

Coronary Stenting for Coronary Vasospasm Complicated with Refractory Ventricular Tachycardia and Fibrillation

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Coronary spasm usually respond to conventional medical treatment. Severe coronary spasm refractory to intensive anti-anginal treatment can be catastrophic and result in myocardial infarction, severe cardiac arrhythmia and sudden death. We report a 58-year-old male with coronary spasm refractory to conventional treatment developed refractory ventricular tachycardia and fibrillation and received emergent stenting of the right coronary artery. He remained asymptomatic after 24-month follow-up.

Key Word: Coronary spasm • Coronary stenting

INTRODUCTION

Coronary spasm, originally described as Prinzmetal's (or variant) angina,¹ usually responds to conventional treatment with nitrates and calcium antagonists. However, severe coronary spasm refractory to intensive anti-anginal treatment can be catastrophic because prolonged occlusion of a major coronary artery can result in myocardial infarction, severe cardiac arrhythmia and sudden death.² For vasospasm refractory to medical therapy, there have been a limited number of case series of percutaneous intervention with variable results.^{3,4} Here, we report on a patient with coronary spasm refractory to conventional treatment, who developed refractory ventricular tachycardia and fibrillation and received emergent stenting of the right coronary artery (RCA).

CASE REPORT

A 58-year-old male presented with sudden onset of epigastric pain with cold sweating in the morning. He was sent to the emergency room (ER) where electrocardiogram (ECG) revealed ST elevation over the inferior leads. The patient was then admitted to our coronary care unit with a diagnosis of acute inferior wall myocardial infarction. He had a 30 pack-per-year history of smoking, with two prior hospital admissions. The first admission was approximately 6 months prior, when the patient received coronary angiography following several ER visits; due to symptoms of epigastric pain with cold sweating. A coronary angiogram showed the patient's patent coronary artery. The second admission was approximately four months prior, where he was admitted through the ER again for a similar attack of epigastric pain with cold sweating. At that time, an ECG revealed a complete atrioventricular block, and hypotension was also noted. Temporary transvenous pacing was given for hemodynamic support, and proper sinus rhythm was restored one day later. Etiology was presumed to be related to right coronary artery vasospasm. The patient was prescribed nitrate (sorbitrate 10 mg tid) and calcium antagonists (diltiazem retard 90 mg bid) after discharge. But his symptoms still occurred even after nicorandil (5

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mg tid) was added, and medication dosage was increased (diltiazem retard to 180 mg bid). Thereafter, sometimes the patient would gain fast relief from his symptoms, and other times a return trip to the ER was necessary.

We administered intravenous nitroglycerine (NTG) infusion after admission, and the symptoms and ECG changes subsided thereafter. The dose was then gradually tapered down on the second day of coronary care unit stay. Unfortunately, chest pain recurred during the night, and although nitroglycerine infusion was given, the symptom persisted. ECG and cardiac enzyme follow-up showed no abnormal change. That same night, a sudden attack of asystole was found, and cardiopulmonary cerebral resuscitation was immediately started. Ventricular tachycardia (VT) and then ventricular fibrillation (VF) developed; he received repeated cardioversion due to recurrent attack of ventricular arrhythmia. Emergent Intraaortic balloon counterpulsation (IABP) and then extracorporeal membrane oxygenation (ECMO) were performed. The patient was sent for emergent catheterization study which revealed right coronary artery severe diffuse spasm (Figures 1A and B). After repeated 200 microgram NTG intracoronary infusions (Figure 1C), the spasm gradually recovered from distal. After we deployed a 4.0 mm × 32 mm Liberte bare metal stent over the proximal RCA, the patient's follow-up angiogram returned to normal. Just after the patient was removed from the table, the heart monitor showed VT again. He was then immediately moved back to table, where another angiogram showed severe spasm over the middle RCA just below the stent site (Figure 1D). Another 4.0 mm × 28 mm Liberte stent then deployed over the middle RCA. Sinus rhythm was restored and remained thereafter. The patient regained consciousness and his vital signs stabilized. After the ECMO and IABP were gradually removed, and extubation performed, the patient was discharged uneventfully.

