Annals of Case Reports
Schwarz J, et al. Ann Case Rep: 10: 102302
www.doi.org/10.29011/2574-7754.102302
www.gavinpublishers.com

OPEN ACCESS

GAVIN PUBLISHERS

Case Report

Treatment of Cardiac Tamponade in Adulthood Secondary to a Congenital Coronary Fistula – A Multidisciplinary Approach

Jonah Schwarz[1], Robert Balan[1*], Kerstin Borgmann[2], Stanimir Georgiev[2], Andreas Eicken[2], Parwis Massoudy[1]

[1]Department of Cardiac Surgery, Klinikum Passau, Passau, Germany

[2]Clinic for Congenital Heart Diseases and Pediatric Cardiology, German Heart Center Munich, Munich, Germany

***Corresponding author:** Robert Balan, Department of Cardiac Surgery, Klinikum Passau, Innstrasse 76, 94032 Passau, Germany

Citation: Schwarz J, Balan R, Borgmann K, Georgiev S, Eicken A, et al. (2025). Treatment of Cardiac Tamponade in Adulthood Secondary to a Congenital Coronary Fistula - A Multidisciplinary Approach. 10: 2302. DOI:10.29011/2574-7754.102302

Received: 24 May 2025; **Accepted**: 28 May 2025; **Published**: 30 May 2025

Abstract

We report the case of acute and life-threatening pericardial tamponade. A coronary arteriovenous malformation and a large aneurysm were found responsible. In a multidisciplinary approach, the patient's pericardial tamponade was surgically released and the patient's coronary artery fistulas thereafter treated interventionally in a staged fashion.

Keywords: Coronary Fistula; Congenital; Cardiac Surgery; Cardiac Tamponade; Myocardial Ischemia.

Introduction

Most coronary artery fistulas are small and patients stay asymptomatic. Among the potential sequelae of coronary artery fistulas, such as chronic myocardial ischemia and angina, congestive heart failure, cardiomyopathy, myocardial infarction, pulmonary hypertension, and endocarditis, rupture is rare [1]. The description of rupture of coronary artery fistulas in the literature is anecdotal. If undiagnosed during life, the condition may only be discovered postmortem [2]. Surgical closure of fistulas has been described, especially in emergent settings [3]. Interventional closure is well established, especially in elective settings [4].

In the present emergent case, we describe a multidisciplinary approach of surgical release of a cardiac tamponade and staged interventional closure of multiple coronary artery fistulas feeding a large aneurysm draining into the pulmonary artery.

Case presentation

On her car ride home, a 58-year-old female patient suddenly felt dizzy, nauseous and fatigued. She called emergency services and was transferred to our hospital. In our emergency room, the patient's blood pressure was 72/55 mm Hg, her heart rate was 89 beats/min. The patient was pale, with cold sweats and had soiled herself. An emergency CT-angiogram without ECG-triggering was performed to rule out aortic dissection. Instead, the examination showed a 2.5 cm circular pericardial effusion. Besides, a 4x5 cm aneurysm was detected, a coronary vessel malformation was suspected (Figure 1).

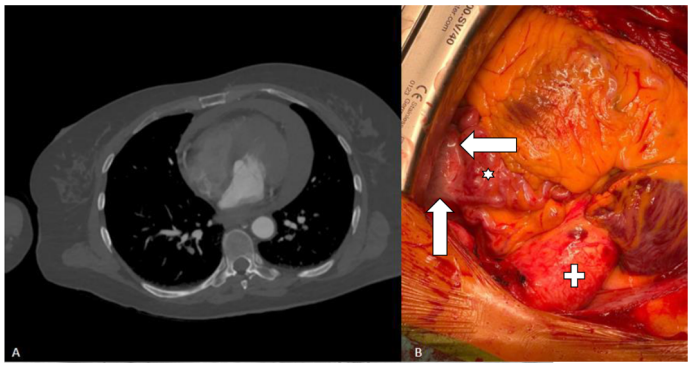

Figure 1: (A) Emergent chest-CT-scan showing the pronounced pericardial effusion; **(B)** Photograph taken during surgery after release of pericardial effusion from the pericardial cavity. Arrows show the margin of the aneurysm. Asterisk shows dilated fistulas. Cross indicates the ascending aorta.

