

2014

Rare case of coronary to pulmonary vein fistula with coronary steal phenomenon

E. A. Barsoum
Northwell Health

F. B. Saiful
Northwell Health

D. Asti
Northwell Health

R. Morcus
Northwell Health

G. Khoueiry
Northwell Health

See next page for additional authors

Follow this and additional works at: <https://academicworks.medicine.hofstra.edu/publications>

 Part of the [Internal Medicine Commons](#)

Recommended Citation

Barsoum E, Saiful F, Asti D, Morcus R, Khoueiry G, Lafferty J, McCord D. Rare case of coronary to pulmonary vein fistula with coronary steal phenomenon. . 2014 Jan 01; 6(7):Article 2435 [p.]. Available from: <https://academicworks.medicine.hofstra.edu/publications/2435>. Free full text article.

This Article is brought to you for free and open access by Donald and Barbara Zucker School of Medicine Academic Works. It has been accepted for inclusion in Journal Articles by an authorized administrator of Donald and Barbara Zucker School of Medicine Academic Works. For more information, please contact academicworks@hofstra.edu.

Authors

E. A. Barsoum, F. B. Saiful, D. Asti, R. Morcus, G. Khoueiry, J. Lafferty, and D. A. McCord

Rare case of coronary to pulmonary vein fistula with coronary steal phenomenon

Emad A Barsoum, Faisal B Saiful, Deepak Asti, Rewais Morcus, Georges Khoueiry, James Lafferty, Donald A McCord

Emad A Barsoum, Faisal B Saiful, Rewais Morcus, Georges Khoueiry, James Lafferty, Donald A McCord, Department of Medicine, Staten Island University Hospital, New York, NY 10305, United States

Faisal B Saiful, Deepak Asti, Georges Khoueiry, James Lafferty, Donald A McCord, Division of Cardiology, Staten Island University Hospital, New York, NY 10305, United States

Author contributions: All authors contributed to this work.

Correspondence to: Emad A Barsoum, MD, Department of Medicine, Staten Island University Hospital, 475 Seaview Ave, Staten Island, New York, NY 10305,

United States. dr_barsoum@yahoo.com

Telephone: +1-347-6669321 Fax: +1-718-2268695

Received: January 20, 2014 Revised: March 11, 2014

Accepted: June 10, 2014

Published online: July 26, 2014

Key words: Coronary artery fistula; Coronary artery anomalies in adult; Coronary artery disease

Core tip: This report highlights the presence of an extremely rare coronary anomaly in adult, in the form of a fistula between left anterior descending coronary artery and left superior pulmonary vein with steal phenomenon causing angina that resolved by medical treatment.

Barsoum EA, Saiful FB, Asti D, Morcus R, Khoueiry G, Lafferty J, McCord DA. Rare case of coronary to pulmonary vein fistula with coronary steal phenomenon. *World J Cardiol* 2014; 6(7): 682-684 Available from: URL: <http://www.wjgnet.com/1949-8462/full/v6/i7/682.htm> DOI: <http://dx.doi.org/10.4330/wjc.v6.i7.682>

Abstract

Coronary artery fistulas are abnormal connections between coronary artery territories and cardiac chambers or major vessels, most of them are congenital. Patients with coronary artery fistula can be asymptomatic or present with different symptoms like angina. Cardiac computed tomography (CT) is one of the best modalities for diagnosis. We present an elderly patient that presented with angina symptoms, non invasive stress test was positive for ischemic heart disease, coronary angiogram could not reveal any obstructive lesions, but an abnormal branch of the left descending coronary artery (LAD), cardiac CT showed fistula that connect left anterior descending coronary artery to left superior pulmonary vein. Our case is extremely rare as most of the reported cases were fistulas between LAD and pulmonary artery, but in our case the fistula between LAD and left superior pulmonary vein. In addition, our patients' symptoms resolved with anti-ischemic medical treatment without any surgical intervention.

© 2014 Baishideng Publishing Group Inc. All rights reserved.

