

## Cardiac Imaging

## Coronary-to-Bronchial Artery Fistula with Conventional and Multi-Detector Computed Tomography Angiographic Images

SERAP BAS<sup>1</sup>, OMER YIGINER<sup>2</sup>, MURAT ATALAY<sup>2</sup>, OMER UZ<sup>2</sup>, HASAN FERAY<sup>1</sup>

<sup>1</sup>Gaziosmanpasa Hospital, <sup>2</sup>GMMA Haydarpasa Hospital, Istanbul, Turkey

Key words:  
Coronary artery  
fistula, coronary  
angiography, multi-  
detector computed  
tomography

Manuscript received:  
June 18, 2009;  
Accepted:  
November 5, 2009.

Address:  
Omer Yiginer

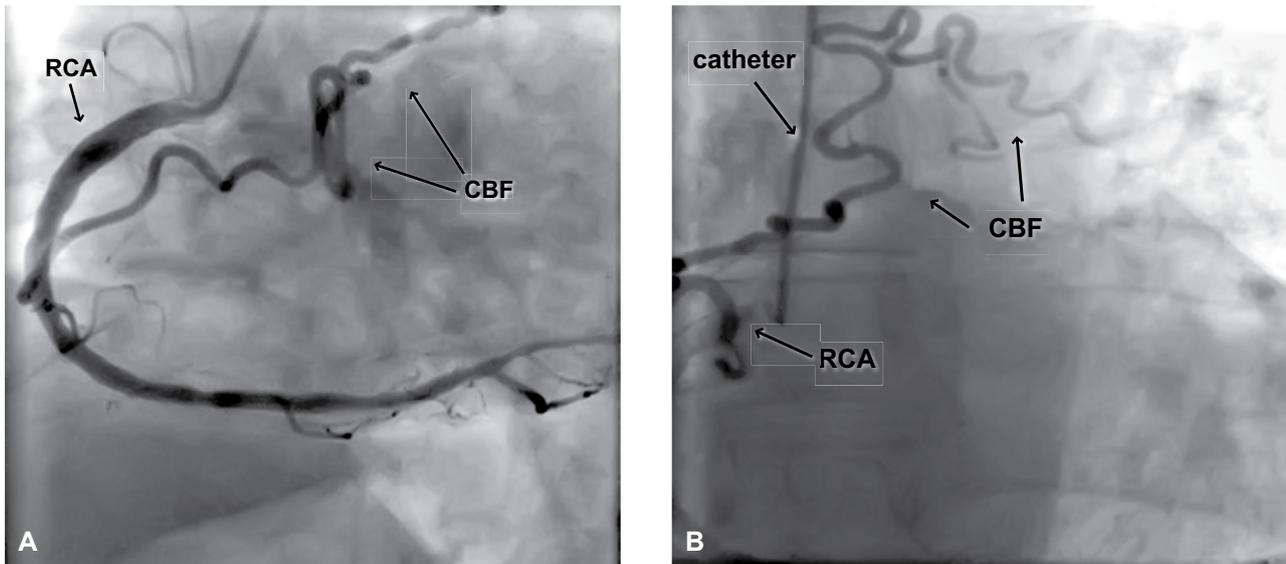
GATA Haydarpasa  
Egitim Hastanesi  
Kardiyoloji Servisi  
Uskudar, Istanbul,  
Turkey  
e-mail: [oyiginer@yahoo.com](mailto:oyiginer@yahoo.com)

A 64-year-old male patient with the risk factors of smoking and hypertension was admitted to our department with anginal symptoms. Coronary angiography showed significant stenotic lesions in the left main and left anterior descending coronary arteries. There was no stenosis in the right coronary artery (RCA); however, a fistulous communication between the right ventricular branch of the RCA and the left bronchial artery was noticed. (Figure 1). Contrast-enhanced multi-detector computed tomography (MDCT) also confirmed the fistulous communication between the RCA and bronchial artery (Figure 2). MDCT angiography demonstrated that the fistula originated from the right ventricular branch of the RCA and coursed through the right side of the aorta and right atrium. The fistula was connected to the left bronchial artery behind the right atrium (Figure 2). The patient was successfully treated with a coronary artery bypass graft and fistula ligation operation.

