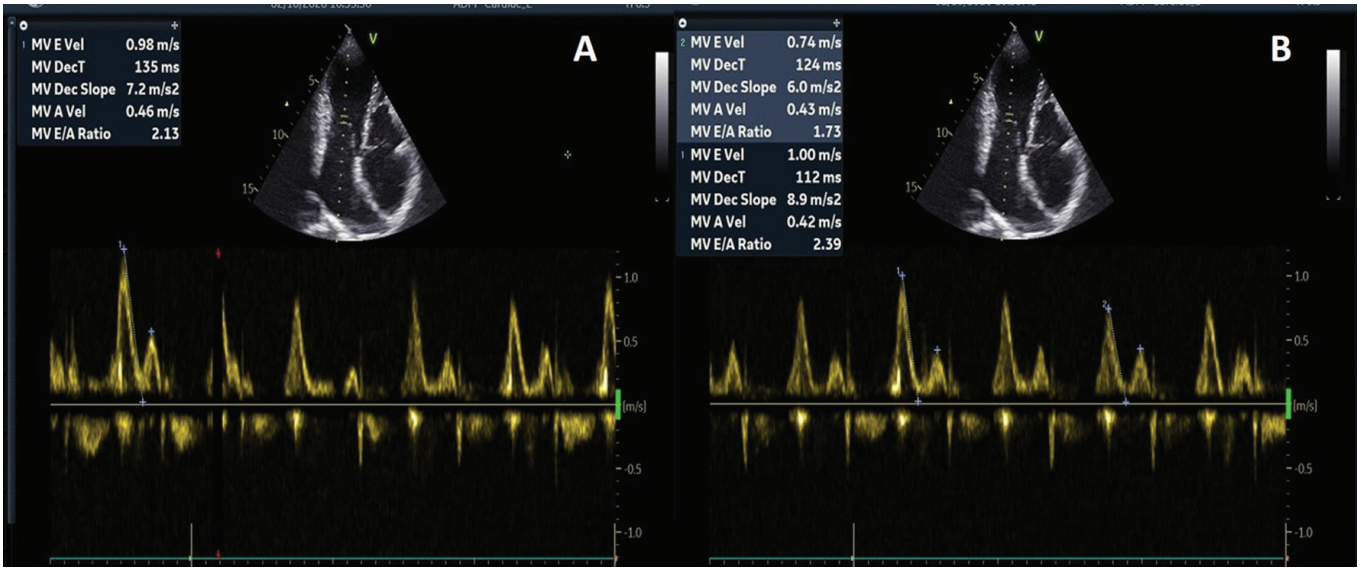

Figure 2. (A) E/A ratio was 2.13 on mitral inflow doppler. (B) Respiratory variability was observed in mitral (>25%) inflow on doppler echocardiography
E/A: Early/atrial

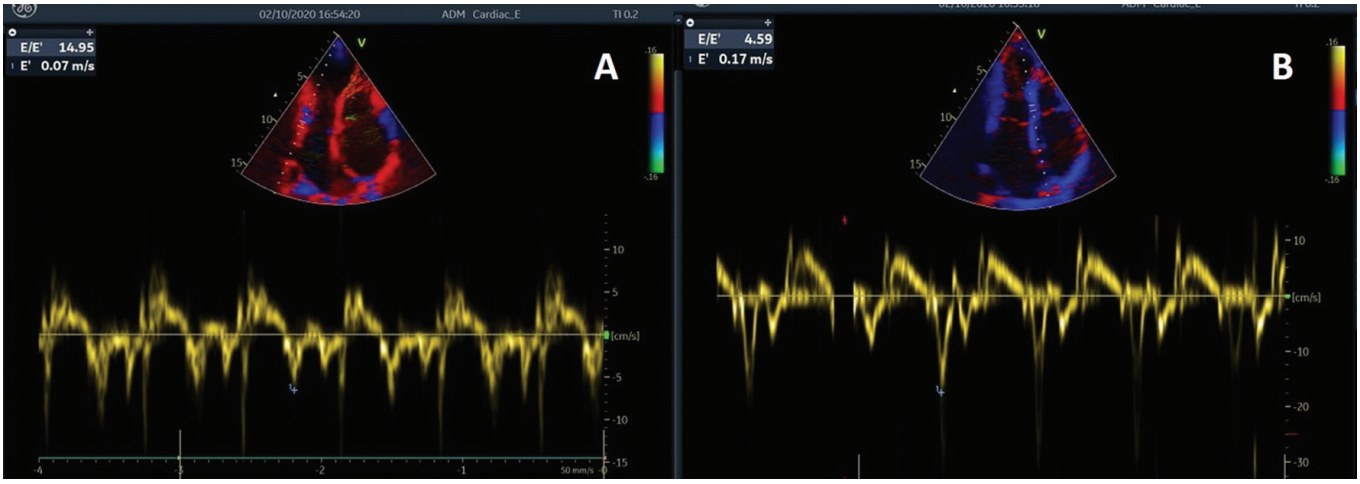

Figure 3. (A) Mitral lateral E' velocity was 7 cm/sec. (B) Mitral annular septal E' velocity was 17 cm/sec on tissue doppler