During the examination, the hemodynamic situation further deteriorated, even under intravenous epinephrine and norepinephrine administrations. In this situation, she reported the diagnosis of a coronary arterial malformation some 40 years ago. Under suspicion of a bleeding vessel malformation, an emergent open sternotomy procedure was planned and performed. Approximately 700 ml of hemorrhagic pericardial effusion were drained from the pericardial cavity, hemodynamic stability promptly recurred. Ventrally to the left auricle and cranially to the right ventricle, multiple enlarged vessels on the surface of the heart were found neighboring an aneurysm (Figure 2), which, upon palpation, seemed to have systemic blood pressure. The heart was thoroughly inspected for active bleeding, which could, however, not be identified. Therefore, the decision was made, to go for further diagnosis of the suspected underlying arteriovenous fistula and then plan the best treatment strategy. Pericardial and mediastinal tube drains were installed, the pericardium and sternum were closed. The patient was transferred to the intensive care unit in stable hemodynamic conditions and could be extubated early. The patient underwent an ECG triggered CT-angiogram, which showed coronary fistulas arising from the left anterior descending artery, the circumflex artery and the right coronary artery. A reference center for congenital heart diseases was contacted. The patient was accepted for further diagnosis and evaluation of treatment strategies and, after a completely uneventful postoperative recovery, was transferred to the reference center for further treatment on her 13th postoperative day.

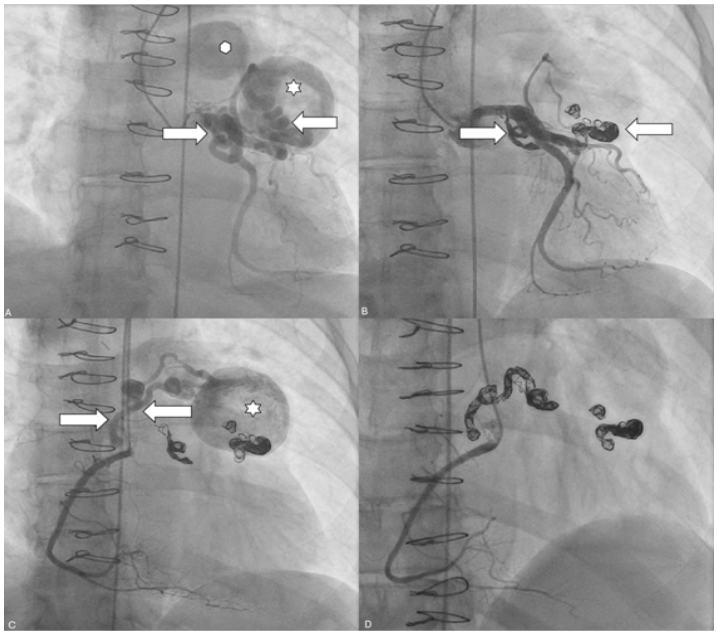

Figure 2: (A) tortuous coronary fistulas (arrows) arising from left coronary artery (LCA) feeding a large aneurysm (asterisk) with drainage into the pulmonary artery (hexagon); **(B)** LCA - final result after coil occlusion (arrows) of fistulas from LCA; **(C)** smaller, tortuous fistulas (arrows) from right coronary artery (RCA) to the aneurysm (asterisk); **(D)** near total occlusion of all fistulas after coil placement

In the reference center an interventional treatment of the malformation was performed. Vascular access was gained through the right femoral artery. Semi-selective angiography of the coronary aneurysm revealed feeding coronary fistulas from the LCA and RCA with drainage into the main pulmonary artery. The LCA was intubated using a 5F left coronary catheter. The 2 main fistulas were probed using a 0.018 coronary wire and 2.4F microcatheter through a 6F JL Guiding and 5F left coronary catheter. A total of 10 AzurCX 18 Micro Coils, were delivered via the microcatheter and deployed. Angiography showed unhindered coronary perfusion of the LCA and total occlusion of the fistulas from the left anterior descending and circumflex artery.