INTRODUCTION

Coronary artery anomalies are found in 1% of coronary angiograms^[1]. Some of these anomalies are clinically insignificant but, many others are associated with serious morbidity and potential mortality. Coronary artery anomalies can be detected by a variety of means including echocardiography, coronary artery angiography and multidetector-row computed tomography^[2,3].

The following case report describes an elderly patient presenting with angina, whose coronary angiography and cardiac computed tomography (CT) revealed an abnormal communication between the left anterior descending (LAD) and the left superior pulmonary vein.

CASE REPORT

A 67-year-old man presented to the office with exertional chest pain of six weeks. He had a past medical history significant for hypercholesterolemia and gastro esopha-

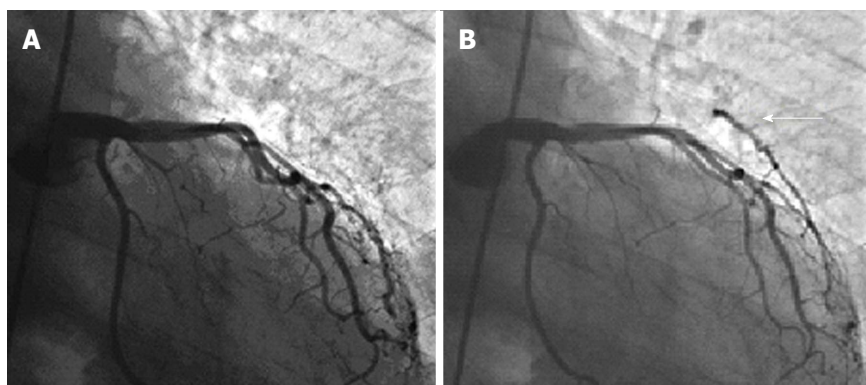


Figure 1 Coronary angiogram. A: Showing coronaries without significant atherosclerotic lesion; B: Showing fistula arises from left anterior descending.

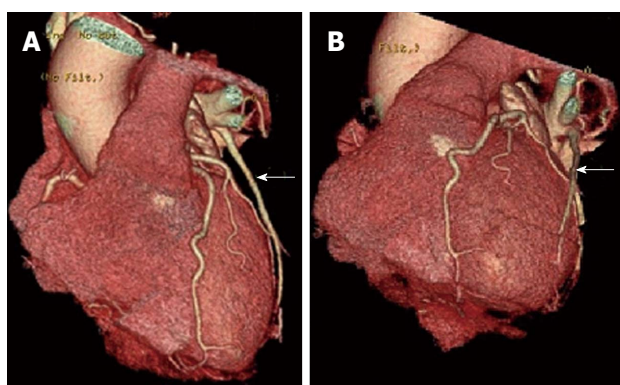


Figure 2 Multislice computed tomographic angiography. A: Showing fistula between left anterior descending (LAD) and superior pulmonary vein; B: Showing fistula between LAD and superior pulmonary vein.

geal reflux disease. He quit smoking 30 years ago. A thallium stress test revealed a moderate sized, completely reversible, anterior and anterolateral wall defect suggestive of LAD territory ischemia. Coronary angiography was performed, which failed to reveal any obstructive disease in the LAD as well any other coronary vessel. However, in the distal segment of the LAD there was a small aneurysmal dilatation and a communication with an extracardiac vessel that was well opacified with antegrade injection of contrast (Figure 1). We concluded that it was likely to be a fistula between the LAD and a segment of the left pulmonary artery system. We decided to get a CT angiogram of the chest to better delineate the nature of the fistula as an outpatient. The patient was discharged home on a regimen including a beta-blocker, statin, ACE inhibitor and a long acting nitrate. Soon after, a multislice computed tomographic angiography of the thorax and coronaries was performed. A fistula arising from the distal LAD and connecting to the left superior pulmonary vein was elucidated (Figure 2). The patient has been followed up at one and three month intervals. He continues to do very well with optimal medical therapy and remains free of exertion and rest angina.

