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Case Report

Non-Coronary Left Ventricular Pseudoaneurysm Diagnosed During the Evaluation of Pericarditic Chest Pain in a Young Woman in Benin: A Case Report

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Abstract

Left ventricular (LV) pseudoaneurysm is a contained rupture of the myocardial wall sealed off by the pericardium. It usually complicates myocardial infarction or cardiac surgery, whereas non-coronary forms are exceptional, particularly in young patients, and their etiology is often difficult to establish. We report the case of a 27-year-old woman with an unspecified childhood heart disease, admitted for prolonged pericarditic chest pain associated with fever, cough, weight loss and New York Heart Association (NYHA) class III dyspnea. Examination showed sinus tachycardia at 100 beats per minute, a body mass index of 18.97 kg/m^2 and isolated jugular venous distension. The electrocardiogram showed PR segment depression, and the chest radiograph showed cardiomegaly (cardiothoracic ratio 0.60) with a bulge of the left middle cardiac border. Transthoracic echocardiography, performed for the work-up of this chest pain, revealed a communicating LV pseudoaneurysm of the basal anterolateral wall (55 mm in diameter, 28 mm neck, no thrombus) and a moderate fibrinous pericardial effusion. Cardiac magnetic resonance imaging confirmed the diagnosis (sac of 62 × 49 mm) and showed no myocardial enhancement suggestive of myocarditis. Laboratory tests showed multifactorial anemia (hemoglobin 8.3 g/dL) with signs suggestive of hemolysis and a C-reactive protein level of 96 mg/L; blood cultures and the tuberculosis work-up were negative. The patient received high-dose aspirin and weight-adjusted colchicine, as first-line therapy for acute pericarditis, and a blood transfusion, with a favorable course after two weeks of hospitalization. Surgical repair was indicated, but cardiac surgery was not available in the country at that time. While awaiting a state-organized cardiac surgery mission, the patient was lost to follow-up, reportedly had four episodes of decompensated heart failure, and died of sudden circulatory collapse in October 2024, approximately nine months after diagnosis. No autopsy was performed; rupture of the pseudoaneurysm is suspected but remains a hypothesis. The etiology remains undetermined, and a congenital and/or infectious (pericardial) origin is possible but unproven. Echocardiography is the first-line examination, and because of the risk of rupture, surgical repair is recommended even in asymptomatic patients and should be made accessible in low-resource settings.

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Keywords

Pseudoaneurysm, Left Ventricle, Young Adult, Echocardiography, Cardiac Magnetic Resonance, Benin, Pericarditis

1. Introduction

Left ventricular (LV) pseudoaneurysms, also called false aneurysms, are rare. They result from a contained rupture of the ventricular wall sealed by adherent pericardium and most often complicate myocardial infarction or cardiac surgery [1, 2]. So-called non-coronary forms have been described in young patients [3]. These forms are even rarer and may have a congenital, traumatic, infectious or inflammatory etiology [3, 4]. In a large clinical series, nearly half of cardiac pseudoaneurysms were discovered incidentally, but the diagnosis may also be made during the investigation of non-specific symptoms or in the course of complications [1, 4, 5]. We report the case of a young woman in whom an LV pseudoaneurysm was discovered during the investigation of pericarditic chest pain and in whom the etiology remains uncertain.

2. Case Presentation

2.1. Clinical Presentation

In January 2024, a 27-year-old woman, with no notable medical history apart from an unspecified heart disease in childhood (reported by the patient, without dyspnea and without further details), was admitted to the University Clinic of Cardiology of the Hubert Koutoukou Maga National University Hospital Center for precordial tugging chest pain, without radiation, of 6/10 intensity and prolonged duration. The pain was aggravated by cough, the supine position and deep inspiration, and relieved by sitting and leaning forward. It was associated with a fever of 38 ℃, a non-productive cough, unquantified weight loss, asthenia, anorexia and dyspnea of NYHA class III.

