

Coronary artery bypass grafting in identical twins: a 6-year angiographic follow-up

Tekyumurta ikizi iki hastada koroner arter bypass greftleme: Altı yıllık anjiyografik takip

Mehmet Erdem Toker, Hasan Basri Erdoğan, Deniz Göksedef, Mustafa Güler, Cevat Yakut

Department of Cardiovascular Surgery, Koşuyolu Heart and Research Hospital, İstanbul

Our knowledge about the prognosis of coronary artery disease in identical twins is limited to case reports and the actual incidence is unknown. There are similarities between the characteristics of coronary artery disease in twin patients, but some differences may also exist. Coronary artery bypass grafting was performed in identical twin brothers aged 32 years. Both patients had stenosis of the left anterior descending (LAD) coronary and circumflex arteries before surgery. Six years after surgery, one of the twins who was not a smoker and had lower lipid levels developed angina. Angiography showed a new stenotic lesion of the right coronary artery that required reintervention. Although anastomosis of the left internal mammary artery and the LAD artery was patent in both patients, the bypass to the circumflex artery performed in one patient was occluded.

Key words: Coronary angiography; coronary artery bypass; coronary disease/genetics/surgery; diseases in twins; twins, monozygotic.

Our knowledge about the prognosis of coronary artery disease in identical twins is limited to case reports and the actual incidence is unknown. There are similarities between the characteristics of coronary artery disease in twin patients, but some differences may also exist.^[1-4]

In this report, we presented two identical twin brothers who underwent coronary artery bypass grafting (CABG) for coronary artery disease.

CASE REPORT

Two identical twin brothers, aged 32 years, presented to our clinic with anginal pain not related to exertion. Both were smokers. Anginal attacks responded to sublingual nitrate administration in both patients. Electrocardiograms showed no signs of a possible myocardial infarction, and none of the patients had a history of hypertension or diabetes. Triglyceride and cholesterol levels were above

Tek yumurta ikizlerinde koroner arter hastalığının prognozuna ait bilgi literatürde olgu sunumları ile sınırlıdır ve gerçek sıklığı bilinmemektedir. İkiz hastalarda koroner arter hastalığının özellikleri genellikle benzer bulgular ile ortaya çıkarken, bazı farklılıklar da bulunmaktadır. Tek yumurta ikizi olan 32 yaşındaki iki erkek hastaya koroner arter bypass greftleme ameliyatı uygulandı. Her iki hastada ameliyat öncesinde sol ön inen (LAD) ve sirkumfleks arterlerde lezyonlar vardı. Ameliyat sonrası altıncı yılda, sigara içmeyen ve lipid düzeyi düşük olan bir ikizde angina gelişti ve anjiyografide müdahale gerektiren sağ koroner arter lezyonu saptandı. Sol internal mammaryan arter ile LAD arter anastomozu her iki hastada açık olmasına rağmen, bir hastada sirkumfleks artere uygulanan bypass tıkalı bulundu.

Anahtar sözcükler: Koroner anjiyografi; koroner arter bypass; koroner hastalık/genetik/cerrahi; ikizlerde hastalık; ikiz, monozygot.

normal in both patients. Coronary angiography showed 70% to 90% long segment stenotic lesions in the proximal segment of the left anterior descending (LAD) coronary artery, a 70% stenotic lesion in the obtuse marginal 2 branch of the circumflex artery (CxOM2), and a normal right coronary artery (Fig. 1a and 2a). The left ventriculography was normal in both patients. Coronary artery bypass grafting was performed including a single vessel bypass (LIMA-LAD) in one patient, and a two-vessel bypass (LIMA-LAD and Ao-CxOM2) in the other. Both patients had an uneventful postoperative period and were discharged on the sixth postoperative day.

In the postoperative period, the latter patient continued to smoke. Their mother underwent a six-vessel CABG and a concomitant Bentall procedure and was discharged uneventfully. An elder brother of the patients experienced a sudden cardiac death.

