

Right Coronary Artery to Superior Vena Cava Fistula Following CABG: A Very Rare Case Report

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Received 2020 May 21; Accepted 2020 November 26.

Abstract

Introduction : Although most coronary artery fistulas to the venous system are congenital, we present a case who was conservatively treated and developed an acquired post-coronary artery bypass grafting (CABG) fistula between the right coronary artery (RCA) and superior vena cava (SVC) that due to with allow-flow shunt and few symptoms.

Case presentation: We report a 65-year-old man with a history of CABG 3 years ago presenting with chest pain. He developed a 3-vessel disease as well as a recent myocardial infarction with a reduced ejection fraction (25%). The case had chest discomfort since 2 months ago after discharge increasing by any physical activity. The consultant cardiologist decided to perform coronary angiography to assess the condition of the native coronary artery and coronary grafts. On coronary angiography, all of the grafts were patent; however, there was an abnormal communication between the proximal of native RCA and SVC that finally filled the right atrium.

Conclusion: Clinically, although most coronary artery fistulas are silent and asymptomatic due to the limited size of the shunt, in some rare cases in which there is a large shunt and steal of coronary circulation, the symptoms and signs of ischemic heart disease appear that there are surgical and interventional options for closure of this abnormal communications.

Keywords: Coronary Artery Fistula, Coronary Artery Bypass Grafting, Coronary Angiography

1. Introduction

Coronary artery fistulas are pathologic connections between a coronary artery and a large diameter venous circulation (i.e., superior vena cava [SVC]/ inferior vena cava [IVC]/pulmonary artery) or a cardiac chamber (1-3). They can be categorized into congenital and acquired coronary artery fistulas and both are rare phenomena with a reported incidence of 0.2% in the general population (4, 5). Previously, cardiac surgeons used to think that there are only congenital coronary artery fistulas; however, it was then proved that they can be the side effects of invasive

cardiac procedures, especially coronary artery bypass grafting (CABG). The most common potential mechanism of post-surgical coronary artery fistulas is direct injury and inadvertent opening of the cardiac chamber or activation of post-surgical inflammatory process (6). There are some reports of coronary artery fistulas after valvular surgery and cardiac transplantation (3). Herein, we present an abnormal coronary artery fistula between right coronary artery (RCA) and SVC 3 years after CABG; nevertheless, all of the grafts were patent without any problems.

Case presentation

We report a 65-year-old man with a history of CABG 3 years ago presenting with chest pain. The patient developed a 3-vessel disease as well as a recent myocardial infarction (MI) with a reduced ejection fraction (25%). The case underwent an on-pump CABG with three grafts (i.e., left internal mammary artery (LIMA) to the left anterior descending artery, saphenous vein graft [SVG] to obtuse marginal, and SVG to the posterior descending artery). Then, the case was discharged 6 days after the procedure. Although the patient was in a good clinical condition up to 2 months ago without any symptoms and signs of ischemic heart disease (IHD), he had chest discomfort

since 2 months ago increasing by any physical activity. The consultant cardiologist decided to perform coronary angiography to assess the condition of the native coronary artery and coronary grafts. All of the arterial and saphenous vein grafts were patent; nonetheless, there was an abnormal communication between the proximal of native RCA and SVC that finally filled the right atrium (RA) (figures 1-4). The estimated size of the shunt was less than 1.5 mm and there was no evidence compatible with IHD due to stealing blood from the coronary artery through the fistula. Finally, it was decided to conservatively manage the case and he was discharged with a good clinical condition.