On admission, blood pressure was 105/60 mmHg in both arms, heart rate 100 beats per minute, respiratory rate 24 breaths per minute and temperature 37.1 ℃. Her weight was 41 kg and her height 147 cm, giving a body mass index of 18.97 kg/m^2. Cardiovascular examination showed isolated spontaneous jugular venous distension and regular heart sounds without a murmur. Examination of the other systems was normal.

2.2. Investigations

The 12-lead electrocardiogram showed regular sinus tachycardia at 100 beats per minute with PR segment depression (Figure 1).

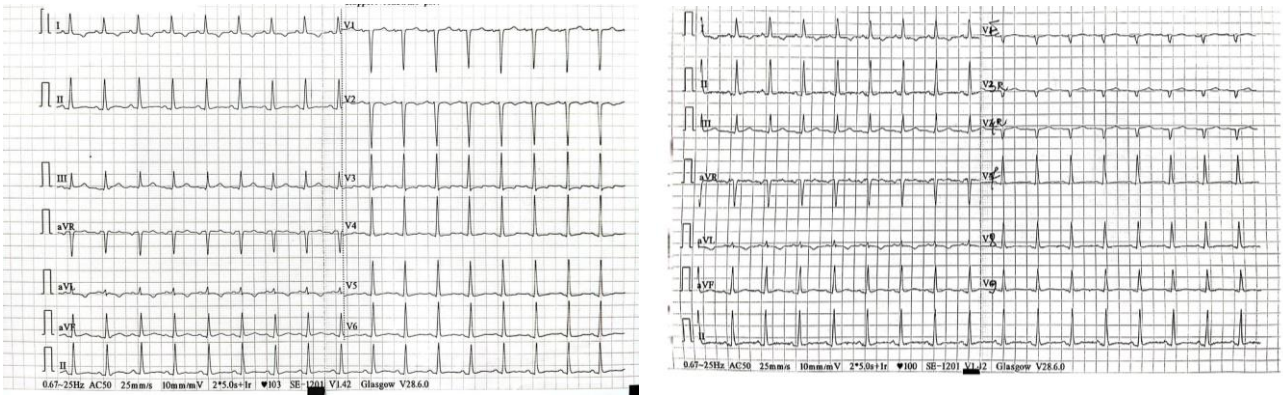


Figure 1. *Twelve-lead electrocardiogram showing regular sinus tachycardia at 100 beats per minute and PR segment depression (A and B: two tracings).*

The posteroanterior chest radiograph showed cardiomegaly with a cardiothoracic ratio of 0.60 and a prominence of the left middle cardiac arc (Figure 2).

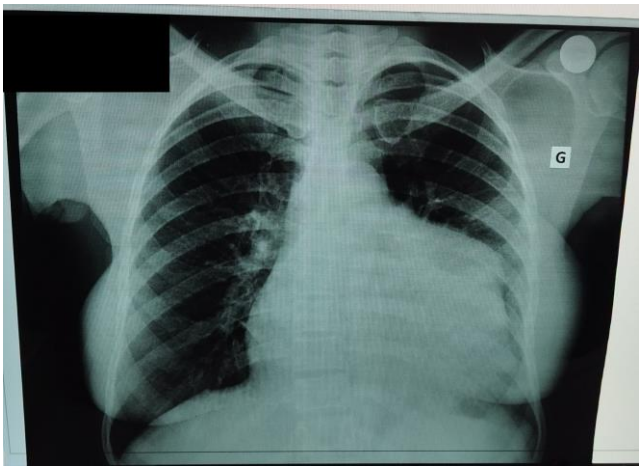


Figure 2. *Posteroanterior chest radiograph showing cardiomegaly (cardiothoracic ratio 0.60) and a bulge of the left middle cardiac border, consistent with the pseudoaneurysm sac. G: left side.*