The patient continued to receive medical treatment and remained asymptomatic after 12 months of follow-up. Coronary angiography after one year revealed approximately 70% stenosis over the junction site of two stents, a 4.0 mm × 20 mm Taxus-Liberte stent was deployed. The patient remained asymptomatic thereafter.

DISCUSSION

In this case, the patient first presented as refractory

variant angina with repeated attack of right coronary artery spasm, which was resistant to optimal medical therapy. In most patients with variant angina, the treatment with calcium blockers and nitrates alone, or in combination therapy, has been effective in preventing angina attacks. However, 5% to 30% of patients with variant angina are refractory to full medical treatment with calcium blockers and nitrates.⁵

The patient later presented a very serious, but rare refractory ventricular arrhythmia, which was also life threatening. Hung et al. had demonstrated coronary vasospasm as the cause of acute coronary syndrome in patients with normal, or near-normal coronary arteries by intracoronary ergonovine testing.⁶ In their study, 3.2% of patients in this hemodynamically insignificant coronary artery disease group developed life-threatening cardiac arrhythmias. Complete atrioventricular block was the most common arrhythmia, followed by ventricular fibrillation and sinus arrest. All of these arrhythmic complications were preceded by ST-segment elevation and/or chest pain. Two consecutive emergent stents were deployed during this attack of refractory ventricular arrhythmia. Although the one year follow-up and post-surgical angiogram revealed re-stenosis over

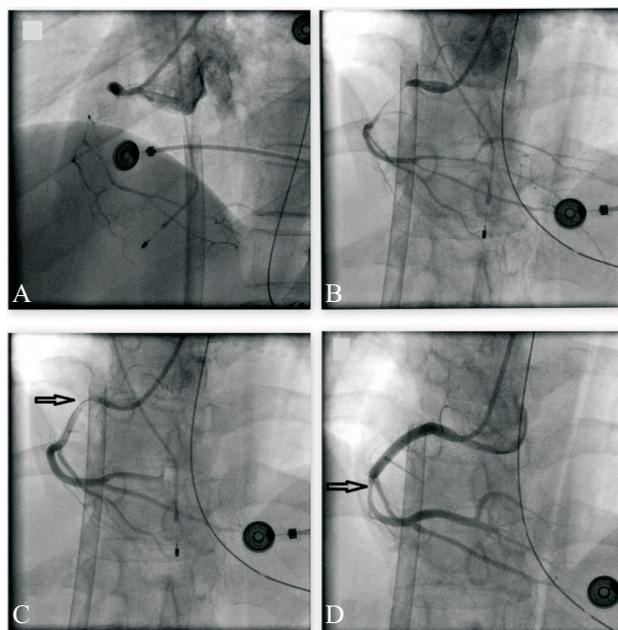


Figure 1. (A) and (B) Right coronary angiogram showed diffuse severe vasospasm. (C) Relief of vasospasm in post-proximal segment after repeated NTG infusion. (D) Vasospasm over middle segment just below the stent site.

the stent junction site, the patient remained quite asymptomatic during this period. Initial experience with angioplasty alone for refractory vasospasm was disappointing.⁷ However, in the stenting era, a few series and case reports have shown promising results in focal vasospasm.^{8,9} There are reports in the literature similar to our case, describing good one-year results for long stenting for multi-focal coronary vasospasm.⁹ Use of implantable cardioverter-defibrillator (ICD) implantation in patients with variant angina complicated by ventricular arrhythmia has been studied.¹⁰ Although it seems reasonable to utilize ICD for patient suffering from this fatal arrhythmia, the efficacy of ICD therapy in these cases may be hampered by a marked transient depression of left ventricular function due to refractory severe ischemia. Furthermore, spontaneous remission of variant angina can occur, which suggests that ICD implantation in some patients may represent an unnecessary solution for a temporary problem. Consequently, it remains controversial.

In this rare case presented as refractory variant angina complicated with refractory ventricular arrhythmia, even after receiving coronary stenting, optimal medical treatment and abstinence from smoking still should be the most essential parts of therapy.

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