Received: November 19, 2004 Accepted: December 20, 2004

Correspondence: Dr. Mehmet Erdem Toker, Kartal Koşuyolu Yüksek İhtisas Eğitim ve Araştırma Hastanesi, Kalp ve Damar Cerrahisi Kliniği, 34846 Cevizli, İstanbul. Tel: 0216 - 459 40 41 e-mail: mertoker@yahoo.com

One twin brother who had given up smoking after surgery began to experience anginal pain in the postoperative sixth year. Coronary angiography showed a 70% stenotic lesion in the distal end of the LIMA-LAD anastomosis and a 70% stenotic lesion in the proximal portion of the right coronary artery (Fig. 1b). Coronary artery stenting was performed in the right coronary artery. His ventriculogram was normal. Coronary angiography of the other twin, who was a smoker, showed a patent LIMA-LAD anastomosis, a totally occluded saphenous graft to the CxOM2, and a normal right coronary artery (Fig. 2b). His left ventriculogram was normal.

Lipid levels were above normal in both patients. Interestingly, it was found that both the development of

anginal pain and progression of coronary atherosclerosis were seen in the one who was not smoking.

DISCUSSION

The similarities between the twin brothers with regard to risk factors, the presentation of anginal complaints, coronary anatomy, and coronary lesions are worth mentioning. Sidd et al.,^[5] who were the first to point to this fact, showed similarities between anginal complaints and lesions detected during coronary angiography. In our patients, similarities and differences existed between the lesions of the LAD and Cx arteries and their localizations, and between the anatomies of the Cx arteries.

