Acta Cardiol Sin 2000; 16:55-60

Case Report

Left Main Coronary Artery Disease in Two Middle - Aged Women — A Report of Two Cases and Clinical Implications

Chi-Hung Huang , Meng-Ling Chen, Paul H. Chen
Section of Cardiology, Department of Medicine, Cathay General Hospital, Taipei, Taiwan

Abstract: Left main (LM) coronary artery disease is a dreadful clinical condition which is associated with high mortality. However, it occurs rarely in middle-aged females. Recently we encountered two such patients; they had similar clinical manifestations but strikingly different angiographic findings. Case 1 had solitary ostial left main stenosis with the remainder of the coronary circulation nearly normal. Case 2 was found to have diffuse triple-vessel coronary disease with left main involvement. They both underwent coronary artery bypass surgery uneventfully. In such patients, life expectancy will often surpass the longevity of the grafts, and a second operation may be anticipated in their later life. An evolving surgical technique, the minimally invasive direct coronary artery bypass grafting (MIDCAB), has been reported to be very effective in young and otherwise healthy patients with single-vessel disease in the anterior circulation. Percutaneous transluminal coronary angioplasty (PTCA) with stenting for LM disease has been performed in selected patients with high rate of success. Thus, one might consider one of these less traumatic procedures to be a more desirable modality in case 1, as a temporizing measure and leaving the more extensive revascularization procedure for a future time. Our two patients were presented and their treatment strategies were discussed in this article.

Key Words: Left main disease; Percutaneous transluminal coronary angioplasty; Coronary stent; Minimally invasive coronary artery bypass grafting.

Introduction

Coronary artery disease is a serious disease and a major cause of morbidity and mortality among women beyond childbearing age, but it rarely occurs in premenopausal women. Left main coronary artery stenosis is the most serious form of coronary artery disease, and coronary artery bypass graft surgery is considered the standard treatment of choice.[1] Recently we encountered two middle-aged women who presented with similar clinical pictures but their coronary angiographic examinations appeared to have two distinct morphologic patterns. The differences presented and the possible therapeutic implications are discussed.

Received December 27, 1999; **Accepted** February 16, 2000
Correspondence: Dr. Paul H. Chen
Section of Cardiology, Department of Medicine, Cathay General Hospital, No. 280, Sec. 4, Ren-Ai Road , Taipei 106, Taiwan, R.O.C.
Tel: 886-2-2708-2121 ext. 3100; Fax: 886-2-2754-0222

Case Presentation

Case 1

A 45 year-old married woman began to experience effort chest pain one month before admission. She had no history of hypertension, diabetes, cigarette smoking, hyperlipidemia or family history of coronary artery disease. She still had a normal menstrual cycle. Her exercise ECG test by standard Bruce protocol demonstrated horizontal ST segment depressions in Leads I, II, III, aVF, V_2-V_6 at stage 2 with chest pain similar to her usual symptoms. At cardiac catheterization, angiograms revealed an 80% aorto-ostial stenosis of the left main coronary trunk without collateral circulation; the remainder of her coronary tree was essentially free of atherosclerotic plaque (Fig. 1A). To ascertain the physiologic significances of this ostial left main disease, a Thallium 201 SPECT myocardial perfusion scan was obtained which demonstrated a large area of severe reversible ischemic myocardium in the anterior wall and another area of reversible ischemic myocardium in the anterolateral wall with marked LV dilatation(Fig. 1B). These abnormal findings were compatible with critical left main coronary stenosis. The patient laboratory examinations, including CBC, renal function, liver function, glucose, total cholesterol, HDL-cholesterol, triglyceride, partial thromboplastin (PTT), prothrombin time (PT), protein C, protein S, antiphospholipid antibody, and antinuclear antibody, were all within the normal ranges. She received coronary artery bypass graft surgery (CABG) and was discharged 2 weeks later without complications.