DISCUSSION

Coronary artery fistula (CAF) is an abnormal connection between coronary artery territories and cardiac chambers

or major vessels, CAF represent 17% of angiographic diagnosed anomalies^[1]. Majority of them are congenital, but can be acquired secondary to increasing application of intravascular diagnostic instrumentations and therapeutic procedures or even secondary to blunt or penetrating trauma^[4-11].

Patient with coronary artery fistulas usually asymptomatic that the fistula accidentally detected by echocardiography and coronary angiography, but patients may have varied symptoms such as angina pectoris, palpitations, syncope, congestive heart failure, and may even present with sudden cardiac death. In some cases, physical examination may or reveal a murmur if the flow is significant^[12].

The majority of reported LAD fistulas have been between the LAD and pulmonary artery, but in our case the anomaly is between the LAD and the left superior pulmonary vein. Also, it is interesting that we have concomitant coronary steal phenomenon by the pulmonary venous system. This is evident due to the presence of angina symptoms and a reversible defect on nuclear imaging that is not explained by coronary artery disease. It is plausible that a small fistulas increase in size with advancing age secondary to changes in vessels compliance and pressure and as it reaches a certain flow threshold, begins to exhibit steal phenomenon.

The main treatment of symptomatic coronary fistulas is surgical and a variety of operative techniques have been described in the literature including internal closure of the fistula from within the distal communication, distal ligation alone, proximal and distal ligations and closure from within the aneurysmal coronary artery^[13,14]. In addition, transcatheter retrograde coil embolization became a safe and effective alternative to standard surgical closure^[15,16]. However, our patient's symptoms are resolved with optimal anti ischemic medical therapy

In a conclusion, Coronary artery fistula to pulmonary vein is extremely rare, medical treatment is effective to resolve patient's symptoms, long term follow up is highly recommended.

COMMENTS

Case characteristics

A 67-year-old man with a history of hypercholesterolemia and gastro esopha-

geal reflux disease presented with exertional chest pain.

Clinical diagnosis

Normal physical exam.

Differential diagnosis

Ischemic heart disease, non cardiac causes of chest pain.

Laboratory diagnosis

Cardiac enzymes were within normal limits.

Imaging diagnosis

Coronary angiography and cardiac computed tomography revealed an abnormal communication between the left anterior descending (LAD) and the left superior pulmonary vein.

Treatment

The patient was treated with beta-blocker, statin, ACE inhibitor and a long acting nitrate.

Related reports

A fistula between left anterior descending coronary artery and left superior pulmonary vein is extremely rare. Most of the reported cases are between a coronary artery and the pulmonary artery.

Term explanation

Coronary artery anomalies are rare in adults, but they can induce angina symptoms.

Experiences and lessons

This case report represents rare fistula between LAD and left superior pulmonary vein, cardiac computed tomography scan was a sensitive modality in the detection of the fistula and the patient improved on medical treatment without surgical intervention.

Peer review

This article presents an extremely rare fistula between LAD and left superior pulmonary vein in adult.

REFERENCES

- 1 **Angelini P.** Coronary artery anomalies: an entity in search of an identity. *Circulation* 2007; **115**: 1296-1305 [PMID: 17353457 DOI: 10.1161/CIRCULATIONAHA.106.618082]
- 2 **Matsumoto M,** Yokoyama K, Yahagi T, Kikushima K, Watanabe K, Tani S, Anazawa T, Kawamata H, Nagao K, Hirayama A. Double left anterior descending artery arising from right and left sinus of Valsalva in patient with acute coronary syndrome. *Int J Cardiol* 2011; **149**: e40-e42 [PMID: 19556019 DOI: 10.1016/j.ijcard.2009.03.049]
- 3 **Kheirkhah J,** Sadeghipour P, Kouchaki A. An anomalous origin of left anterior descending coronary artery from right coronary artery in a patient with acute coronary syndrome. *J Tehran Heart Cent* 2011; **6**: 217-219 [PMID: 23074373]

