

Late-Term Regression of Stenosis at the Kink Site in the Internal Thoracic Artery in Two Cases

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A kink in the internal thoracic artery (ITA) is a rare postoperative complication after coronary artery bypass surgery. The kink can be accompanied by significant stenosis and has been observed after the ITAs are harvested by the skeletonization method. In this report, we present two cases in which early postoperative angiography showed the kink accompanied by significant stenosis, and late angiography revealed regression of stenosis at the kink site. Immediate intervention is not always necessary even when the kink, accompanied by significant stenosis was observed on early postoperative angiography. (Ann Thorac Cardiovasc Surg 2006; 12: 441–4)

Key words: coronary artery bypass surgery, angiography, kink in the internal thoracic artery

Introduction

When a kink accompanied by stenosis of the internal thoracic artery (ITA) graft is observed on angiography after coronary artery bypass surgery, some place a stent into the kink site,¹⁾ and others surgically treat the kink through a thoracotomy.^{2,3)} However, late-term changes of a stenotic lesion at the kink site have not been reported in the cases that have not received special treatment for the kink. On the other hand, it has been occasionally reported that stenosis around the anastomotic site is observed on early postoperative graft angiography after coronary artery bypass surgery disappears on late angiography.^{4–6)} In this report, we present two cases in which late angiography revealed regression of stenosis at the kink site of the ITA graft.

Case Report

Case 1

We report on a case of a 78-year-old male who had re-

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ceived hemodialysis because of chronic renal failure due to diabetic nephropathy since the age of 70 years. He had had chest oppression from that time. At the age of 76 years, chest oppression became severe during hemodialysis, and he was admitted to the Department of Cardiology in our hospital for close examination. A coronary angiography showed severe stenosis accompanied by calcification in the proximal portion of the anterior descending artery. Therefore, off-pump bypass surgery with a left ITA (LITA) to the anterior descending artery was performed. The ITA was harvested by the skeletonization method using an ultrasonic scalpel. Graft angiography performed on postoperative day 10 revealed that the kink was accompanied by stenosis in the LITA (Figs. 1A and 1B). He had chest pain during hemodialysis after surgery, therefore a myocardial scintigraphy was performed. However, since myocardial scintigraphy showed that the anterior wall was free from ischemia, we did not treat the kink and discharged the patient. He complained of chest oppression during hemodialysis 10 months after surgery, and a coronary angiography was performed 11 months after surgery the LITA — anterior descending artery bypass was patent, and stenosis at the kink site of the LITA observed at the early postoperative phase showed regression (Figs. 1C and 1D). The chest pain was thought to be caused by severe stenosis of the postero-lateral branch.

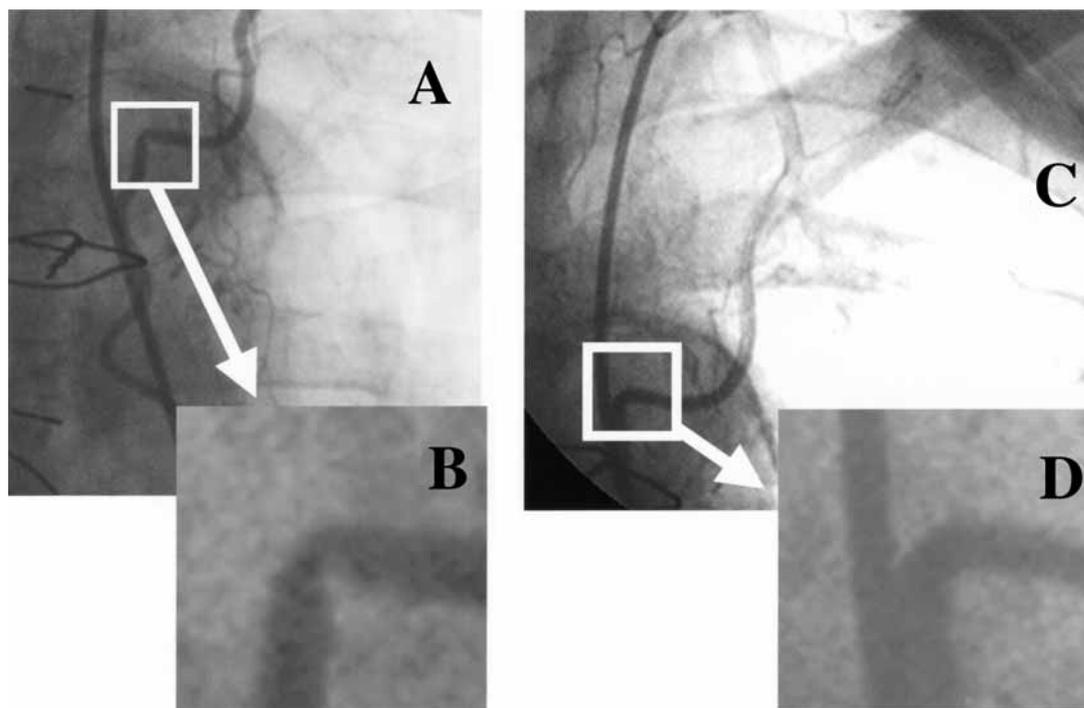


Fig. 1. Left internal thoracic artery — anterior descending artery bypass angiogram in Case 1. (Photographs were obtained with the same view.)

A: Left internal thoracic artery angiogram obtained 10 days after surgery.

B: Magnified photograph of the kink site. There observed 75% stenosis at the kink site.

C: Left internal thoracic artery angiogram obtained 11 months after surgery.

D: Magnified photograph of the kink site. Remarkable regression of stenosis was observed.