Due to radiation and procedure time a second operation was scheduled 5 months later. Selective angiography of the RCA showed 2 medium-sized tortuous fistulas to the large aneurysm, exiting the proximal RCA just beyond the ostium. A 5F AR MOD

coronary catheter was advanced via the right femoral artery and placed in the proximal RCA. A 0.018 coronary wire was then used to probe the fistulas, exiting the coronary catheter through a side-hole. A Swift Ninja microcatheter 2,4F was then advanced over the coronary wire into the fistulas and a total of 7 AzurCX 18 Micro Coils were deployed. Final angiography of LCA and RCA showed near total occlusion of all feeding fistulas to the aneurysm. There was no obstruction of blood flow to LCA and RCA after both procedures.

Discussion

Although anecdotic, the occurrence of cardiac tamponade in connection with coronary artery fistulas has been described [2, 3]. Both, interventional and surgical techniques have been described to treat coronary artery fistulas [4]. In the emergency setting there seems to be a preference for the surgical strategy [3]. As the usual reason for the emergency is a rupture resulting in a cardiac tamponade. This life threatening condition has to be first resolved and a surgical approach is better able to quickly asses and treat the underlying pathology in one sitting. However, the presented case differs from the usual emergency treatment as there was no active bleeding discovered. This was the reason the decision was made to only treat the tamponade and to determine the further treatment after more detailed examinations were performed.

Conclusion

In the present case, prompt recognition of a life-threatening condition was crucial for initiating appropriate management. In the hemodynamically unstable patient, there was only time for rudimentary diagnostic procedures. The patient´s mention of a coronary vessel anomaly diagnosed some forty years earlier prompted the team on duty to make the decision for a full sternotomy in order to be in a position to initiate cardiopulmonary bypass and be prepared for sewing over or closing a fistula.

Postoperatively, an ECG-triggered CT-angiogram confirmed the presence of a coronary fistula. With the patient completely stable, a decision was made to transfer the patient to a center for congenital heart diseases for more detailed identification of the origin of the fistulas and with the option for interventional treatment. In a two-staged fashion, the patient's fistulas could be closed almost completely.

Overall, in a multidisciplinary approach, emergent release of life-threatening cardiac tamponade and successful interventional therapy saved this patient's life.

Declarations

Contributors: All authors contributed to planning, literature review and conduct of the review article. All authors have reviewed and agreed on the final manuscript.

Competing interests: None

Patient consent for publication: Informed consent was obtained from the patient, consent form available upon request.

Ethics approval and consent to participate: Not applicable

Availability of data and materials: Not applicable

References

1. Sommer RJ, Hijazi ZM, Rhodes JF Jr. (2008) Pathophysiology of congenital heart disease in the adult: part I: Shunt lesions. Circulation. 117: 1090-1099.
2. Harada Y, Mori A, Abiko T, Saka S, Shinagawa T, et al. (2013) Cardiac tamponade due to the rupture of the coronary artery fistula. Cardiovasc Diagn Ther. PMID: 24282752.
3. Iwasawa Y, Kitamura Y, Higuma K, Ono F, Imoto K, et al. (2007) Cardiac tamponade due to rupture of coronary artery fistulas with a giant aneurysm containing a free floating ball thrombus: A case report. J Cardiol. 50: 71-76.
4. Al-Hijji M, El Sabbagh A, El Hajj S, AlKhouli M, El Sabawi B, et al. (2023) Coronary artery fistulas: Indications, techniques, outcomes, and complications of transcatheter fistula closure. J Am Coll Cardiol Intv. 14: 1393-1406.