

# Ventricular fibrillation during coronary angiography in a patient with left dominant coronary artery ectasia

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The presence of coronary ectasias in otherwise normal epicardial coronary arteries are an infrequent angiographic finding. Coronary ectasia is not a benign condition and has been associated with a high risk of coronary

Coronary artery ectasia is a rare coronary anomaly and is found in approximately 5% of patients who undergo coronary angiography (1). Coronary ectasia is not a benign condition nor is it within the normal variation of healthy coronary arteries. Previous studies have shown that patients with coronary ectasia should be treated as a high-risk group for coronary events (2). Ectatic coronary arteries have been shown to be more prone to slow blood flow, spasm, myocardial ischemia, thrombosis, dissection and rupture (3-5). They are also associated with angina pectoris, myocardial infarction, hypertrophic cardiomyopathy, heart failure, respiratory arrest, electrical instability, ventricular fibrillation and sudden death (5-8).

In the present report, we describe a case of left dominant coronary artery ectasia, involving a woman who developed ventricular fibrillation during coronary angiography. Possible mechanisms include myocardial ischemia, microvascular dysfunction, intracoronary thrombi and electrical instability in this group of patients.

## CASE PRESENTATION

An 84-year-old woman was admitted with recurrent episodes of dyspnea and chest discomfort. The patient had a history of hypertension, hyperlipidemia and angina pectoris with regular outpatient treatment. She did not smoke or consume alcohol.

At physical examination, her body temperature was 37°C, her pulse rate was 98 beats/min, her respiratory rate was 22 breaths/min and her blood pressure was 150/70 mmHg. Her breathing sound was coarse. The patient's heart rhythm was regular, with a grade 2/6 systolic murmur over the left sternal border. Her abdomen was soft and her peripheral pulses were intact. There was no peripheral edema and a neurological examination was unremarkable. Her complete blood count and blood chemistry profile were normal, except for hypercholesterolemia. Cardiac enzyme values were within normal limits. Radiographs of the chest revealed mild cardiomegaly and pulmonary congestion. An electrocardiogram showed sinus rhythm with T wave inversion over the anterior leads. An echocardiogram showed normal chamber size, mild mitral and tricuspid regurgitation, and normal left ventricular systolic function. Thallium-201 myocardial perfusion single-photon emission computed tomography imaging revealed a moderate fixed perfusion defect of the septum, suggestive of myocardial ischemia.

Because of persistent chest tightness and dyspnea, in spite of antianginal medications, the patient underwent cardiac catheterization. Coronary angiography revealed slow flow with delayed antegrade dye filling and deposition of dye in the coronary arteries. The right

events. In the present case, a patient with left dominant coronary artery ectasia who developed ventricular fibrillation during coronary angiography is described. This event was unexpected, and has not been previously reported.

**Key Words:** *Coronary angiography; Coronary artery ectasia; Ventricular fibrillation*

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coronary artery was small. The dominant left coronary arteries were aneurysmal with no significant stenosis. There were diffuse and multiple coronary artery ectasias involving all vessels.

There was no event following coronary angiography of the right coronary artery; however, shortly after the injection of dye into the dominant left coronary arteries, ventricular fibrillation was detected and the patient lost consciousness. Regular sinus rhythm was successfully restored by a single, 200 J, direct current cardioversion. The patient regained consciousness almost immediately. The decision was made to manage the patient medically, and she was discharged after two days with oral anticoagulant and antianginal medications.

## DISCUSSION

Coronary artery abnormalities are infrequent findings that are usually detected incidentally during cardiac catheterization. Although most anomalies are asymptomatic, some may be associated with angina pectoris, myocardial infarction, heart failure, arrhythmias and sudden cardiac death (5-8).