Case 2

We report on a case of a 70-year-old female who underwent two percutaneous catheter interventions. At the age of 66 years, she underwent on-pump double-vessel bypass surgery (with a right ITA (RITA) to the anterior descending artery, and with a LITA and a radial artery to the postero-lateral branch). The ITA was harvested in the same manner as Case 1. A graft angiography performed on postoperative day 11 revealed that the two grafts were patent but a kink accompanied by severe stenosis was observed in the LITA graft (Figs. 2A and 2B). Since she had no chest pain after surgery, myocardial scintigraphy was not performed and she was discharged without any particular treatment for the kink. At the age of 68 years, she had exertional chest pain and received coronary angiography. The two grafts were patent and stenosis at the kink site of the LITA showed regression (Figs. 2C and 2D). However, there was a severe stenosis of the diagonal branch. Her angina was thought to be caused by stenosis of the diagonal branch.

Comment

Several investigators have reported that stenosis around the anastomotic site, which is shown by early postoperative angiography after coronary artery bypass surgery using the ITA, disappears on late angiography.⁴⁻⁶ As the possible reasons for this reversible stenosis, edema, hematoma and spasm of the ITA wall have been raised.^{4,6} Various surgical techniques for the harvest of the the ITA induce trauma of the arterial wall, which may cause reversible edema of the ITA wall. Some investigators suggest that local edema easily occurs especially when the ITA is harvested by the skeletonization method. In our cases, the kink occurred in the ITA harvested by the skeletonization method using an ultrasonic scalpel, and stenosis was observed at the kink site.

The ITA skeletonization has the following advantages: long effective length of grafts can be obtained, and sequential bypass grafting can be easily performed.⁷ Furthermore, the ITA skeletonization using an ultrasonic scal-

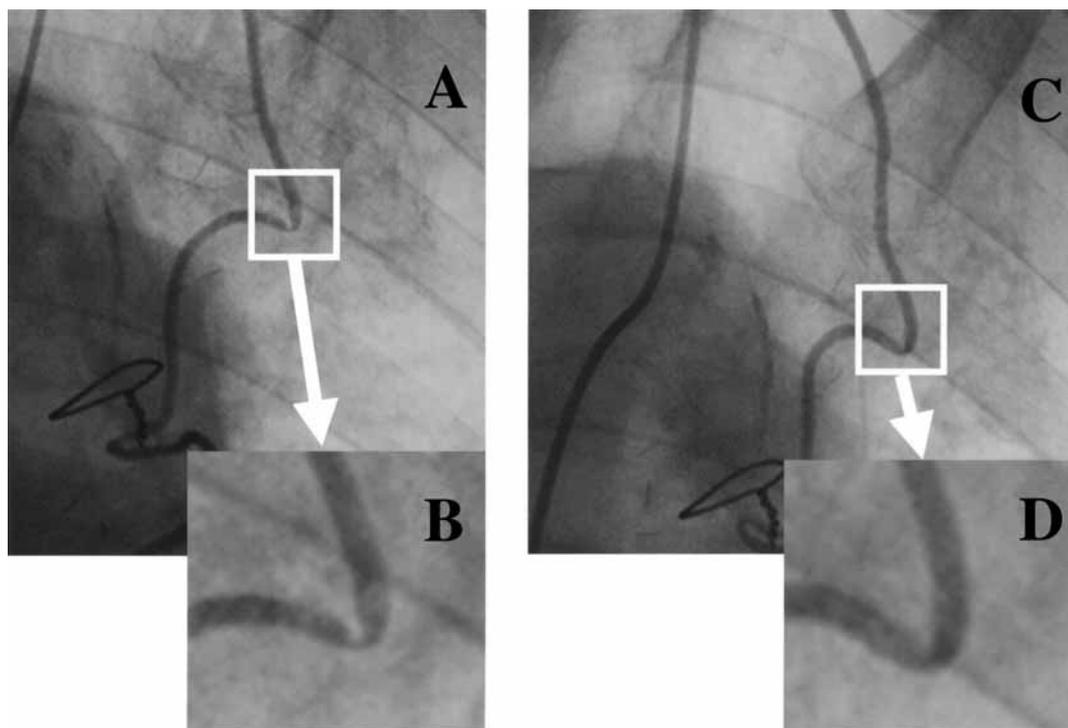


Fig. 2. Left internal thoracic artery — left radial artery — postero-lateral branch bypass angiogram in Case 2. (Photographs were obtained with the same view.)

A: Left internal thoracic artery angiogram obtained 11 days after surgery.

B: Magnified photograph of the kink site. Severe stenosis was observed at the kink site.

C: Left internal thoracic artery angiogram obtained 25 months after surgery.

D: Magnified photograph of the kink site. Remarkable regression of stenosis was observed.

pel is a superior method; with which graft harvest can be performed in a short time, and the amount of postoperative bleeding is small.⁸⁾ However, since the graft harvested by the skeletonization method has a small amount of connective tissue that serves as a cushion around the vessel, a kink at a sharper angle may occur and severe stenosis due to geometric problems may be induced when the graft length is redundant. Our cases showed regression of stenosis at the kink site on late angiography. If the stenosis simply occurred due to geometric problems of the kink site, even long-term observation might show no changes in the severity of stenosis without changes of the form of the kink itself. Therefore, other reasons such as edema and hematoma might be involved in stenosis at the kink site of the ITA.

To treat stenosis at the kink site of the ITA, some place a stent,¹⁾ and others surgically repair the kink through thoracotomy,^{2,3)} as mentioned above. However, since stenosis even at the kink site showed late-term regression in

some patients as in our cases, follow-up without special treatment might be recommended if the patients had no angina caused by stenosis at the kink site and showed no abnormal changes on the electrocardiogram.

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