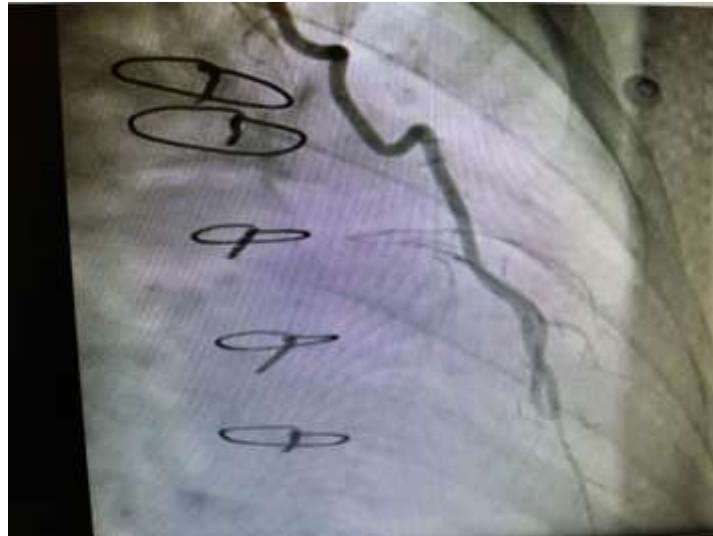


Figure 1. Left internal mammary artery to left anterior descending graft



Figure 2. Saphenous vein graft to obtuse marginal graft

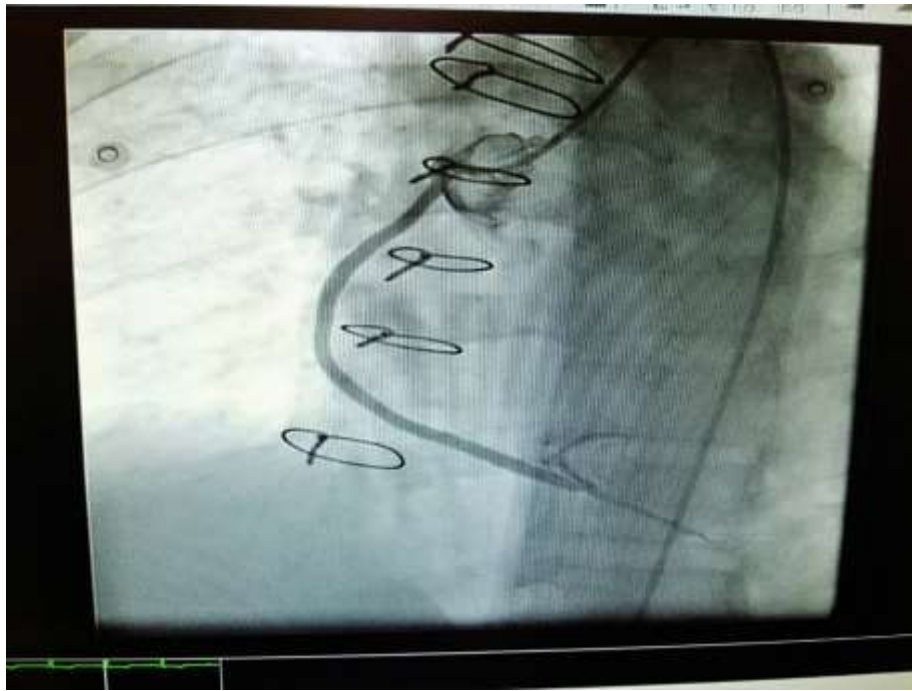


Figure 3. Saphenous vein graft to posterior descending artery graft

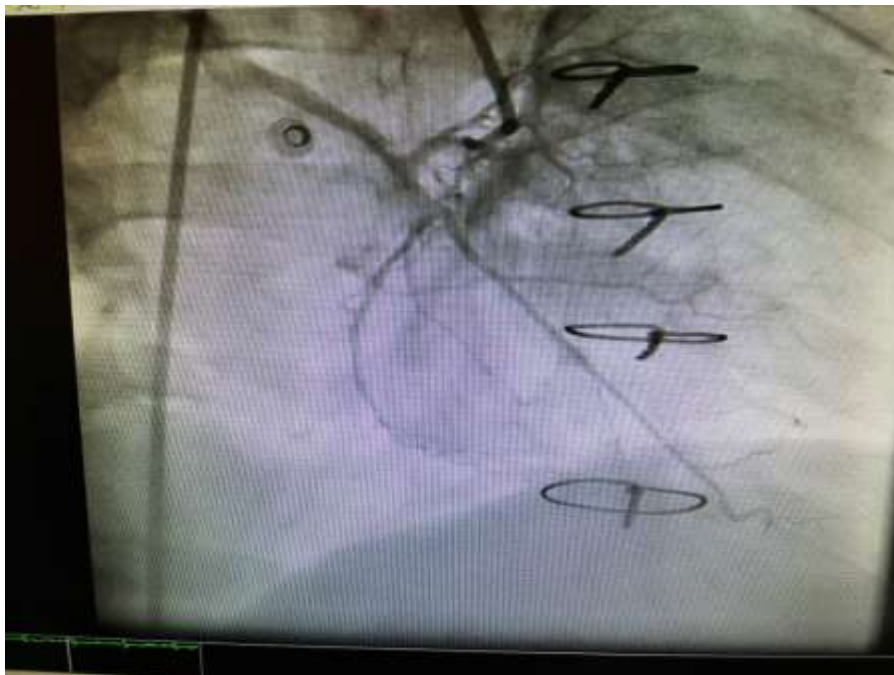


Figure 4. Fistula between right coronary artery and superior vena cava

Discussion

Coronary arteriovenous fistulas are very rare cardiac anomalies firstly described by Krause in 1865, and the very first surgical treatment was performed by Bjork and Crawford. An arteriovenous fistula is an abnormal vascular communication leading to a blood shunt from an arterial system to allow a resistance venous system. Coronary artery fistula is a pathologic connection of a major coronary artery with a cardiac chamber or with a

venous system or pulmonary vascular system (7-10).

Other uncommon fistulas include abnormal connections between the ascending aorta and pulmonary artery and RA/SVC/IVC and between CABG (i.e., arterial or venous grafts) and a cardiac vein. The abnormal fistula of the coronary artery connects with the intraluminal surface of all cardiac chambers (RV: 41%; RA: 26%; LA: 5%, LV: 3%), coronary sinus (7%), SVC (1%), pulmonary artery (17%), or pulmonary vein. Actually, 90% of venous drainage

is observed to leak into the systemic venous side (11, 12). Coronary artery fistulas are usually asymptomatic; however, due to aging and according to the size of shunts, coronary artery fistulas can become symptomatic, and chest pain as well as exertional dyspnea, which is related to the size of the shunt and amount of coronary steal, can be presented. Finally, patients with significant coronary artery fistulas develop the symptoms and signs of chronic heart failure, repeated MI, and endocarditis (8, 12).

In most cases, the origin of coronary fistulas is RCA. There are some reports of abnormal fistulas indicating that the origin of the fistula is a conduit or graft that is constructed at the time of CABG. Both arterial and venous conduits could be involved in this phenomenon. For example, there are some reports of fistula formation between the LIMA and pulmonary vasculature (pulmonary artery/pulmonary vein) (13, 14).

Conclusion

Clinically, although most of coronary artery fistulas are silent and asymptomatic due to the limited size of the shunt, in some rare cases in which there is a large shunt and steal of coronary circulation, the symptoms and signs of IHD appear that there are surgical and interventional options for closure of this abnormal communications.

Conflicts of interest

The authors declare that there is no conflict of interest.

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