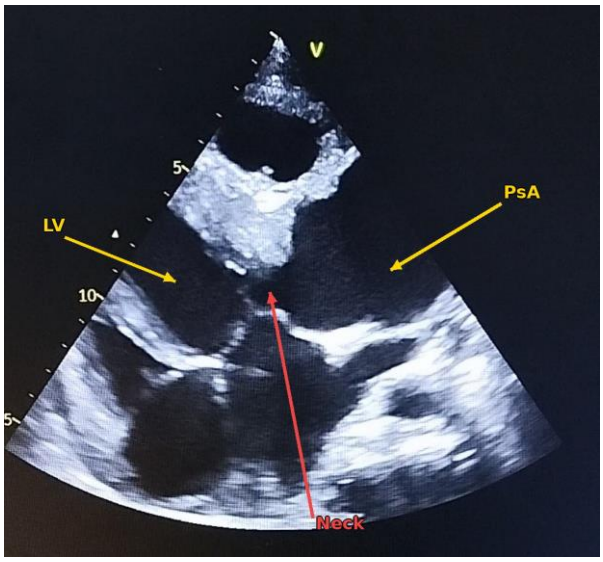


Figure 3. *Transthoracic echocardiography, apical four-chamber view, showing the left ventricular pseudoaneurysm (PsA, arrow) communicating with the left ventricle (LV) through a 28-mm neck (Neck, red arrow); maximal sac diameter 55 mm. LV: left ventricle; PsA: pseudoaneurysm.*

Transthoracic echocardiography, performed as part of the work-up of this pericarditic chest pain, showed a communicating LV pseudoaneurysm arising from the basal portion of the anterolateral wall of the left ventricle. It measured 55 mm in diameter, with a neck of 28 mm (ratio of neck diameter to maximal sac diameter of approximately 0.51), and no intrasaccular thrombus was seen. The wall of the sac was thin and irregular, and color Doppler showed bidirectional flow across the neck between the left ventricle and the sac (velocities were not measured). A moderate fibrinous pericardial effusion (17 mm lateral to the left ventricle) was also noted, with no significant variation of transvalvular flows and no sign of poor tolerance (Figure 3, apical four-chamber view). The left ventricular ejection fraction (LVEF) was 63% (Simpson biplane method), and there was no significant valvular disease.

Cardiac magnetic resonance (CMR) imaging confirmed the LV pseudoaneurysm, showing an aneurysmal sac attached to the left ventricle and measuring 62 × 49 mm (Figure 4). The diagnosis of pseudoaneurysm rather than true aneurysm was supported by an abrupt interruption of the myocardium at the level of the neck, a sac wall devoid of myocardium and late gadolinium enhancement of the pericardium, features that discriminate false from true aneurysms [6, 7]. There was no late gadolinium myocardial enhancement suggestive of myocarditis.

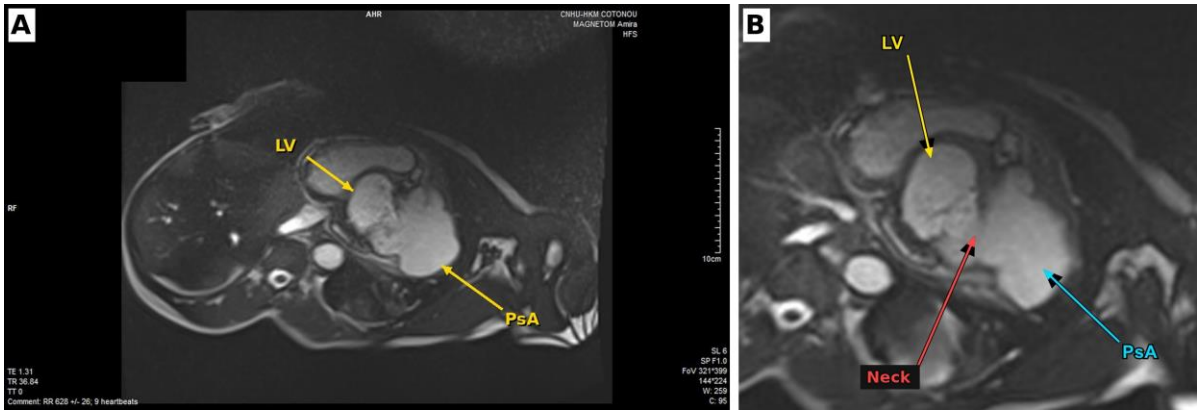


Figure 4. *Cardiac magnetic resonance axial cine images showing the left ventricular pseudoaneurysm. (A) Pseudoaneurysm (PsA, arrow; 62 × 49 mm) attached to the left ventricle (LV). (B) Magnified view showing the neck (red arrow) connecting the left ventricle (yellow arrow) to the pseudoaneurysm sac (blue arrow). LV: left ventricle; PsA: pseudoaneurysm.*

