

# False Lumen Catheterization in a Patient Who Has Type A Aortic Dissection That Mimics Acute Inferior Myocardial Infarction: A Case Report

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## ABSTRACT

We report a 61-year-old patient who suffered from a type A aortic dissection that mimicked an acute inferior myocardial infarction. During a routine cardiac catheterization procedure, diagnostic catheters can be inserted accidentally into the false lumen. Invasive cardiologists should keep this complication in mind.

## INTRODUCTION

Many conditions such as acute aortic dissection, pericarditis, and myocarditis may mimic acute myocardial infarction. One of them, acute type A aortic dissection can be confused with acute myocardial infarction, leading to delayed diagnosis and inappropriate treatment with antiplatelet, antithrombin, and fibrinolytic therapies [Hansen 2007]. Clinicians should be alert to patients with this condition because such patients can be saved by early diagnosis and treatment. We report a 61-year-old woman who had a type A aortic dissection that mimicked an acute inferior myocardial infarction.

## CASE REPORT

A 61-year-old woman who was a heavy smoker with a history of hypertension without regular treatment suddenly developed chest discomfort and then lost consciousness. She was referred to our hospital for primary transluminal coronary angioplasty with the diagnosis of acute inferior wall myocardial infarction with cardiogenic shock. She was semi-comatose when she was first seen in the emergency department. On admission, her pulse rate was 58/bpm and her blood pressure was 70/40 mmHg. A 12-lead surface ECG showed normal sinus rhythm with typical signs of acute inferior wall myocardial infarction (Figure 1). During cardiac catheterization, we first engaged the left main coronary artery using a left Judkins-4 diagnostic catheter without any resistance. The left coronary system was completely normal (Figure 2). Second, we pushed a right Judkins-4 diagnostic catheter into the ascending aorta without any resistance and we began to manipulate the catheter. Then, we noticed opacification of

a false lumen and obtained an angiographic view via a right Judkins-4 diagnostic catheter (Figure 3; Video). In this view, we saw a false lumen which included our diagnostic catheter, the true lumen, and recognized an aortic dissection flap below the false lumen. We realized that our diagnostic catheter was inside the false lumen and then we ended our procedure.

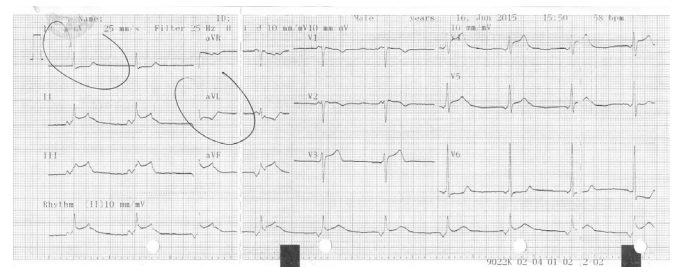


Figure 1. Typical sign of acute inferior wall myocardial infarction on surface ECG.



Figure 2. Anterior-posterior coronary angiographic view with cranial angulation demonstrating normal left anterior descending and circumflex coronary arteries.

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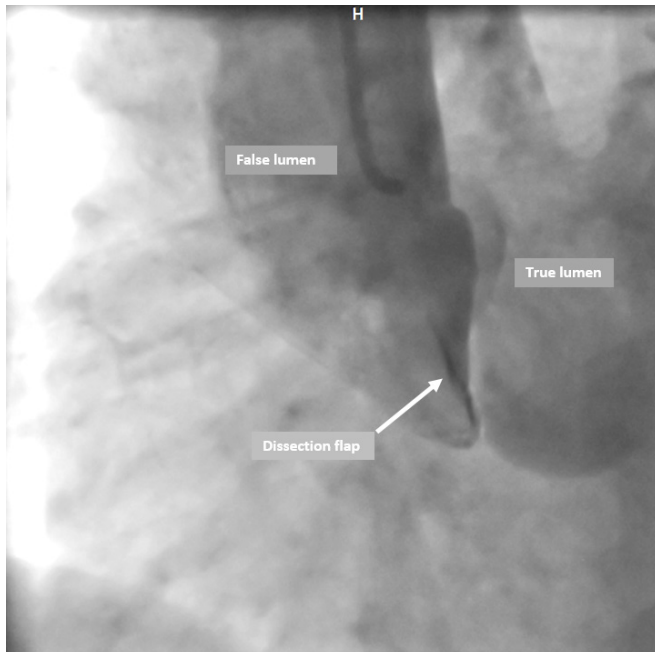


Figure 3. Aortographic view via right Judkins-4 catheter including false lumen with diagnostic catheter, true lumen, and aortic dissection flap.

