

Coronary Stenting and Medication in Refractory Variant Angina— A Case Report

Chih-Wei Chen, Tin-Kwang Lin, Chih-Da Lin, Bin-Chen Chen, Chih-Jen Liu, Chin-Lon Lin

Division of Cardiology, Department of Internal Medicine, Buddhist Dalin Tzu Chi General Hospital, Chia Yi, Taiwan

ABSTRACT

A 56-year-old man had suffered from intermittent chest tightness with cold sweats, dyspnea and near syncope for years. Amlodipine, trichlormethiazide and isosorbide-5-mononitrate were prescribed with no relief. A treadmill exercise test disclosed significant exercise related ST-T elevation over the anterior leads accompanied by chest pain. Nonsustained ventricular tachycardia was noted at peak exercise rate. Coronary angiography showed proximal left anterior descending coronary artery (LAD) stenosis (50%). LAD spasm with transient transmural ischemia complicated by ventricular tachycardia was highly suspected. Stenting for this proximal LAD lesion was performed. The patient was readmitted to our hospital 3 days after the procedure because of chest pain. He had ceased taking the prescribed drugs for 1 day. The chest pain severity was, however, far less than before. Repeat coronary angiography revealed a severe left coronary spasm, sparing the stent site. He was well after discharge with medications including isosorbide-5-mononitrate (40 mg), long-acting nifedipine (30 mg) and diltiazem (180 mg). This case demonstrates that coronary stenting is effective for refractory coronary spasm with discrete coronary artery stenosis. It possibly prevented life-threatening arrhythmia. Medications such as nitrates and long-acting calcium channel blockers should be prescribed even after stent placement. (*Tzu Chi Med J* 2003; 15:185-189)

Key words: variant angina, coronary spasm, coronary stenting

INTRODUCTION

Variant angina, also called Prinzmetal's angina, was first described by Prinzmetal et al in 1959 [1]. They described 32 subjects with "variant" angina pectoris who complained of chest pain at rest. An electrocardiogram obtained during chest pain showed ST-segmental elevation. Prinzmetal et al hypothesized that variant angina was caused by transient increases in the coronary arterial tone (i.e. vasospasm) at the site of an atherosclerotic plaque, leading to repetitive episodes of transmural myocardial ischemia. The cornerstone of therapy for patients with variant angina pectoris is calcium-channel blockers, alone or in combination with long-acting nitrates [2-6]. Transluminal coronary angioplasty or coronary artery bypass grafting is sometimes required but

the efficacy is not as good as for typical angina pectoris [7,8]. Coronary stenting has been prescribed for patients with coronary spasm refractory to medical treatment. Herein, we report a case of variant angina refractory to medical treatment successfully managed by coronary stenting in combination with medication.

CASE REPORT

A 56-year-old man with a history of hypertension and hypercholesterolemia visited our clinic in October, 2000. He had suffered from intermittent chest discomfort, cold sweats and presyncope for many years. The symptoms were not related to physical effort and the duration of each episode was around 3 to 20 minutes.

Received: November 5, 2002, Revised: December 3, 2002, Accepted: January 13, 2003

Address reprint requests and correspondence to: Dr. Ting-Kwang Lin, Division of Cardiology, Department of Internal Medicine, Buddhist Dalin Tzu Chi General Hospital, 2, Min Sheng Road, Dalin, Chia Yi, Taiwan

Isosorbide-5-mononitrate (40 mg), amlodipine (5 mg) and trichlormethiazide (2 mg) were prescribed for hypertension and angina with no relief. A resting ECG was normal at the initial presentation. A treadmill exercise test performed in February, 2001 elicited chest pain and ST-segment elevation in leads V1 to V4 with delayed recovery (Fig.1). Nonsustained ventricular tachycardia (not demonstrated here) and paired VPCs were noted at the peak exercise rate and in the early recovery phases (Fig. 2). Coronary angiography disclosed a 50% discrete stenosis at the proximal left anterior descending coronary artery which was not relieved by nitroglycerin (NTG) infusion (Fig. 3). A 3.0×9 mm NIR stent (Boston Scientific) was deployed at the discrete lesion. He was discharged the next day. He was readmitted to our hospital 3 days later due to chest tightness at rest and dyspnea. The chest pain severity was, however, far less than before. One tablet of nitroglycerine (0.6 mg) was given sublingually and the chest pain subsided immediately. He reported that he had ceased taking the pre-