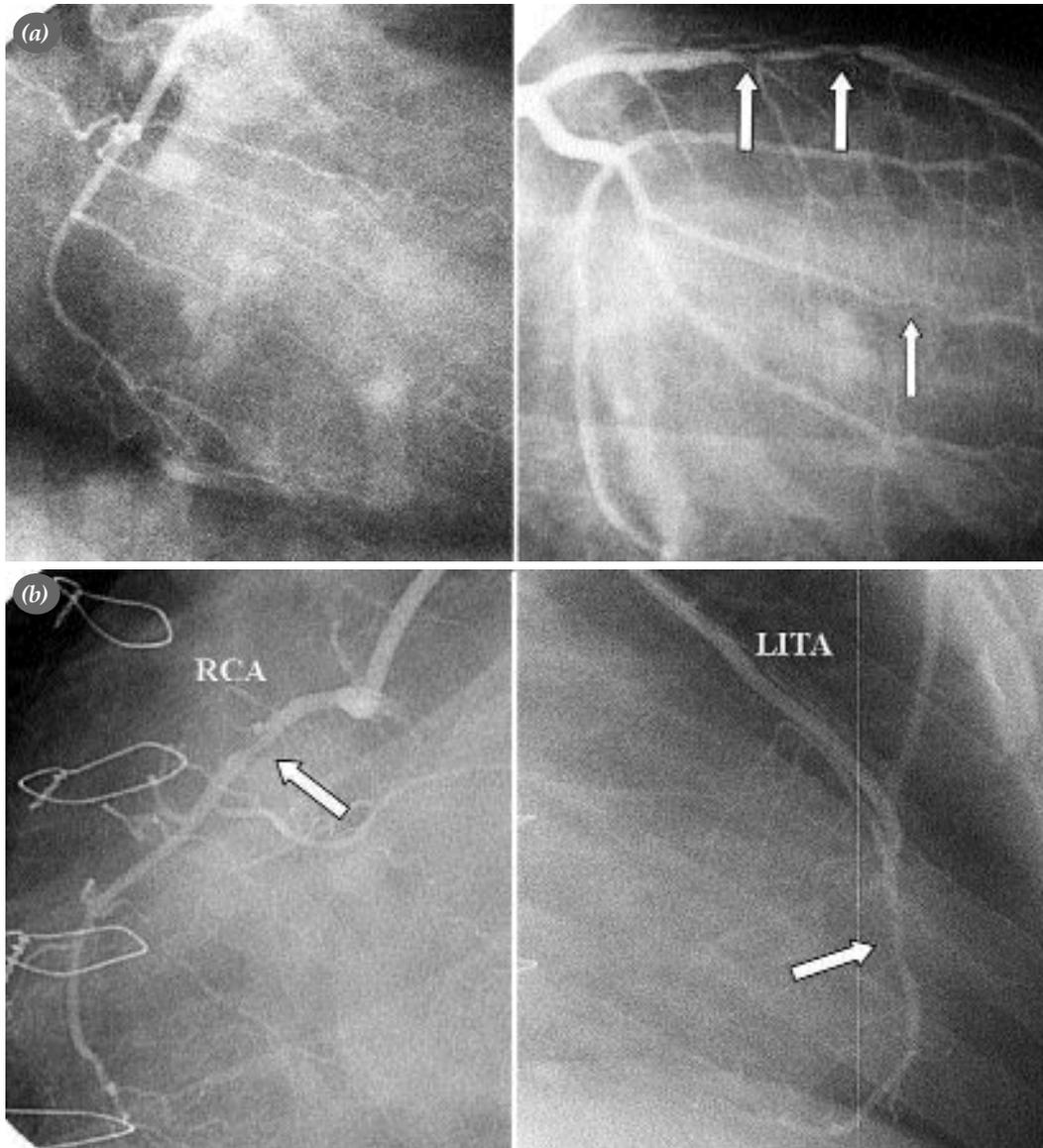


Fig. 1. (a) Preoperative and (b) postoperative angiographic views of one twin brother who developed anginal pain in the postoperative sixth year. A new lesion occurred after LIMA-LAD anastomosis and a %70 lesion in the proximal portion of the right coronary artery.

Holmes et al^[6] also found anatomical and pathological similarities and differences during angiography of twin patients. An interesting feature of the twins presented is that their mother underwent CABG with a concomitant Bentall operation and their elder brother died because of sudden cardiac death two years after the twins' operation, both of whom had increased total cholesterol levels. A family history of sudden cardiac death is a very important feature in both male and female patients.^[7] This increased risk is at least partially related with genetic factors.

Both of the twin patients had high blood cholesterol levels and one patient continued smoking after CABG. Both were under statin treatment. Although the non-

smoker twin had lower lipid and cholesterol levels, he was the one that started to describe anginal attacks.

When the environmental factors that affect total cholesterol and apolipoprotein B levels are considered, a positive correlation was found in the twins who shared the same environment compared to those who did not.^[8] The twins presented had been living in the same environment.

Differences were found in the pathology of coronary artery disease in the twins who underwent operation on the same day. These differences became most obvious in the sixth postoperative year. In spite of the fact that they were living in the same environment, the twin who