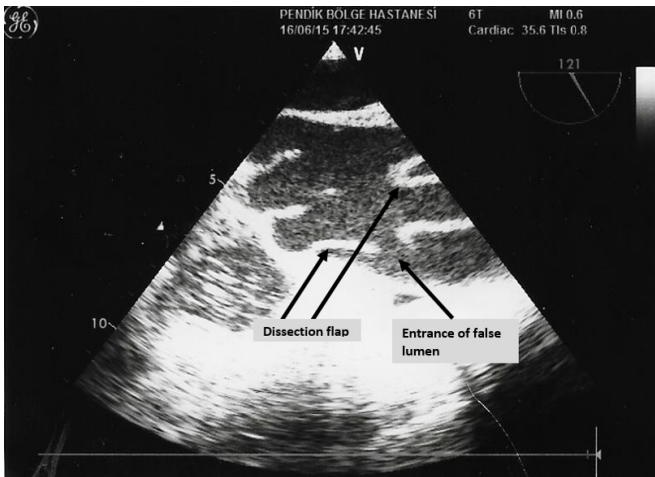


Figure 4. Aortic dissection flap in the ascending aorta on intraoperative long axis view of TEE at 121 degrees.

The patient was taken immediately to the operation room. During the operation, we assisted our surgical team via transesophageal echocardiography (TEE). In the TEE views, we confirmed the diagnosis of a type A aortic dissection (Figure 4). The ascending aorta was repaired with a Dacron graft but aorta-right coronary bypass graft couldn't be done since our surgical team couldn't see the right coronary artery in its bed. Postoperative transthoracic echocardiography showed left ventricle inferior wall hypokinesia and severe right ventricular dysfunction. The patient developed acute renal and multi-organ failure on the postoperative second day and died on the third postoperative day.

## DISCUSSION

The correct diagnosis of an acute Stanford type A aortic dissection may be a challenging process for physicians. Mortality in untreated acute aortic dissection (AAD) is estimated at more than 1% per hour after onset of symptoms, whereas 30-day survival for appropriately treated patients is greater than 80%. Therefore, timely diagnosis and rapid management of AAD are of paramount importance for the emergency physician [Von Kodolitsch 2000; Mészáros 2000]. Every patient with suspected AAD should undergo advanced imaging to confirm the diagnosis, establish Stanford classification, and detect valvular or branch involvement [Golledge 2008; Erbel 2001]. The European Society of Cardiology guidelines recommend CT aortography or TEE for diagnosis of AAD [Erbel 2001].

CT aortography has the advantage of imaging adjacent chest structures for alternative diagnoses [Erbel 2001]. It can delineate extent of dissection and branch compromise and is helpful in planning definitive surgical management [Golledge 2008]. Sensitivity and specificity are 94% and 77%, respectively. New ECG gating can eliminate motion artifact in structures close to the heart and may allow simultaneous imaging of the coronary and pulmonary arteries. This creates potential for a novel, single “triple rule-out” test for AAD, pulmonary embolism, and coronary artery disease, which is currently being studied [Smith 2008].

In our case, the first implication is that diagnostic catheters can easily be pushed into the false lumen without any resistance during routine cardiac catheterization, and operators must avoid aggressive catheter manipulation. Therefore, a discussion should be had regarding the necessity of cardiac catheterization for diagnostic purposes. Cardiac catheterization could have proved unnecessary if we had diagnosed acute type A aortic dissection and normal coronary anatomy via multidetector CT angiography, which had high negative predictive value. It could be hard to determine if there is a necessity for cardiac catheterization for certain diagnoses of coronary artery disease in situations when acute type A aortic dissection and abnormal coronary anatomy had been detected by multidetector CT angiography, which has a 77% specificity rate. There should be a balance between the value of knowing the entire coronary anatomy and the risk of aortic rupture with catheter manipulation.

The second important issue is that the right coronary artery couldn't be found at cardiac catheterization and in the operation room. This may have resulted from an obstruction of blood supply at the origin of the non-dominant right coronary artery by the aortic dissection flap. In this setting, CT angiography may help the surgical team to obtain a trace of coronary arteries prior to operation. Furthermore, the temporary right ventricular assist device and inhaled nitric oxide could be used for supporting the ischemic right ventricle in a potentially salvageable patient.

In conclusion, cardiologists should be aware of the possibility of a type A dissection if clinical signs of shock and loss of consciousness are present in the setting of an apparent inferior myocardial infarction. In this setting, transthoracic

echocardiography and multidetector CT angiography prior to catheterization could be performed, and then the necessity of cardiac catheterization for coronary anatomy should be meticulously questioned. Furthermore, invasive cardiologists shouldn't forget that the diagnostic catheters can easily enter into the false lumen.

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