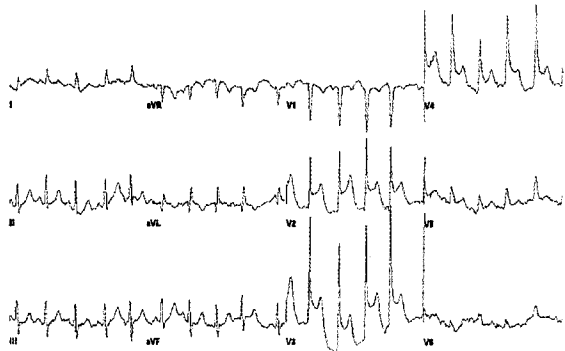


Fig. 1. Treadmill exercise test in stage 2 shows sinus tachycardia with ST segment elevation in leads V1 to V4.

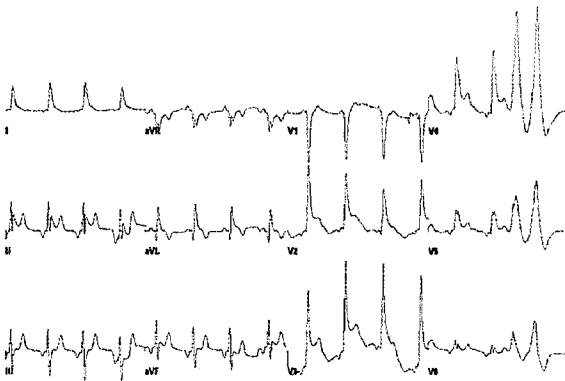


Fig. 2. Treadmill exercise test in the early recovery phase shows ectopic atrial rhythm and ST segment elevation in leads V1 to V4 with paired VPCs.

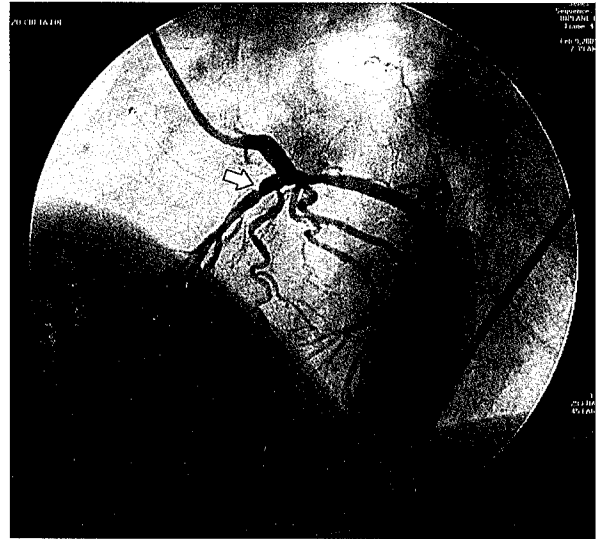


Fig. 3. Coronary angiography shows a 50% stenosis (arrow) at the proximal left anterior descending artery in the left anterior oblique view.



Fig. 4. Coronary angiography shows a diffuse spasm in the left coronary arteries (arrow head) in the left anterior oblique view with the stent site spared (arrow).

scribed medication for one day. Repeated coronary angiography disclosed a severe coronary spasm in the left coronary artery, sparing the stent site (Fig. 4). Intracoronary injection of 100 micrograms of nitroglycerin was given and the spasm improved gradually. Slow-release nifedipine (30 mg), diltiazem (180 mg), and isosorbide-5-mononitrate (40 mg) were prescribed after discharge. The patient has remained well.

DISCUSSION

Variant angina is caused by a transient coronary spasm resulting in myocardial ischemia and chest pain [1]. Angiography has shown that a transient coronary artery spasm can occur in arteries with or without significant atherosclerotic coronary artery disease [9]. Most patients become symptom-free with calcium channel blockers, alone or in combination with long acting nitrates [2-6]. Several calcium blockers, such as verapamil, diltiazem, nifedipine, amlodipine and felodipine have been shown to be efficacious in reducing the frequency of chest pain, sublingual nitroglycerine usage, and transient ST-segment deviation [2-6,10,11]. Occasionally, some patients with variant angina suffer from complications, such as high degree AV block, myocardial infarction, ventricular tachyarrhythmia or sudden cardiac death [12-15]. Some cases may be refractory to medical therapy, especially those with significant fixed coronary stenosis. Transluminal coronary angioplasty or coronary artery bypass grafting have been tried but the results have not been promising [7,16].

