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# Spontaneous left main coronary artery dissection, possibly due to cystic medial necrosis found in the internal mammary arteries.

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### **Abstract**

A 55-year-old male without previous medical history developed chest pain. Coronary catheterization showed left main coronary dissection. Coronary artery bypass grafting was performed using bilateral internal mammary arteries, which were very fragile. The internal mammary artery specimen sent for pathology showed cystic medial necrosis. (**Abstract word count 44**)

### **Introduction**

Spontaneous coronary artery dissection is an uncommon disease, which often occurs in pregnant or postpartum females but is rare in male.<sup>1</sup> Here we present a 55-year-old male without any coronary risk factors who developed spontaneous coronary artery dissection. Coronary artery bypass grafting (CABG) was performed using the bilateral internal mammary arteries (IMAs). During surgery, these IMAs were noted to be very fragile. Although postoperative recovery was steady and uneventful, pathology of the IMA showed cystic medial necrosis.

### **Case presentation**

A 55-year-old male without any previous medical history or coronary risk factors developed chest pain. EKG was normal but troponin was minimally elevated (1.4 ng/ml). The patient underwent coronary catheterization, which showed spontaneous coronary dissection of the left main trunk (Figure 1, Video 1).

The patient underwent an emergent CABG. Intraoperative echocardiography showed normal ventricular functions and normal appearance of the aorta. Bilateral IMAs were harvested in a skeletonized fashion without difficulty. The distal flow when the IMA was detached from the distal end was excellent. These left and right IMAs were used to bypass the obtuse marginal branch of the circumflex artery and the left anterior descending artery (LAD), respectively. During anastomoses, we noted that the IMA was too fragile to hold 7-0 suture. The IMAs had

appropriate thickness and there was no injury from harvest; however, it felt very soft and tore easily. The anastomoses were redone using 8-0 Prolene suture twice for the obtuse marginal artery and three times for the LAD due to fragility of the graft. After completion of the bypass, the graft flow was assessed by doppler and was considered excellent (80 ml/min for left IMA-obtuse marginal, 90 ml/min right IMA-LAD). Because of the abnormal quality of the IMA, pieces of the IMAs, one from left and another from right IMA were sent for pathological examination. The postoperative course was uneventful and the patient was discharged home 6 days after surgery. The pathology of the IMA showed cystic medial necrosis (Figure 2).

The patient was followed-up at his private medical doctor every other month. The patient remained symptom free 9 month after surgery even with his regular activities. Dobutamine stressed EKG and echocardiography performed at 1 and 6 month after surgery were normal.

### **Comments**

The prevalence of spontaneous coronary artery dissection is between 0.1 and 0.2% among those who undergo coronary angiographies.<sup>1, 2</sup> Spontaneous coronary artery dissection is female dominant (70-78%), and among these patients, one-third occur during pregnancy or the postpartum period.<sup>1, 3</sup> In most cases, dissection occurs without coronary risk factors or coronary atherosclerosis.<sup>3</sup> Most often the reported patients are healthy young to middle aged women (mean age of 40 years) without any risk factors.<sup>3</sup> In women, spontaneous coronary dissection often affects the left coronary system (84%), and in men, it often affects the right coronary artery (67%).<sup>3</sup> Sudden increase in blood pressure due to cocaine use or heavy exercise also may cause spontaneous coronary dissection. Collagen disease such as Marfan syndrome is also known to cause spontaneous coronary dissection.<sup>1, 3</sup> The patient described in this case report had no history of hypertension, illicit drug use, or intense exercise. He had no signs of Marfan syndrome or other collagen diseases.

Cystic medial necrosis of the coronary artery is rare, but it was reported to cause spontaneous coronary dissection.<sup>4</sup> The pathology of left main coronary artery dissection in our patient was not available. However, postoperative pathology of the internal mammary artery showed medial necrosis, and this may be speculated as the cause of the spontaneous coronary dissection. Hake et al reported a case of medial necrosis of the internal mammary artery.<sup>5</sup> The patient was a 55-year-old male who demonstrated a low free blood flow from the IMA stump and multiple hematomas on the pedicle of the IMA at the time of CABG. They used the IMA as a free graft and latter, pathology showed medial necrosis. Hake et al pointed out that their patient had sternal deformity compatible to Marfan syndrome; thus, they concluded that medial necrosis of the IMA could have been related to Marfan syndrome. However, our patient had no signs of Marfan syndrome, thus the cause of medial necrosis of the IMA in our case remained unknown.