Laboratory tests showed anemia (hemoglobin 8.3 g/dL) of multifactorial origin. Hemolysis was suggested by an elevated unconjugated (free) bilirubin level of 40 μmol/L. Other likely contributing factors were systemic inflammation, with a C-reactive protein level of 96 mg/L, and undernutrition (body mass index 18.97 kg/m^2); serum protein levels and iron status were

not assessed. Regarding the etiological work-up, blood cultures were negative and the work-up for tuberculosis was negative.

2.3. Management and Outcome

In view of the clinical, electrocardiographic and echocardiographic features of acute pericarditis (pericarditic chest pain, fever, PR segment depression and fibrinous pericardial effusion), the patient received guideline-recommended first-line anti-inflammatory therapy for acute pericarditis: high-dose aspirin (1000 mg every 8 hours) combined with colchicine at a weight-adjusted dose (0.5 mg once daily, as her body weight was below 70 kg) [8]. A blood transfusion was given for the anemia. Hemodynamic and respiratory status and the pericardial effusion remained stable, and the clinical course was favorable under treatment; the patient was discharged after two weeks of hospitalization. Surgical repair was indicated, but it could not be performed, as cardiac surgery was not available in the country at that time; the patient was to be operated on during the next state-organized cardiac surgery mission, as such missions are held only intermittently [9].

After discharge, the patient was lost to follow-up, and no control examinations, including echocardiography, could be performed. When she was seen again in October 2024, her relatives reported four episodes of decompensated heart failure, treated in private outpatient clinics; these episodes could therefore not be documented. She died during this hospitalization for heart failure in October 2024, approximately nine months after the diagnosis and a few weeks before the planned cardiac surgery mission, after a sudden circulatory collapse. No autopsy was performed, so the cause of death could not be established. Rupture of the pseudoaneurysm was suspected because of the sudden collapse, but this remains a hypothesis; death from refractory heart failure or ventricular arrhythmia cannot be excluded.

3. Discussion

LV false aneurysms may remain asymptomatic for a long time or present with non-specific symptoms such as chest pain, dyspnea or heart failure; in one large series, nearly half were discovered incidentally [4]. In our patient, the pseudoaneurysm was not an incidental finding: it was identified during the echocardiographic work-up of pericarditic chest pain. Whether the pericarditis was a cause, a consequence or a coincidental association of the pseudoaneurysm cannot be determined. Echocardiography with Doppler is the first-line examination [3]. It usually establishes the diagnosis and helps to rule out a true aneurysm. Unlike true aneurysms, whose wall contains myocardium or fibrotic scar and which have a wide neck, pseudoaneurysms have a wall devoid of myocardium, formed by pericardium and thrombus, and a narrow neck; a ratio of neck diameter to maximal sac diameter below 0.5 favors a pseudoaneurysm [10-12]. In our patient, this ratio was approximately 0.51, close to the threshold, so that echocardiography alone was not fully discriminant. CMR, which can show an abrupt interruption of the myocardium at the neck and late enhancement of the pericardium forming the sac wall, is therefore valuable to confirm the diagnosis [6, 7], and cardiac computed tomography is an alternative [4].

The main cause of LV pseudoaneurysm is myocardial infarction: rupture of the necrotic free wall is contained by adherent pericardium [2, 7]. In the review by Frances et al. of 290 cases, myocardial infarction accounted for 55% of cases, cardiac surgery for 33%, chest trauma for 7% and infection for 5%, and untreated pseudoaneurysms carried a 30–45% risk of rupture [1]. Non-coronary etiologies are more frequently found in young patients, as in our patient [3]. LV false aneurysms may also be secondary to infectious diseases: bacterial endocarditis with abscess (notably of the mitral annulus), purulent pericarditis and septicemia [13, 14].