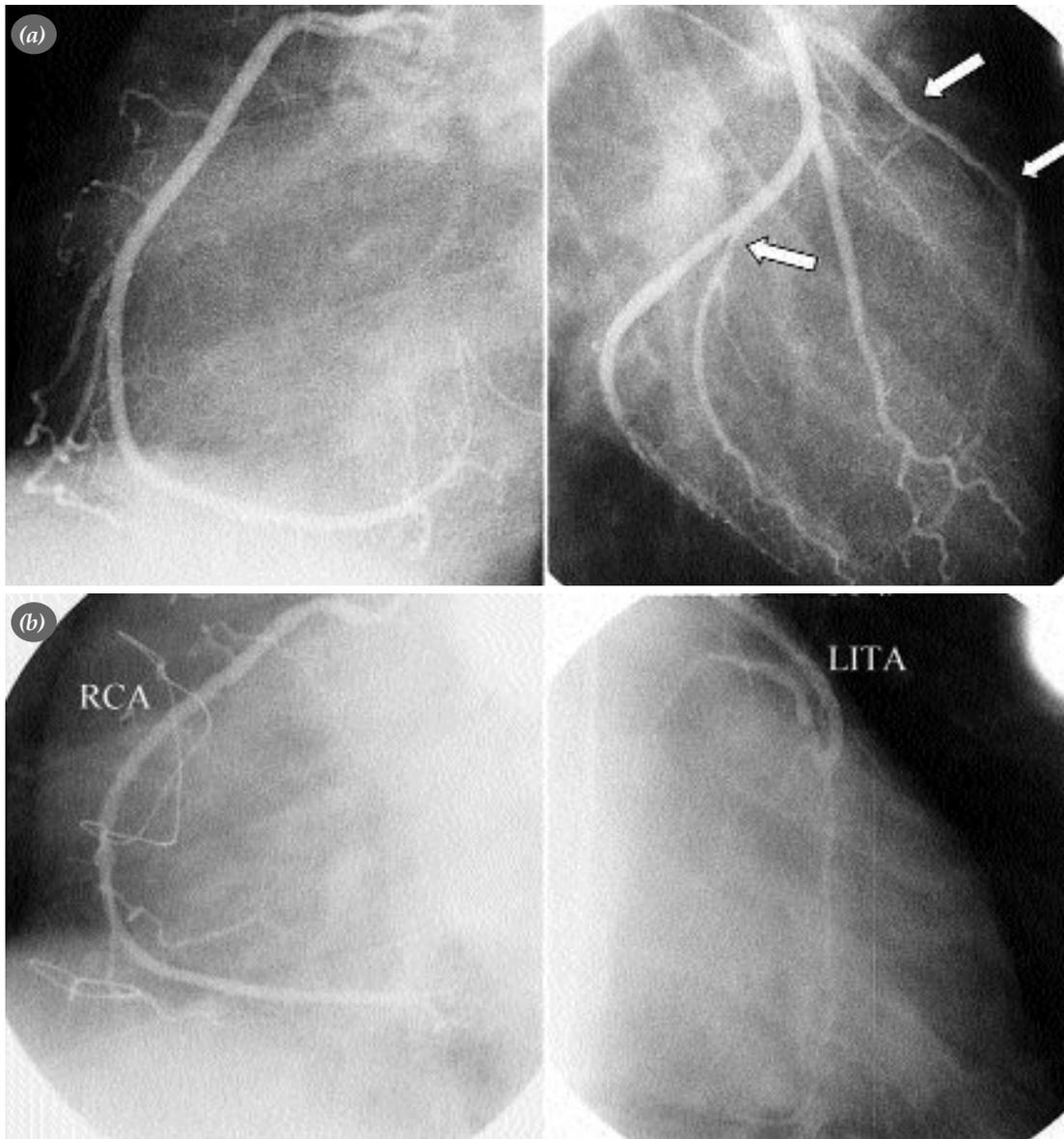


Fig. 2. (a) Preoperative and (b) postoperative angiographic views of one twin brother who continued smoking after surgery. There is no lesion after LIMA-LAD anastomosis. Despite formation of a plaque, lesions in the right coronary artery are not critical.

gave up smoking and had a lower cholesterol level showed a faster progression of atherosclerosis. This shows that not only the risks and environmental factors play a role in the progression of the disease but also genetic factors are important.

REFERENCES

1. Herrington DM, Pearson TA. Clinical and angiographic similarities in twins with coronary artery disease. *Am J Cardiol* 1987;59:366-7.
2. Samuels LE, Samuels FS, Thomas MP, Morris RJ, Wechsler AS. Coronary artery disease in identical twins. *Ann Thorac Surg* 1999;68:594-600.
3. Kaluza G, Abukhalil JM, Raizner AE. Identical atherosclerotic lesions in identical twins. *Circulation* 2000;101:E63-4.
4. Ener S. Coronary artery disease in identical twins. *Ann Thorac Surg* 2000;70:692.
5. Sidd JJ, Sasahara AA, Littmann D. Coronary-artery disease in identical twins. A family study. *N Engl J Med* 1966;274:55-60.
6. Holmes DR Jr, Kennel AJ, Smith HC, Gordon H, Moore SB. Coronary artery disease in twins. *Br Heart J* 1981;45:193-7.
7. Marenberg ME, Risch N, Berkman LF, Floderus B, de Faire U. Genetic susceptibility to death from coronary heart disease in a study of twins. *N Engl J Med* 1994;330:1041-6.
8. Heller DA, de Faire U, Pedersen NL, Dahlen G, McClearn GE. Genetic and environmental influences on serum lipid levels in twins. *N Engl J Med* 1993;328:1150-6.