Case 2

Another 45 year-old married obese woman without smoking had a case of hypertension and hyperlipidemia but was irregularly treated for nearly 10 years. She was admitted because of experiencing effort chest pain for one month before admission. This effort chest pain was associated with cold sweating and with radiation to her jaws. Resting ECG showed a normal sinus rhythm and ST segment depressions in the precordial leads. Her coronary angiograms showed severe triple-vessel coronary artery disease. There was a 75% discrete eccentric stenosis in the distal left main trunk, and a 90% discrete eccentric stenosis in the proximal LAD, a 95% discrete eccentric stenosis in the intermediate branch, a 90%

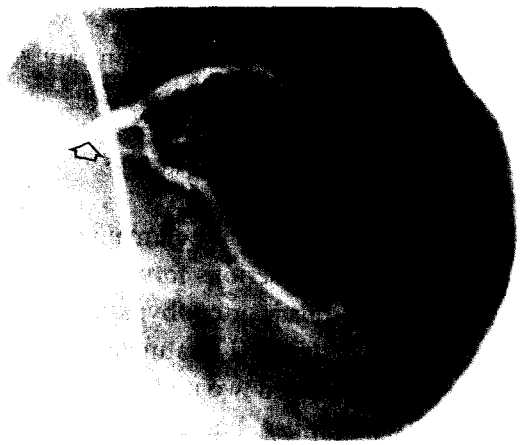

Fig. 1A. Left coronary angiography in RAO caudal view showed 80% ste nosis in ostial left main coronary artery. No back flow was found in this view(arrow). The remaining coronary tree was free of atherosclerotic plaque.

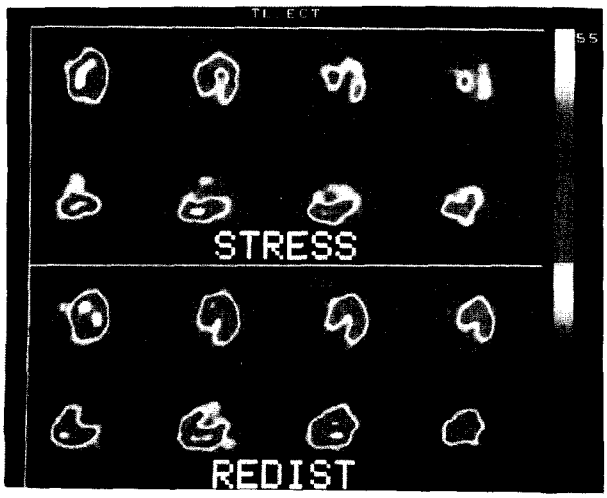

Fig. 1B. Depicted is the large area of severe reversible ischemic myocardium in the anterior wall and another area of reversible ischemic myocardium in the anterolateral wall with marked LV dilatation.

discrete eccentric stenosis in the RCA, and a 95% discrete eccentric stenosis in the PDA(Figs. 2A, 2B). The blood pressure during the procedure was 150/90 mmHg and her laboratory data revealed a cholesterol of 435mg/dl, a HDL-cholesterol of 43mg/dl and a triglyceride of 126mg/dl. The patient received coronary artery bypass graft surgery the following day and was discharged uneventfully 2 weeks later.

Discussion

Coronary artery disease is one of the leading causes of morbidity and mortality in women,[2] and the mortality rate in women after menopause is nearly equal to that of men. The coronary risk factors in women who have experienced a cardiovascular event were similar to those in men, i.e., cigarette smoking, diabetes, hypertension, hyperlipidemia, and a family history of CAD. Patients can be treated conservatively with anti-anginal therapy, or with invasive interventional therapy or coronary artery bypass graft surgery. The severity of the disease, the locations of the lesions, and the general conditions of the patient should be taken into consideration when the physician is contemplating a suitable mode of treatment. Left main disease is the most serious form of all coronary artery diseases, and it has been regarded as a surgical disease. Unfortunately, about half of all vein grafts are totally occluded or develop advanced atherosclerotic change within 10 years, requiring repeated CABG surgery. In contrast to the first CABG surgery, re-operation is technically more difficult and is associated with higher morbidity and mortality.[3,4] In the middle-aged patents, their life expectancy surpasses the graft longevity and a re-operation is nearly inevitable. A temporizing measure to alleviate symptoms and to relieve the immediate danger of a catastrophic cardiac event is thus becoming an important issue for this age group. A recently evolving surgical technique, the minimally invasive direct coronary artery bypass (MIDCAB) grafting surgery has yielded some promising results. This technique was first introduced in 1995 by Acuff et al.[5], and Doty et al. reported a two year patency rate of 92% in a recently published article.[6] This procedure has been recommended for an otherwise healthy individual with single-vessel disease in the anterior circulation.