In our case, the etiology remains undetermined, and the following hypotheses must be considered with caution. An infectious or inflammatory process involving the pericardium is possible, given the concomitant pericarditis, but blood cultures and the work-up for tuberculosis were negative, no histological evidence was obtained, and the pericarditis may equally have been a reaction to the pseudoaneurysm itself. A congenital origin is also possible, but the unspecified heart disease reported in childhood could not be documented. Pseudoaneurysms have been described after surgical ligation of a ductus arteriosus, although such cases are rare and their mechanism is not fully understood [15]; our patient, however, had no history of cardiac surgery. Finally, without histological examination, a congenital LV aneurysm or diverticulum cannot be formally excluded.

The pseudoaneurysm may also be secondary to an unrecognized chest trauma in childhood, since the interval between the trauma and the onset of symptoms varies from five days to 20 years [16, 17]. Delayed post-traumatic LV pseudoaneurysms have recently been reported in young women [4, 18], but no history of chest trauma was reported by our patient.

The hemolysis observed in our patient, suggested by an elevated unconjugated bilirubin level, is unusual. Mechanical hemolysis related to turbulent, bidirectional flow across the neck of the pseudoaneurysm is a possible explanation, but it could not be demonstrated, and the anemia was considered multifactorial, with contributions from systemic inflammation and probable undernutrition.

Regarding management, surgical repair is recommended even in asymptomatic patients. Surgical exclusion of the sac with closure of the neck, directly or with a patch, is the reference treatment, whereas conservative management is generally reserved for patients at prohibitive surgical risk [2, 11]. In our patient, the absence of surgery, due to the unavailability of cardiac surgery in the country at that time, was followed by recurrent heart failure and death within approximately nine months; although the cause of death was not confirmed, rupture of the pseudoaneurysm, which is the complication that

surgical repair is meant to prevent, is a plausible hypothesis. This outcome illustrates the consequences of limited access to cardiac surgery in sub-Saharan Africa, where cardiac surgery centers are scarce, and patients often depend on intermittent surgical missions [9].

This report has several limitations. The diagnosis rests on imaging only, since no histological examination was available, and the etiological work-up was incomplete, so that the congenital, infectious and inflammatory hypotheses could not be confirmed or excluded. Neither computed tomography nor coronary imaging was performed. The work-up of the anemia was incomplete (iron status and serum protein levels were not assessed), and the patient was lost to follow-up, so that the episodes of decompensated heart failure are known only from her relatives. The cause of death was not confirmed, since no autopsy was performed. The interest of this report lies in the rarity of a non-coronary LV pseudoaneurysm in a young patient, its discovery during the investigation of pericarditic chest pain, and its documented natural course in the absence of surgical treatment.

4. Conclusions

Non-coronary LV pseudoaneurysm is an uncommon condition. It mainly affects young patients, and its etiology may be inflammatory, infectious, traumatic or congenital, but often remains undetermined, as in our patient. The clinical presentation, the electrocardiogram and the chest radiograph may point to the diagnosis, but transthoracic echocardiography remains the examination of choice, and CMR is useful to confirm it. Because of the risk of rupture, surgical repair is recommended, and in our patient its absence was followed by recurrent heart failure and death, the cause of which could not be confirmed.

Abbreviations

CMR	Cardiac Magnetic Resonance
LV	Left Ventricular
LVEF	Left Ventricular Ejection Fraction
NYHA	New York Heart Association
PsA	Pseudoaneurysm

Author Contributions

Carmel Gloria Abatti: Writing – review & editing
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Borelle Padonou: Writing – review & editing
F élicit é Agbayi: Writing – review & editing
Fustel Sossa: Writing – review & editing
Tibaud Ebessa: Writing – review & editing
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Francis Soummonni: Writing – review & editing
David Dossou: Writing – review & editing
Xavier Fadonougbo: Writing – review & editing
Philippe Agbalika: Writing – review & editing
Murielle Hounkponou: Writing – review & editing
Djidjoho Jo ël Arnaud Sonou: Writing – review & editing
L éopold Hou étondji Codjo: Conceptualization, Writing – original draft, Writing – review & editing

Data Availability Statement

The data is available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

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