- 4 **Toda S,** Nakamura A, Iwamoto T, Nakaji S. Successful surgical treatment of aortic regurgitation with coronary artery fistula due to blunt chest trauma--a case report. *Nihon Kyobu Geka Gakkai Zasshi* 1991; **39**: 1087-1092 [PMID: 1894994]
- 5 **Sandhu JS,** Uretsky BF, Zerbe TR, Goldsmith AS, Reddy PS, Kormos RL, Griffith BP, Hardesty RL. Coronary artery fistula in the heart transplant patient. A potential complication of endomyocardial biopsy. *Circulation* 1989; **79**: 350-356 [PMID: 2644055]
- 6 **Saeian K,** Vellinga T, Troup P, Wetherbee J. Coronary artery fistula formation secondary to permanent pacemaker placement. *Chest* 1991; **99**: 780-781 [PMID: 1995248]
- 7 **el-Omar MM,** Hargreaves MR, Venkataraman A, Been M. Coronary ventricular fistula as a complication of PTCA: a case report and literature review. *Int J Cardiol* 1995; **51**: 113-116 [PMID: 8522405]
- 8 **Morgan JR,** Forker AD, O'Sullivan MJ, Fosburg RG. Coronary arterial fistulas: seven cases with unusual features. *Am J Cardiol* 1972; **30**: 432-436 [PMID: 5056854]
- 9 **Cheng TO,** Adkins PC. Traumatic aneurysm of left anterior descending coronary artery with fistulous opening into left ventricle and left ventricular aneurysm after stab wound of chest. Report of case with successful surgical repair. *Am J Cardiol* 1973; **31**: 384-390 [PMID: 4687853]
- 10 **Jones RC,** Jahnke EJ. Coronary artery-atrioventricular fistula and ventricular septal defect due to penetrating wound of the heart. *Circulation* 1965; **32**: 995-1000 [PMID: 5846104]
- 11 **Tsagaris JT,** Bustamante RA. Coronary arteriovenous fistula and myocardial infarction due to trauma. *Am J Cardiol* 1966; **18**: 777-780 [DOI: 10.1016/0002-9149(66)90098-1]
- 12 **Schamroth C.** Coronary artery fistula. *J Am Coll Cardiol* 2009; **53**: 523 [PMID: 19195610 DOI: 10.1016/j.jacc.2008.06.055]
- 13 **Fernandes ED,** Kadivar H, Hallman GL, Reul GJ, Ott DA, Cooley DA. Congenital malformations of the coronary arteries: the Texas Heart Institute experience. *Ann Thorac Surg* 1992; **54**: 732-740 [PMID: 1417232]
- 14 **Bauer EP,** Piepho A, Klövekorn WP. Coronary arteriovenous fistula: surgical correction of a rare form. *Thorac Cardiovasc Surg* 1994; **42**: 237-239 [PMID: 7825163 DOI: 10.1055/s-2007-1016495]
- 15 **Vitek J,** Moses JW, Roubin GS, Leon MB, Kipshidze N. Transcatheter therapeutic embolization of multiple coronary artery fistulas. *Circulation* 2001; **104**: E19 [PMID: 11479265 DOI: 10.1161/hc3001.093607]
- 16 **Mavroudis C,** Backer CL, Rocchini AP, Muster AJ, Gevitz M. Coronary artery fistulas in infants and children: a surgical review and discussion of coil embolization. *Ann Thorac Surg* 1997; **63**: 1235-1242 [PMID: 9146308 DOI: 10.1016/S0003-4975(97)00251-8]

P- Reviewer: Avanzas P, Cebi N, Desouza KA, Kettering K

S- Editor: Wen LL **L- Editor:** A **E- Editor:** Wu HL





Published by **Baishideng Publishing Group Inc**

8226 Regency Drive, Pleasanton, CA 94588, USA

Telephone: +1-925-223-8242

Fax: +1-925-223-8243

E-mail: bpgoffice@wjgnet.com

Help Desk: <http://www.wjgnet.com/esps/helpdesk.aspx>

<http://www.wjgnet.com>

