Treatment of Spontaneous Left Main Coronary Artery Spasm with a Drug-Eluting Stent

Hsin-Hua Chou,1 Kun-Eng Lim2 and Yu-Lin Ko1

Variant angina due to spontaneous left main trunk spasm is rarely reported in the literature. Despite intensive medical treatment or surgical intervention, patients may still suffer from recurrent symptoms. We describe a 70-year-old male patient who had spontaneous left main coronary artery spasm with recurrent angina. The patient was successfully treated with a drug-eluting stent and remained free of symptoms at a 2-year clinical follow-up.

Key Words: Variant angina • Left main trunk spasm • Drug-eluting stent

INTRODUCTION

Coronary artery vasospasm plays an important role in the genesis of variant angina. It primarily occurs in the right coronary artery, and less commonly in the left anterior descending coronary artery.1 While patients with variant angina suffer recurrent episodes of chest pain, long-term survival is excellent for those diagnosed with variant angina.2 In contrast, if the angina is a result of spontaneous spasm in the left main coronary artery, rarely reported in the literature, patients may experience malignant ventricular fibrillation and even sudden death.3,4 Moreover, despite intensive medical treatment with nitrate and calcium channel blocker, some of these patients still have refractory angina. Oftentimes, coronary artery bypass surgery or surgical coronary angioplasty is required in this subset of patients. Here, a case of refractory angina caused by spontaneous left main coronary artery spasm is described. The lesion was successfully treated with a drug-eluting stent with good long-term (i.e., two-year) results, suggesting that drug-eluting stents are a viable treatment option for isolated left main trunk (LMT) spasm.

CASE REPORT

A 70-year-old man presented with history of progressive angina pain that occurred while exercising and at rest for 10 months’ duration. The patient reported no health concerns until several years before this examination, when he began to suffer from precordial chest tightness with exertion. His chest discomfort usually persisted for several minutes and could only be relieved by rest or sublingual nitroglycerin. Since early 2004, the episodes of chest discomfort had increased in frequency and were often associated with cold sweats. The patient had history of hyperlipidemia but reported no other ailments.

Clinical examination was unremarkable, and the resting electrocardiogram showed a sinus rhythm. A treadmill exercise test with Bruce protocol was performed, but stopped at the seventh minute at a heart rate of 144 beats/min, due to severe angina, marked horizontal ST-segment depression in the inferolateral leads and 3-mm ST segment elevation at aVR, and a drop of systolic blood pressure from 181 mmHg to 93 mmHg.

Coronary arteriography by Judkin’s technique was...
performed due to the strong evidence suggestive of myocardial ischemia. Selective right coronary angiography revealed patent right coronary artery (Figure 1A), and a patent left main trunk was noted when contrast medium was injected without selective engagement of the left coronary artery. A significant spasm over the proximal left main trunk was noted when the Judkin left catheter selectively engaged in the left coronary artery (Figure 1B). Sublingual nitroglycerin was administered to the patient, and an improvement in the patient’s discomfort was noted. The selective left coronary angiography was then repeated and a patent left main coronary artery was noted (Figure 2A). The catheter was removed since the procedure was complete. However, the patient suddenly developed severe chest pain in the catheterization laboratory, and his blood pressure decreased to 76/44 mmHg. Repeat coronary angiography revealed an extreme narrowing of the left main coronary artery again. Intravascular ultrasound was performed to evaluate the left main coronary artery lesion, and no dissection or atherosclerotic lesion of the left main coronary artery was identified. Since the patient had recurrent chest pain associated with hypotension in the absence of catheter, a presumptive diagnosis of left main coronary artery spasm was made.

The decision was made to perform direct stenting using a drug-eluting stent to treat the left main coronary artery spasm. After successful wiring of the left anterior descending artery and left circumflex artery via a 6 French Judkin left catheter, a Taxus 3.5 × 16-mm stent (Boston Scientific, Natick, MA) was deployed in the left main coronary artery and left anterior descending artery directly (Figure 2B). Kissing balloon technique was applied for the left main coronary artery, the proximal portion of the left anterior descending artery and the proximal portion of the left circumflex artery. This intervention completely relieved the patient’s angina.