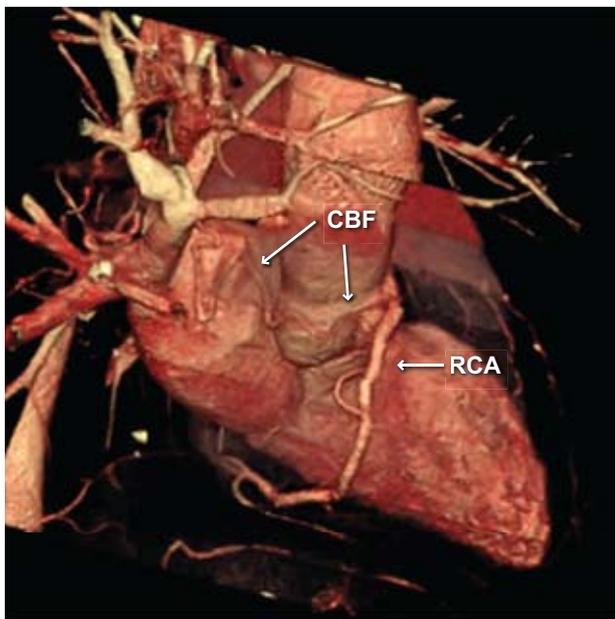
The incidence of coronary artery anomalies has been estimated at 1.3% in the population undergoing coronary arteriography and coronary fistulas accounted for 13% of these anomalies.<sup>1</sup> Coronary artery fistula is defined as an abnormal vascular communication between any coronary artery and any of the cardiac chambers or great vessels.<sup>2</sup> In a

recent study, the incidence of coronary-to-bronchial artery fistula (CBF) has been estimated to be 0.61% among the population undergoing coronary MDCT angiography.<sup>3</sup> Because of the asymptomatic nature of this anomaly, most of the cases are usually discovered incidentally during MDCT and/or conventional coronary angiography after the development of atherosclerotic coronary artery disease. CBFs usually originate from the left circumflex artery via a left atrial branch.<sup>3</sup> Most patients with CBF are asymptomatic, but cardiovascular symptoms, such as continuous machinery murmur, angina due to coronary steal phenomenon, congestive heart failure and rupture of an aneurysmal fistula, may be developed. CBF can be a source of hemoptysis. Although anomalous communications between a coronary artery and the bronchial or other mediastinal artery are thought to be congenital, some underlying pulmonary diseases such as bronchiectasia can cause the anastomoses to dilate and become functional. Because our case did not have any pulmonary disease, the CBF in our patient was judged to be congenital in origin.

Although cardiac catheterization has been the best diagnostic method for the identification of such communications, it is invasive with a defined degree of risk (roughly 1.5% morbidity, 0.15% mortality). MDCT angiography is an



**Figure 1.** Right coronary angiogram in left (A) and right (B) anterior oblique projections, showing a coronary-to-bronchial artery fistula (CBF) originating from the right ventricular branch of the right coronary artery (RCA).



**Figure 2.** Three-dimensional volume rendered image from multi-detector computed tomography coronary angiography, showing that the coronary-to-bronchial artery fistula (CBF) originating from the right coronary artery (RCA) coursed through the right wall of the right atrium and connected to the left bronchial artery behind the right atrium.

increasingly frequently used alternative for the evaluation of coronary artery anatomy. A growing number of articles are demonstrating its usefulness

for the study of atherosclerotic coronary artery disease and the identification of anatomic anomalies of the coronary arteries, such as aberrant arterial origins and coronary fistulas.<sup>3</sup> Although MDCT is inferior in temporal resolution to conventional coronary angiography (40 ms), its three-dimensional reconstruction technique with viewing at an unlimited angle allows the visualization of a complex lesion and its adjacent structures in its best projection.

Stent graft or coil embolization is regarded as the best treatment for coronary steal phenomenon.<sup>4</sup> In cases of severe coronary artery disease, as in our patient, bypass surgery plus surgical ligation of the CBF can be a more definitive treatment.

## References

1. Yamanaka O, Hobbs RE. Coronary artery anomalies in 126,595 patients undergoing coronary arteriography. *Cathet Cardiovasc Diagn.*1990; 21: 28-40.
2. Papadopoulos DP, Perakis A, Votreas V, Anagnostopoulou S. Bilateral fistulas: a rare cause of chest pain. Case report with literature review. *Hellenic J Cardiol.* 2008; 49: 111-113.
3. Lee ST, Kim SY, Hur G, et al. Coronary-to-bronchial artery fistula: demonstration by 64-multidetector computed tomography with retrospective electrocardiogram-gated reconstructions. *J Comput Assist Tomogr.* 2008; 32: 444-447.
4. Dorros G, Thota V, Ramireddy K, Joseph G. Catheter-based techniques for closure of coronary fistulae. *Catheter Cardiovasc Interv.* 1999; 46: 143-150.