In its early application, percutaneous transluminal coronary angioplasty (PTCA) for unprotected left main disease was associated with high rates of immediate and long-term morbidity and mortality.[7] The risks improved after the development of coronary stenting. Coronary stents were designed

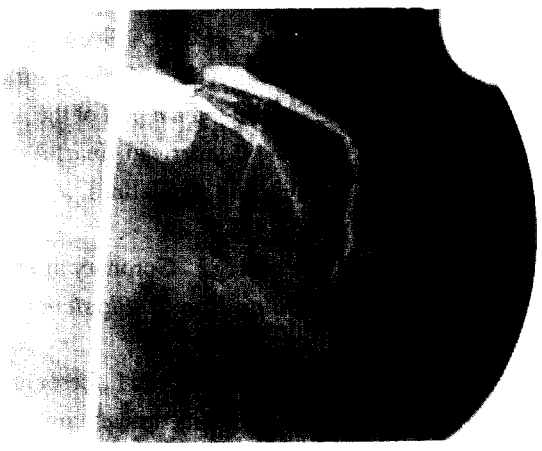

Fig. 2A. Left coronary angiography in PA cranial view showed a 75% stenosis in the distal left main trunk, a 90% stenosis in the proximal LAD, and a 95% stenosis in the proximal intermediate branch.

Fig. 2B. Right coronary angiography in LAO cranial view showed a 90% stenosis in the middle RCA and a 90% stenosis in the middle PDA.

specifically for acute closure and for reducing the restenosis rate after PTCA.[8] PTCA and stenting for left main disease was shown to have good final results with a residual stenosis of less than 20-30% and a long-term survival comparable to surgery in selected groups of patients.[9,10] Recently, coronary stenting for unprotected left main coronary artery has been demonstrated to be quite safe. Thus, PTCA with coronary stenting was found to be a reasonable option for the patients who had LM disease and were at high risk for CABG, such as those with severe COPD, advanced age, and previous heart surgery.[11] Despite the fact that coronary stenting reduces the restenosis rate and improves the clinical outcome of PTCA, in-stent restenosis remains an important clinical problem. Newer debulking techniques, such as Excimer laser angioplasty, directional coronary atherectomy, and intravascular radiation therapy, might have some theoretical advantages over conventional PTCA by ablating or inhibiting intra-stent neoinitimal hyperplasia.[12] Those therapeutic maneuvers have improved clinical outcomes for the treatment of in-stent restenosis. This means newer interventional therapy might offer a better immediate and long-term outcome than coronary stenting alone.

In our first case with a solitary ostial left main disease, there was a morphological similarity between the patient's angiographic findings and those seen in the aorto-ostial stenosis of the reno-vascular system in young hypertensives. It is beyond the scope of our discussion to dwell upon the possible etiologic connections. But suffice it to say that successful percutaneous balloon angioplasty in this latter group[13,14] has been very promising, and one would consider applying this interventional procedure in this patient, who was essentially an otherwise healthy individual with a solitary lesion in the left main ostium.

However, CABG remains the mainstay for the treatment of left main disease. In the middle-aged patients, patients almost always outlive their grafts. A second sternotomy at a later time is nearly inevitable. The second operation carries a surgical risk which is multiple times that of the first, and in certain situations, i.e., varicose veins or internal mammary artery of too small a caliber or insufficient flow, one also encounters an embarrassing clinical circumstance of running out of grafts. With the above considerations, we would like to propose that a minimally invasive procedure, be it MIDCAB or PTCA with stenting, which could not and would not replace CABG, should be considered as the initial temporizing measure, leaving the more complete total revascularization procedure for the future.

Our case 2 had totally different angiographic findings, and because of the complexity of her disease, no one would argue that a conventional total revascularization was the best option. Afterall, we are essentially combatting the natural course of a disease and time with limited armaments at our disposal, and we could better accomplish this by improving our versatilities. A carefully laid out strategic plan would improve patients' quality of life and prolong their lives, which are the ultimate goals of our therapy.

In summary, we would like to propose that in treating patients with left main disease, the angiographic morphology should be taken into consideration for selecting a therapeutic modality.

References

1. Eagle KA, Guyton RA, Davidoff R, Ewy GA, Fonger J, Gardner TJ, Gott JP, Herrmann HC, marlow RA, Nugent WC, O'Connor GT, Orszulak TA, Rieselbach RE, Winters WL, Yusuf S. ACC/AHA guidelines for coronary artery bypass graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol* 1999; 34:1262-1342.
2. Chiamvimonvat V, Sternberg L. Coronary artery disease in women. *Canadian Family Physician* 1998; 44:2709-2717.
3. Bourassa MG, Enjalbert M., Campeau L, Lesperance J. Progression of atherosclerosis in coronary arteries and bypass grafts: ten years later. *Am J Cardiol* 1984; 53(Suppl C):102-107.
4. Fitzgibbon GM, Leach AJ, Kafka HP, Keon WJ. Coronary bypass graft: long-term angiographic study. *J Am Coll Cardilol* 1991; 17:1075-1080.