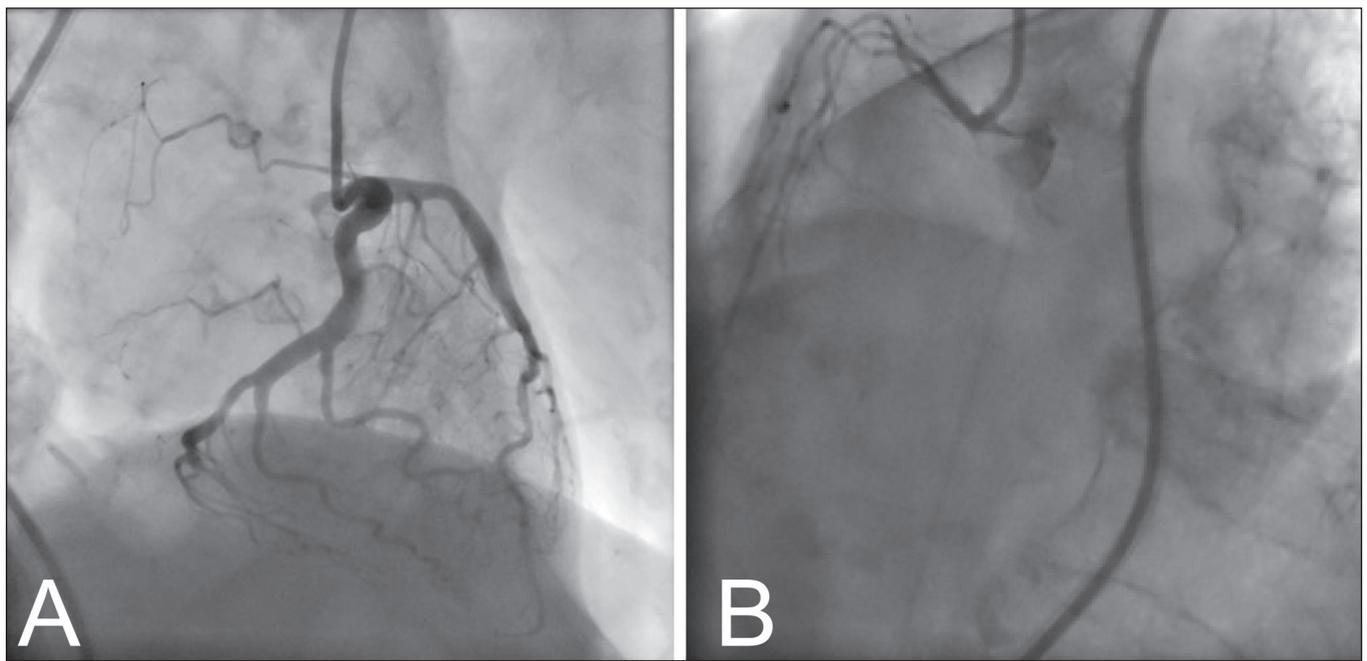
Coronary artery ectasia or aneurysmal coronary artery disease, a rare coronary anomaly, is characterized by inappropriate dilations of coronary vessels. The pathophysiology and clinical significance of coronary ectasias remains poorly understood. Possible etiologies of coronary artery ectasias include atherosclerosis, congenital abnormalities, inflammatory and connective tissue diseases (1,9). Clinically, coronary artery ectasias frequently present as myocardial ischemia, arrhythmias, heart failure and sudden death (5-8).

Coronary angiography in our patient clearly showed a small right coronary artery and dominant aneurysmal left coronary arteries, in addition to diffuse and multiple coronary artery ectasias involving all vessels. However, the occurrence of ventricular fibrillation shortly after the injection of dye into the dominant aneurysmal left coronary arteries was unexpected, and has not been previously reported. Coronary angiography may lead to serious complications such as death (<0.2%), myocardial infarction (<0.5%), stroke (<0.7%) and malignant ventricular arrhythmias (<0.5%) (10). These complications are very rare and usually occur in the presence of severe left main disease, multivessel disease, the disruption of plaque, and dissection or hemodynamic instability. In reference to the clinical presentation of our patient, the finding of coronary artery ectasia is likely a contributing factor in the ventricular fibrillation in the present case. Myocardial ischemia is one of the main causes of ventricular arrhythmias. We believe that coronary artery ectasias/aneurysm may predispose arteries to slow flow leading to myocardial ischemia (4,7), which may lead to ventricular

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**Figure 1** Coronary angiography showing a left dominant circulation, with small right coronary artery (**B**) and aneurysmal left coronary arteries (**A**), in association with diffuse coronary artery ectasia

fibrillation. Moreover, the injection of dye into an aneurysmal left coronary artery during coronary angiography may lead to 'myocardial stretch', which may induce electrophysiological changes and arrhythmias, triggering ventricular fibrillation (11). Intracoronary thrombi may also be present in the ectasias or aneurysmal coronary arteries, and thromboembolization from unusual thrombi within the ectasia/aneurysmal segments cannot be excluded, which may be responsible for episodes of myocardial ischemia and arrhythmia (1,6). Furthermore, microvascular dysfunction and/or ischemia

may be the cause of the prolonged QT interval duration and QT dispersion, leading to electrical instability and ventricular fibrillation (8).

### CONCLUSION

Coronary ectasia is not benign; patients with the condition should be considered to be at high risk for coronary events. Particular caution must be exercised when performing coronary angiography in such patients, especially in a dominant coronary artery.

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