Variant angina was diagnosed in this case based on the treadmill exercise test, which showed chest tightness accompanied by ST-T elevation in leads V1 to V4. Diagnostic coronary angiography showed a 50% stenosis at the proximal part of the LAD. This means that total occlusion occurred at the stenosis during coronary spasm. We knew that the coronary spasm was not induced by stent placement from the results of the treadmill exercise test which was done before coronary stenting. The patient felt near-syncope at the peak exercise rate when the ECG showed non-sustained ventricular tachycardia. This phenomenon was similar to the situation before stenting when the angina was refractory to nitrates and calcium channel blockers. A coronary stent was deployed at the stenosis to resolve refractory angina symptoms and prevent life-threatening ventricular arrhythmia. This approach is supported by many authors who recommend coronary stenting for refractory variant angina [17-20]. Gaspardone and associates concluded in a nine-case study that intracoronary stenting represents an attractive therapeutic option in patients with vasospastic angina refractory to aggressive medical therapy when the vasospastic coronary artery segment can be clearly identified [21].

As mentioned above, coronary stenting is useful in cases of variant angina which are refractory to medical treatment. We found no reports of calcium channel blocker and nitrate use after stent placement. This case demonstrated that these medications are indeed necessary even after stent placement. Coronary spasm is a diffuse disease. Stent placement can prevent total oc-

clusion at the preexisting stenosis and possibly reduce the risk of myocardial infarction or ventricular tachyarrhythmia when diffuse coronary spasm occurs. It cannot prevent diffuse spasm beyond the stent. This is why that the patient's symptoms became less severe after stent placement but were not totally resolved. We should emphasize that medications are the cornerstone of treatment for diffuse coronary spasm.

In conclusion, coronary stenting at a discrete stenosis is effective in cases of variant angina that are refractory to calcium channel blockers and nitrates. Stenting can prevent transient total occlusion when a discrete stenosis is superimposed on a spasm and can further prevent ventricular tachyarrhythmia and possible myocardial infarction or sudden death. Without calcium channel blockers and nitrates, symptoms may recur, even though the severity is far less after stent placement. For refractory variant angina, coronary stenting at a fixed stenotic lesion in addition to calcium channel blockers and nitrates for the diffuse spasm is the treatment choice.

REFERENCES

1. Prinzmetal M, Kennerly R, Merliss R, et al: Angina pectoris. I. A variant form of angina pectoris. *Am J Med* 1959; **27**:375-388.
2. Lombardi M, Morales MA, Michelassi C, Moscarelli E, Distanti A, L'Abbate A: Efficacy of isosorbide-5-mononitrate versus nifedipine in preventing spontaneous and ergonovine-induced myocardial ischemia. A double-blind, placebo-controlled study. *Eur Heart J* 1993; **14**:845-851.
3. Chahine RA, Feldman RL, Giles TD, et al: Randomized placebo-controlled trial of amlodipine in vasospastic angina. Amlodipine Study 160 Group. *J Am Coll Cardiol* 1993; **21**:1365-370.
4. Morikami Y, Yasue H: Efficacy of slow-release nifedipine on myocardial ischemic episodes in variant angina pectoris. *Am J Cardiol* 1991; **68**:580-584.
5. Winniford MD, Johnson SM, Mauritson DR, et al: Verapamil therapy for Prinzmetal's variant angina: Comparison with placebo and nifedipine. *Am J Cardiol* 1982; **50**:913-918.
6. Ardissino D, Savonitto S, Mussini A, et al: Felodipine (once daily) versus nifedipine (four times daily) for Prinzmetal's angina pectoris. *Am J Cardiol* 1991; **68**:1587-1592.
7. Shubrooks SJ Jr, Bete JM, Hutter AM Jr, et al: Variant angina pectoris: Clinical and anatomic spectrum and results of coronary bypass surgery. *Am J Cardiol* 1975; **36**:142-147.
8. David PR, Waters DD, Scholl JM, et al: Percutaneous transluminal coronary angioplasty in patients with variant angina. *Circulation* 1982; **66**:695-702.
9. Maseri A, Pesola A, Marzilli M: Coronary vasospasm in angina pectoris. *Lancet* 1977; **1**:713-717.

