

Reversible anastomotic stenosis after minimally invasive coronary artery bypass grafting

Jean-François Morin, MD; John Tsang, MD; Christian Constance, MD

Minimally invasive direct coronary artery bypass (MIDCAB) grafting can be associated a number of pitfalls and difficulties in assessing the patency of the anastomosis. These are illustrated in this paper. A patient underwent MIDCAB through an inferior hemisternotomy. A repeat angiogram obtained 4 days postoperatively showed an 80% stenosis at the anastomosis. Four months later, there was no residual stenosis. The cause of this coronary artery stenosis is unclear.

Case report

A 52-year-old man had severe angina (New York Heart Association class III) resistant to medical treatment. Coronary an-

giography revealed a tight 90% proximal left anterior coronary artery stenosis not amenable to angioplasty. He underwent MIDCAB grafting of his left internal mammary artery (LIMA) to his left anterior descending (LAD) coronary artery on a beating heart through an inferior hemisternotomy. The procedure went very well considering the small calibre (1.5 mm) and the thin anterior wall of the LAD coronary artery. A horseshoe platform (AutoSuture, Norwalk, Conn.) was used to stabilize the target vessel. A bloodless field was obtained with soft vascular clamps proximal and distal to the anastomosis. The anastomosis was carried out using a running suture of 7-0 Prolene. No extra suture was added once the anasto-

mosis was completed. There was no tension on the pedicle of the mammary artery, which was anchored to the epicardium with a suture of 5-0 Prolene. The patient's postoperative course was uncomplicated. Repeat coronary angiography 4 days after the MIDCAB surgery revealed an 80% stenosis of the coronary anastomosis (Fig. 1). Infusion of intracoronary nitroglycerin did not reverse the stenosis. The patient was discharged home on day 5 postoperatively with a prescription for a β -adrenergic blocking agent and an antiplatelet agent. At follow-up 1 and 4 months postoperatively, he was free of symptoms. Repeat coronary angiography done 4 months postoperatively showed no residual stenosis (Fig. 2).

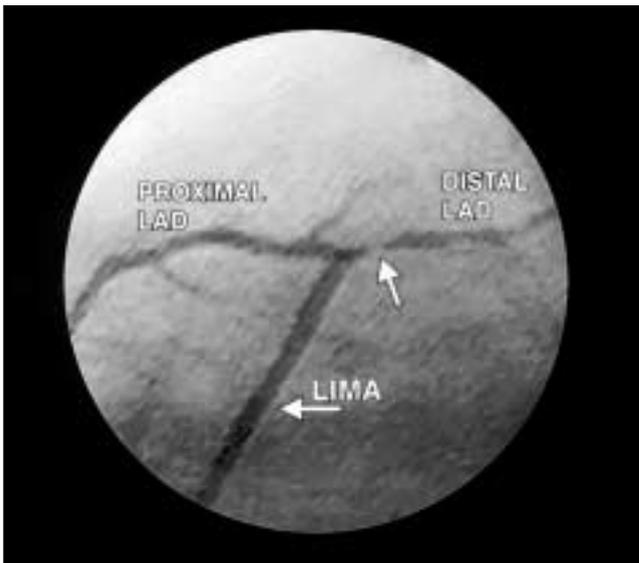


FIG. 1. Early postoperative angiogram showing 80% stenosis at the anastomosis of the left internal mammary artery (LIMA) to the left anterior descending (LAD) coronary artery.