5. Acuff TE, Landreneau RJ, Griffith BP, Mack MJ. Minimally invasive coronary artery bypass grafting. *Ann Thorac Surg* 1996; 61:128-134.
6. Doty TR, Fonger JD, Salazer JD, Walinsky PL, Salomon NW. Early experience with minimally invasive direct coronary artery bypass grafting with the internal thoracic artery. *J Thorac Cardiovasc Surg* 1999; 17:873-880.
7. Ellis SG, Tamai H, Nobuyoshi M, Kosuga K, Colombo A, Holmes DR, Macaya C,Grines CL, Whitlow PL, White HJ, Moses J, Teirstein PS, Serruys PW, Bittl TA, Mooney MR, Shimashak PM, Block PC, Erbel R. Contemporary percutaneous treatment of unprotected left main coronary stenoses: initial results from a multicenter registry analysis, 1994-1996. *Circulation* 1997; 96:3867-3872.
8. Chauhan A, Zubaid M, Ricci DR, Buller CE, Moscovich MD, Mercier B, Fox R, Penn IM. Left main intervention revisted: early and late outcome of PTCA and stenting. *Cathet Cardivasc Diag* 1997; 41:21-29.
9. Park SJ, Park SW, Hong MK, Cheong SS, Lee CW, Kim JJ, Hong MK, Mintz GS, Leon MB. Stenting of unprotected left main coronary artery stenosis: immediate and late outcomes. *J Am Coll Cardiol* 1998; 31(1) 37-42.
10. Ambrosini V, Tesorio T, Salemme L, Spidalieri G, Rubino P. Unprotected left main angioplasty: a case report. *G Ital Cardiol* 1998; 28(10):1138-1142.
11. Karam C, Marco J, Fajadet J, Cassagneau B, Laurent JP, Jordan C, Laborde JC, Marco J. Results of stenting of unprotected left main coronary artery stenosis in patients at high surgical risk. *Am J Cardiol* 1998; 82: 975-978.
12. Amols HI, Trichter FD, Weinberger, J. Intracoronary radiation for prevention of restenosis: dose perturbations caused by stents. *Circulation* 1998; 98:2024-2029.
13. Tegtmeyer CJ, Elson J, Glass TA, Ayers CR, Chevalier RL, Wellons HA Jr, Studdard WE Jr. Percutaneous transluminal angioplasty: the treatment of choice for renovascular hypertension due to fibromuscular dysplasia. *Radiology* 1982; 143: 631-637.
14. Tegtmeyer CJ, Selby JB, Hartwell GD, Ayers C, Tegtmeyer V. Results and complications of angioplasty in fibromuscular disease. *Circulation* 1991; 89 (Suppl 2):155-161.

二例中年未停經女性左主冠狀動脈疾病之血管攝影 — 病例報告及臨床關係

黃啟宏 陳孟麟 陳 淮

臺北市 國泰綜合醫院心臟內科

摘 要: 左主冠狀動脈疾病是一種可怕而且高致命性的疾病，但是較少發生在中年女性。最近我們遇到兩個病人有相同的臨床症狀但是卻有不同的血管攝影結果。第一個病例的血管攝影發現是單一左主冠狀動脈開端病灶，第二個病例則為瀰漫性病變合併遠側左主冠狀動脈狹窄。她們都接受冠狀動脈繞道手術而且順利出院。但是在中年人平均餘年均較植入血管久的情況下，二次手術的機會及手術危險均增加。所以如何避免高危險手術及提供一種較不侵襲性的解決方法，便成為努力的方向。而經皮氣球擴張術合併血管支架置放及'迷你' 冠狀動脈繞道手術是二種可供選擇的治療途徑。

關鍵詞: 左主冠狀動脈疾病；經皮氣球擴張術；血管支架置放術；'迷你' 冠狀動脈繞道手術。

聯絡人：陳淮醫師，106 臺北市仁愛路四段 280 號，國泰綜合醫院心臟內科

投稿日期：88 年 12 月 27 日；同意刊登：89 年 2 月 16 日