10. Schroeder JS, Feldman RL, Giles TD, et al: Multiclinic controlled trial of diltiazem for Prinzmetal's angina. *Am J Med* 1982; **72**:227-232.
11. Scholl JM, Veau P, Benacerraf A, Brau M, Hennetier G, Achard F: Long-term prognosis of medically treated patients with vasospastic angina and no fixed significant coronary atherosclerosis. *Am Heart J* 1988; **115**: 559-564.
12. Delacretaz E, Kirshenbaum JM, Friedman PL: Prinzmetal's angina. *Circulation* 2000; **101**:E107-108.
13. MacAlpin RN: Cardiac arrest and sudden unexpected death in variant angina: Complications of coronary spasm that can occur in the absence of severe coronary stenosis. *Am Heart J* 1993; **125**:1011-1017.
14. Myerburg RJ, Kessler KM, Mallon SM, et al: Life-threatening ventricular arrhythmias in patients with silent myocardial ischemia due to coronary-artery spasm. *N Engl J Med* 1992; **326**:1451-1455.
15. Fukai T, Koyanagi S, Takeshita A: Role of coronary vasospasm in the pathogenesis of myocardial infarction: Study in patients with no significant coronary stenosis. *Am Heart J* 1993; **126**:1305-1311.
16. David PR, Waters DD, Scholl JM, et al: Percutaneous transluminal coronary angioplasty in patients with variant angina. *Circulation* 1982; **66**:695-702.
17. Gupta S, Schiele F, Vuilleminot A, Appfel F, Bassand JP: Coronary stent for variant angina: Atypical presentation. *Cathet Cardiovasc Diagn* 1998; **45**:439-441.
18. Lopez JA, Angelini P, Leachman DR, Lufschanowski R: Gianturco-Roubin stent placement for variant angina refractory to medical treatment. *Cathet Cardiovasc Diagn* 1994; **33**:161-165.
19. Kuppens C, Put P, Mertens D, Jaspers L, Dendale P, Benit E: Coronary NIR stent implantation for refractory variant angina. *Acta Cardiol* 1998; **53**:169-171.
20. Serrador A, Roman JA, Duran JM, Gimeno F, Vega JL, Fernandez-Aviles F: Successful treatment of vasospastic angina with a coronary stent. *J Invasive Cardiol* 2000; **12**:586-588.
21. Gaspardone A, Tomai F, Versaci F, et al: Coronary artery stent placement in patients with variant angina refractory to medical treatment. *Am J Cardiol* 1999; **84**: 96-98.



冠狀動脈金屬支架置放合併藥物治療於頑固的變異型心絞痛—病例報告

陳志暉 林庭光 林志達 陳炳臣 留志仁 林俊龍

佛教大林慈濟綜合醫院 心臟內科

摘要

一位56歲男性因陣發性胸悶合併冒冷汗，喘及瀕臨昏厥有數年之久而至本院就醫。初期對於抗絞痛藥物 (amlodipine 及 isosorbide-5-mononitrate) 之反應不佳。運動心電圖顯示胸痛合併胸前導程ST波段上升並產生非持續的心室頻脈，冠狀動脈攝影顯示左前降枝近端有50%的窄縮。根據此二檢查，推測左前降枝近端產生厲害的冠狀動脈痙攣，因而將一冠狀動脈支架置放於左前降枝狹窄處。病患在出院以後兩天都沒有症狀，自行停藥，結果在停藥一日後症狀復發，但較為輕微。再一次心導管檢查發現除了支架置放處外的左前降枝均顯示厲害的冠狀動脈痙攣。因此在出院後投予長效型的 isosorbide-5-mononitrate, nifedipine 及 diltiazem，自此之後症狀才消除。此病例證實對於對藥物反應不良頑固的變異型心絞痛，可以冠狀動脈金屬支架置放於窄縮處以減輕症狀，甚至避免致命性的心律不整，但是長效型硝氮鹽及鈣離子阻斷劑不可因而省略不用。(慈濟醫學 2003; 15:185-189)

關鍵語：變異型心絞痛，冠狀動脈痙攣，冠狀動脈金屬支架

收文日期：91年11月5日，修改日期：91年12月3日，接受日期：92年1月13日

抽印本索取及聯絡地址：嘉義縣大林鎮民生路2號 佛教大林慈濟綜合醫院心臟內科 林庭光醫師