Post-stenting, the patient was prescribed long-acting nitrate and calcium channel blockers. Angiography, repeated at 2 weeks and 6 months post-stenting, revealed a patent coronary tree without evidence of restenosis (Figure 2C). A treadmill exercise test performed 1 year later showed no evidence of myocardial ischemia, and a computed tomography angiogram of coronary arteries, also performed 1 year after stenting, revealed patent coronary arterial trees, including the stented segment of the left main coronary artery (Figure 2D). The patient remained asymptomatic at 2-year follow-up.

DISCUSSION

The prognosis of patients with coronary artery spasm in the absence of significant coronary artery disease appears to be relatively good. In a large series of 277 pa-
patients with a median follow-up of 7.5 years, cardiac death and myocardial infarction were relatively infrequent and occurred in 3.5% and 6.5% of patients, respectively. However, recurrent angina was commonly reported, and occurred in 39% of patients. While long-acting calcium antagonist, nitrates and nicorandil are frequently employed for symptom relief, ultimately, medical treatment is usually ineffective. Indeed, in a study performed by Sueda et al., up to 42% of patients with pure coronary spastic angina had more than one attack per month irrespective of the administration of calcium antagonist or isosorbide dinitrate. Increasing the dosage of these medications may alleviate the anginal symptom; however, adverse effects due to higher doses or different combinations of agents may lead to discontinuation of therapy.

When medical therapy is ineffective in symptom control for patients with variant angina, surgical intervention is usually considered. Coronary artery bypass grafting with saphenous vein or internal mammary artery is the most commonly recommended surgical procedure. However, results have been variable in that higher rates of recurrent angina and graft occlusion have been reported, especially when the saphenous vein is used for grafting.

Surgical angioplasty with plexectomy is another option for the surgical management of variant angina. This technique is preferred to conventional coronary artery bypass grafting because it results in a more physiologic perfusion of the coronary tree and prevents competitive flow risk. The long-term clinical outcome of this technique, however, remains controversial.

Coronary angioplasty is another choice of treatment in patients with coronary artery spasm superimposed on atherosclerotic narrowing. Although high procedural success rates are reported, recurrent symptoms due to coronary spasm usually persist or recur, often accompanied with restenosis. Intracoronary stent implantation represents an attractive therapeutic option in patients with persistent coronary spasm refractory to conventional medical therapy. The therapeutic effect of stenting, however, is potentially limited by the stimulation of neointimal proliferation and the occurrence of spasm at the unstented sites along the length of the vessel, and possibly at the stent-edge.

Isolated spontaneous left main coronary artery spasm is rarely reported in the literature. Of the twelve patients with isolated left main coronary artery spasm included in ten case reports, seven patients were treated medically (i.e., calcium channel blockers and/or nitrates) and five patients were managed surgically, either with coronary artery bypass graft or surgical angioplasty. Not one of these patients was treated via coronary angioplasty, which makes the case described above truly unique. Further, our patient with severe spontaneous left main coronary artery spasm treated with a Taxus drug-eluting stent enjoyed long-term relief from his condition.

To our knowledge, this is the first patient with isolated spontaneous left main coronary artery spasm successfully managed with a drug-eluting stent. Thus, this technique should be considered as a viable option for isolated LMT spasm, and further research using this modality is encouraged. While there may be some criticism about the procedure, such as recurrent spasm in other site of coronary artery, and possible subacute and late thrombosis of drug-eluting stents, we believe that for patients with severe isolated left main coronary artery spasm who have recurrent symptoms and who are in high risk of sudden cardiac death and malignant cardiac arrhythmia, coronary angioplasty with the implantation of a drug-eluting stent in combination with medical treatment provide an alternative treatment option.

REFERENCES