



# Traumatic Left Anterior Descending Coronary Artery-Right Ventricle Fistula: A Case Report

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## Abstract

*Traumatic coronary artery-cameral fistulas (TCAF) are rare and may present secondary to penetrating injuries (80%) or iatrogenic traumas. Early operative intervention remains the recommended treatment modality for accidental traumatic coronary artery fistulas. We report the case of a 17-year-old man who presented with left anterior descending coronary artery-right ventricle fistula following penetrating cardiac trauma, which was successfully repaired surgically.*

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## Introduction

Traumatic cardiac penetration is highly lethal, with case fatality rates of 70-80%. Patients that are profoundly unstable benefit from emergency thoracotomy with ongoing aggressive resuscitation. Postoperative deterioration may be due to bleeding or post-ischemic cardiac myocardial dysfunction.

Residual and delayed sequelae include postpericardiotomy syndrome, fistulas, valvular dysfunction, ventricular aneurysms, and pseudoaneurysms.<sup>1</sup> Traumatic coronary artery-cameral fistulas (TCAF) are uncommon sequelae of trauma that require early surgical intervention to prevent complications.<sup>2</sup> Although the left coronary artery is the most frequently injured vessel of the heart, traumatic fistulas appear more often in the right coronary vessels, as the initial injury to the left coronary artery usually results in early death prior to hospitalization.<sup>3</sup>

We report the case of a patient with left anterior descending (LAD) artery to right atrium fistula following cardiac penetrating trauma.

## Case Report

A 17-year-old man presented to the emergency room with a stab wound to the heart about 45 minutes prior to arrival. At arrival, he was in a shock state and was pale, dyspnic, and agitated with blood pressure of 80/40 mmHg, heart rate of 130 beat/min, and respiration rate of 30/min. There was a 4-5 cm laceration located at the level of the 3<sup>rd</sup> and 4<sup>th</sup> ribs in the left midclavicular line with active bleeding. He was transferred to the operating room immediately while his bleeding was controlled by finger pressure and initial resuscitation was administered. Anterolateral thoracotomy and repair of the left ventricular rupture at the line of the LAD were performed, but

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the patient suffered dyspnea two hours postoperatively and his electrocardiography (ECG) showed ST-T segment elevation in the pericardial leads and ST-T segment depression in the inferior leads. Transesophageal echocardiography revealed severe left ventricular hypokinesia and apical akinesia with a left ventricular ejection fraction of 40% and possibility of the LAD fistula. Emergency coronary angiography, conducted approximately twelve hours postoperatively, showed an LAD cut-off at mid part with poor distal run-off and fistula of the LAD to the right ventricle (Figures 1).

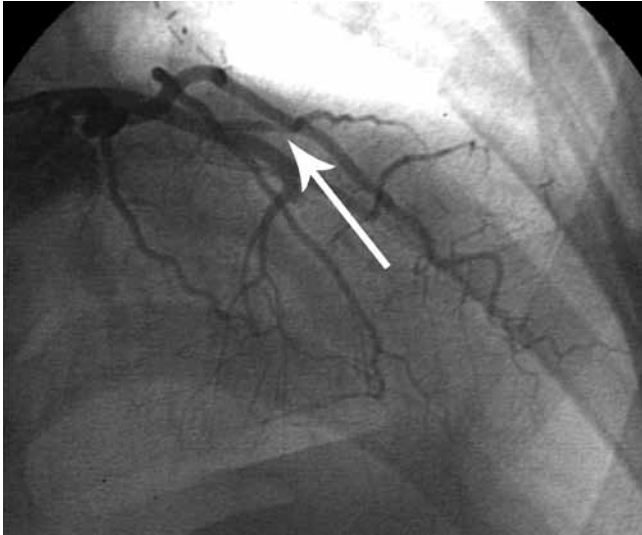


Figure 1. Left anterior descending cut-off at mid part with poor distal run-off and fistula of the left anterior descending to the right ventricle (arrow)  
LAD, Left anterior descending

On post-admission day 7, the patient underwent reoperation, during which he was placed on cardiopulmonary bypass and high-potassium blood cardioplegia was administered. The fistula of the LAD to the right ventricle was repaired with Prolene 5-0 and the left interior mammary artery was grafted to the LAD, distal to the site of the suture ligation of the LAD fistula.

Twenty months later, the patient was in healthy condition.

## Discussion

Coronary arteriovenous fistulas were first described by Krause in 1865.<sup>4</sup> They commonly have a congenital origin but can be acquired as complications of surgical procedures and traumas. The venous side of the coronary arteriovenous fistula can be the coronary sinus, the great cardiac vein, the right atrium, or the right ventricle.<sup>5</sup>

Most of the reported cases of accidental traumatic coronary artery fistulas were diagnosed several months to years after

the initial operation when there was morbidity secondary to the fistula such as congestive heart failure and pulmonary hypertension. Our case was diagnosed early postoperatively and underwent reoperation on post-admission day 7.

Early intervention in TCAF prevents the late complications of high flow left-to-right shunting, including the development of pulmonary artery hypertension and congestive heart failure.<sup>2</sup> Shimabukuro et al. reported the case of a patient with cardiac penetrating trauma who presented with congestive heart failure and tricuspid regurgitation due to coronary arteriovenous fistula 8 years after trauma. They suggested that early surgical repair be undertaken in cases of traumatic coronary artery fistula, even if the shunt is minimal and early symptoms are mild.<sup>6</sup> Bernard Maitre et al. reported the unusual case of a patient with left ventricular aneurysm and coronary-pulmonary artery fistula detected 23 years after a thoracic wound; the patient presented with severe hemoptysis and anemia.<sup>1</sup> Reubendra and associates reported the case of a patient with traumatic LAD-to-pulmonary artery fistula that developed delayed pericardial tamponade and underwent emergency intervention; they believe that survival is not unlikely with fistulas occurring in the mid-LAD to right ventricle, as indicated by the significant number of reported cases. Proximal LAD fistulas are probably more likely to result in a fatal injury, but early repair seems indicated given the life-threatening sequelae such as delayed pericardial tamponade.<sup>7</sup>

Depending on whether the drainage is into the left or right heart, coronary artery fistulas are classified into two major types. Akhras et al. reported a right coronary artery-right atrial fistula about 40 years after shrapnel injury.<sup>8</sup> Alberto Rangel and associates presented the case of a 17-year-old man who sustained a knife chest wound and secondarily developed a traumatic coronary arteriovenous fistula communicating the left main coronary artery to the pulmonary artery, associated with pulmonary valvular insufficiency and endocarditis.<sup>9</sup>

Survivors of traumatic coronary artery fistulas have an excellent prognosis after successful closure of the fistula.<sup>10</sup> We suggest that patients with traumatic coronary artery fistulas be considered for elective surgical repair to prevent the development of complications. Operative repair can be accomplished safely with excellent long-term outcome.

## Conclusion

Most patients with traumatic coronary artery fistulas should undergo early surgical intervention to prevent the sequelae of a left-to-right shunt since survivors of traumatic coronary artery fistulas have an excellent prognosis after a successful closure of the fistula.

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