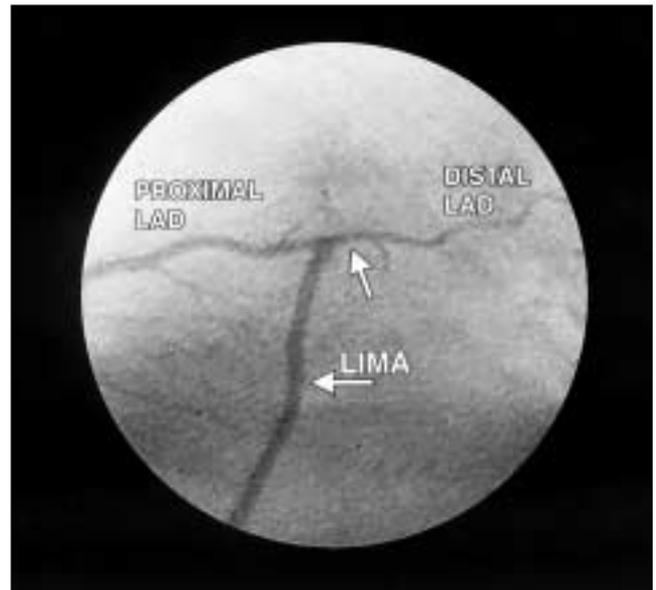


FIG. 2. Resolution of the anastomotic stenosis seen on the follow-up angiogram.

From the Division of Cardiothoracic Surgery, The Montreal General Hospital, McGill University Health Centre, Montreal, Que.

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Correspondence to: Dr. Jean-François Morin, Suite L9 513, The Montreal General Hospital, 1650 Cedar Ave., Montreal, QC H3G 1A4; fax 514 934-8210

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Discussion

MIDCAB grafting is a new and technically more demanding procedure than conventional coronary artery bypass grafting. Angiography has been the reference standard for determining the patency of the internal thoracic to LAD coronary artery graft, particularly in the early phase of the learning curve. Abnormalities in the internal mammary graft have been reported to be present in up to 20% of patients in some series.¹ However, there is no standard for comparison of the early angiographic appearance of the internal mammary artery (IMA) to LAD coronary artery anastomosis performed with cardiopulmonary bypass.

We report an unusual case of angiographically reversible coronary artery anastomotic stenosis after MIDCAB grafting. This stenosis at the toe of the anastomosis, despite being 80%, did not cause any symptoms. Ischemia may not have been manifested owing to several factors. Collateral flow was demonstrated by the lack of hemodynamic compromise during occlusion of the LAD coronary artery while performing the anastomosis. Anesthesia can decrease the afterload on the heart and may decrease myocardial oxygen demands postoperatively. Limited activity postoperatively will also minimize the development of symptoms.

This case illustrates one of the advantages of intraoperative angiography that is being advocated by many to verify the patency of the anastomosis.² The late identification of an anastomotic stenosis in an asymptomatic patient poses a dilemma. After discussion with this patient, it was elected to perform follow-up angiography to determine the fate of the graft.

Furthermore, despite the 80% stenosis seen on the first angiogram postoperatively, the flow in the distal LAD coronary artery was reported as satisfactory. Repeat angiography was booked 3 months later after complete healing of the anastomosis, for consideration of possible angioplasty of a failing graft. The repeat angiography showed no residual stenosis. On comparison with the previous study, this was felt to be a true improvement of the stenosis rather than simply an effect of viewing the anastomosis at a different angle.

The haziness seen on the initial angiogram from which the stenosis was reported as 80%, has been described by others performing MIDCAB grafting.³ It has also been described previously as a persistent luminal narrowing after angioplasty with subsequent resolution.⁴ The present angiographic picture may be caused by prolonged vasospasm. The distal end of the LIMA was harvested in our case through the inferior hemisternotomy approach. This segment of the mammary artery has been reported to be more prone to vasospasm.⁵ Furthermore, angiography itself has been reported to induce vasospasm. However, the intracoronary infusion of nitroglycerin did not reverse the stenosis in our case.

With this case we have illustrated the pitfalls of MIDCAB grafting and the difficulties in assessing the patency of the anastomosis. Although intraoperative angiography is probably ideal in most cases as it allows immediate correction of any technical problems, it is not without its deficiencies. The use of other noninvasive tests such as thermal angiography or Doppler ultrasonography may provide additional

information about the adequacy of flow when the patency of the anastomosis is in doubt. The use of the distal IMA during MIDCAB grafting due to the limitations of the incision for complete harvest of the IMA should be avoided to prevent possible reactive vasospasm. When the anastomosis is technically perfect, other possibilities and therapeutic options of an angiographic picture of stenosis may be considered. This may include a trial of vasodilators in instances of possible vasospasm.

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