The management of spontaneous coronary dissection would be coronary artery bypass or percutaneous coronary intervention with stent.<sup>6</sup> The patient presented here had an extensive left main lesion, thus surgical management was mandated. Because of the relatively young age of this patient and because of the lack of any risk factors of sternal infection such as diabetes, we proceeded to perform CABG using bilateral IMAs to bypass the LAD and the marginal artery.<sup>7</sup> Although abnormality of the quality of the IMAs was not appreciated while harvesting the vessels, we found the IMA to be very fragile and easily torn, during anastomosis and redo anastomosis was required. We did not perform any additional procedure because good graft flow was confirmed by intraoperative doppler. If we had not obtain a good doppler signal at the end of the surgery, we would have placed additional vein grafts to the target coronary arteries.

After reviewing the pathology of the IMA, the patient was placed under close observation. Fortunately, he has not developed any sings of graft failure to date; thus he did not undergo any invasive study. High resolution CT angiography has a potential role to evaluate coronary

dissection;<sup>8</sup> however its utility is still experimental. If any signs of ischemia develop to the patient, prompt angiography is warranted. Elective redo surgery using vein graft for this patient who had received IMA graft with a pathology is controversial because of risk of redo surgery and lack of symptoms.

### Legends of Figures

Figure 1: Preoperative coronary angiography showed dissection of the left main coronary trunk.

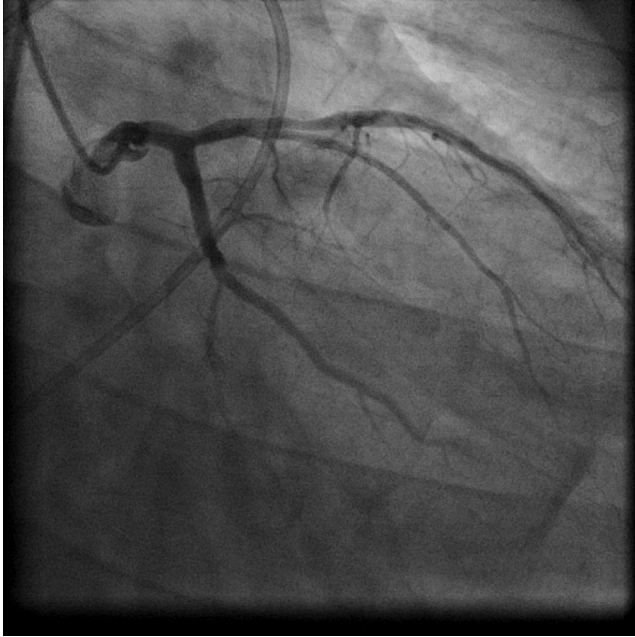
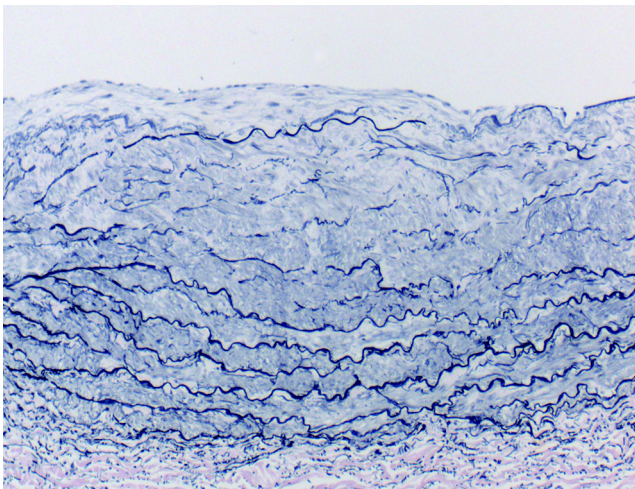


Figure 2: Patchy areas of elastin loss within the media of the internal mammary artery, consistent with cystic medial necrosis (elastic stain, original magnification 100x).



### Legend of Video

Video 1: Preoperative coronary angiography showed dissection of the left main coronary trunk.



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