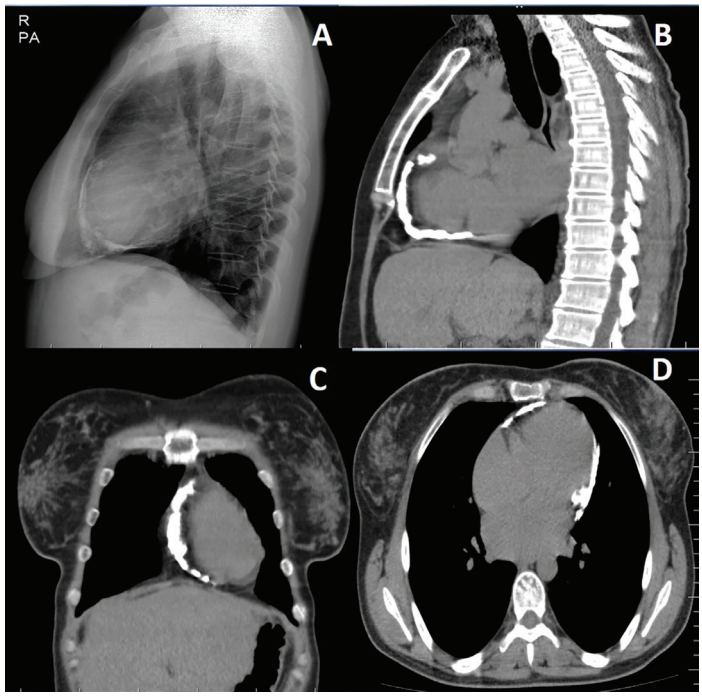

Figure 4. (A) Lateral chest X-ray shows egg-shell pericardial calcification around the heart. (B-D) Transverse computed tomography with sagittal and coronal reconstructions shows diffuse pericardial calcified thickening.

types of CHD, such as tetralogy of Fallot.[11,12] Chronic constrictive pericarditis, which produces a clinical picture similar to right heart failure, causes late recurrent pregnancy losses, decreased cardiac output, venous congestion, and decreased uteroplacental flow. Our patient experienced three miscarriages before diagnosis: the first at 10 weeks of a twin pregnancy, the second at 20 weeks, and the last at 14 weeks. Endometriosis is the presence of endometrial glands and stroma outside the uterine cavity. The thoracic cavity is the second most common area of involvement following the abdominopelvic cavity.[13,14] Moreover, spontaneous, recurrent pneumothorax is the most well-known type of catamenial pneumothorax (CP); it occurs in women of reproductive age without underlying lung disease and is associated with their menstrual cycle.[15] Symptoms typically appear at different times of the cycle (i.e., before, during, or after menstruation) and can last from a few hours to 7 days. CP is the most common manifestation of thoracic endometriosis syndrome, which includes hemothorax, hemoptysis, pulmonary nodules, and pneumothorax.[16,17] Several hypotheses regarding the involvement of thoracic tissues exist, including retrograde menstruation, transdiaphragmatic air passage, physiological factors, metastasis, coelomic metaplasia, vascular embolization, vasculogenesis, and immune dysfunction.[18] In accordance with the coelomic metaplasia theory, endometriosis tissue can be found in the pericardium because pericardial tissue is also mesothelial cell-derived.[19] Based on the current patient's medical

history, it was hypothesized that endometriosis caused the constrictive pericarditis; however, this diagnosis has not been supported pathologically. The primary cause of the patient's constrictive process was assessed as inadequate treatment and a lack of follow-up during the pericardial effusion attack. The patient should have received longer medical treatment and should have been followed up on more closely.

CONCLUSION

Cardiovascular diseases can complicate pregnancy. Young women with acute pericarditis should be monitored closely, as inadequate treatment can lead to constrictive pericarditis, which may rarely cause RM.

Informed Consent: Informed consent was obtained from the patient.

Authorship Contributions: Concept: S.A., A.V.Ö., Data Collection or Processing M.D., Literature Search: S.A., A.V.Ö., Writing: M.D.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

Video 1. Intraoperative view of stony pericardium
https://youtube.com/shorts/FG-fyH5D3Ws

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