

# Coronary artery fistula: an innocent bystander or harmful company?

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**RELATED ARTICLE**  
by Podolec et al,  
see p. 1034

Coronary fistulas are defined as an abnormal communication between the coronary artery and a cardiac chamber (“coronary-room fistula”), bypassing the capillary bed, or any part of the systemic or pulmonary circulation.<sup>1</sup> Fistulas are rare anomalies—the incidence varies from 0.002% to 0.3%.<sup>2-4</sup>

They are often asymptomatic, so their diagnosis is frequently incidental. Epidemiological data and their incidence may be underestimated in the literature. Coronary fistulas may be congenital or acquired, but most of them are congenital and their embryological origin appears to be due to persistence of sinusoidal connections between the lumens of the primitive tubular heart. The acquired forms may be further divided into iatrogenic (during percutaneous coronary intervention, cardiac surgery, myocardial biopsy, septal myectomy), traumatic, or related to a disease (such as myocardial infarction, Takayasu arteritis, cardiomyopathies).<sup>5,6</sup>

The study by Podolec et al,<sup>7</sup> published in this issue of *Kardiologia Polska* (*Kardiol Pol*, *Polish Heart Journal*), is a retrospective study that aims to determine the prevalence of coronary artery fistulas (CAFs) in Poland using coronary angiography. Data were obtained from the Polish National Registry of Procedures of Invasive Cardiology (Polish, Ogólnopolski Rejestr Procedur Kardiologii Inwazyjnej). They included 298 558 patients and the percentage of CAFs was 0.087%, which was in line with the literature. They showed that left anterior descending artery is the most frequent origin of CAFs accounting for 59.2% of cases, in contrast with previously published results. In fact, the right coronary artery is reported to be the most common origin site of CAFs, accounting for 50%

to 55% of cases, and is followed by the left anterior descending artery, accounting for about 35% to 40% of cases, and the left circumflex artery, accounting for 5% to 20% cases.<sup>8,9</sup> These literature data were generally derived from a smaller number of patients, while Podolec et al<sup>7</sup> analyzed a larger population in a relatively short period, thus providing more robust epidemiologic data.

In this large registry, Podolec et al<sup>7</sup> analyzed data from coronary angiography. Recently, it has been demonstrated that the prevalence of CAFs seen at coronary computed tomography is 0.9%, which is higher than the previously reported prevalence of 0.002% to 0.3% at coronary angiography.<sup>10</sup> Coronary angiography and coronary computed tomography are the common imaging modality for diagnosing CAFs. Coronary angiography is the gold standard of atherosclerotic coronary artery disease imaging, but coronary computed tomography seems to be more indicated for coronary artery anomalies. Li et al<sup>11</sup> reported that 80% of CAFs were detected by coronary angiography and 20% were missed, while coronary computed tomography successfully revealed all CAFs and included the cases missed on coronary angiography. This discrepancy may be explained by limitations of the latter, such as difficulties in cannulation of arteries with a fistulous origin and in reliable assessment of anatomic relations of complex, anomalous vessels based on 2-dimensional fluoroscopic images.<sup>10</sup> Furthermore, coronary computed tomography may clearly show the course of fistula vessels, drainage site, and their relationship with adjacent tissues in 3-dimensional form, which may be very valuable for further choice of decision and preoperative assessment compared with coronary angiography.<sup>11</sup>

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**Received:** September 16, 2019.  
**Accepted:** September 17, 2019.  
**Published online:**  
November 22, 2019.  
*Kardiol Pol*. 2019;  
77 (11): 1009-1010  
doi:10.33963/KP.15068  
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Indications for coronary angiography in the study of Podolec et al<sup>7</sup> were stable coronary artery disease, acute coronary syndromes, cardiac arrest, congenital heart defects, and other indications. They found a higher prevalence of CAFs in the subgroup of patients submitted to coronary angiography for other indications. As we know, the most frequent symptoms of CAFs are nonspecific (dyspnea on exertion, angina, fatigue, palpitations, and paroxysmal nocturnal dyspnea) and the majority of CAFs are asymptomatic. Only in a low percentage of cases, the initial manifestation of CAFs is acute coronary syndrome due to the “steal” phenomenon.<sup>12</sup>

Another issue emerging from this study is the association between chronic obstructive pulmonary disease and CAFs that is more frequent than in other groups (0.23%). Lim et al<sup>10</sup> demonstrated that there is a relation between CAFs, in particular in coronary to bronchial and pulmonary fistulas, and lung parenchymal abnormalities such as bronchiectasis or hypoplasia of the pulmonary vasculature. These findings could, in part, explain the high incidence of chronic obstructive disease in association with CAFs reported by Podolec et al.<sup>7</sup>

In conclusion, the relevance of the study by Podolec et al<sup>7</sup> lies in the amount of data described, and it provides useful information on prevalence and anatomy of CAFs. However, as all the studies on CAFs, it is a retrospective analysis, which cannot provide information on clinical significance and prognostic impact of CAFs. It would be of interest to plan follow-up studies in these patients in order to evaluate what characteristics of CAFs could be associated with an evolution towards more serious forms of disease and therefore with worse clinical manifestations and prognosis. The widespread use of coronary computed tomography will allow detecting CAFs more frequently, and, due to the noninvasiveness of the diagnostic method, to follow their morphologic evolution over time.

Furthermore, no data are present in the literature about surgical or percutaneous treatment of CAFs and their long-term results.

It can be said that CAFs constitute an unexplored area and that prospective studies are needed to answer the question of whether they always are innocent bystanders or not. The growing role of coronary computed tomography in the area of diagnostic workup will be very helpful in reaching this goal.

## ARTICLE INFORMATION

**DISCLAIMER** The opinions expressed by the author are not necessarily those of the journal editors, Polish Cardiac Society, or publisher.

**CONFLICT OF INTEREST** None declared.

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**HOW TO CITE** Romano S, Petroni R. Coronary artery fistula: an innocent bystander or harmful company? *Kardiol Pol.* 2019; 77: 1009-1010. doi:10.33963/KP.15068

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