Myotomy After Previous Coronary Artery Bypass Grafting for Treatment of Myocardial Bridging

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A 57-year-old man with a long history of frequent chest pain was admitted to our cardiac center. Four years ago, he underwent coronary artery bypass grafting (CABG) with the left internal mammary artery (LIMA) to the distal segment of the left anterior descending coronary artery (LAD) grafting for myocardial bridging (MB) in LAD despite having β-blockers and calcium channel blockers. However, the patient still had recurrent angina within 3 months after the operation. ECG showed negative T wave in leads V1 and V2. On echocardiography, left ventricular ejection fraction was 60% with normal regional wall motion. The repeat coronary angiography showed a MB in the proximal LAD about 3 cm in length with 90% systolic narrowing of the LAD, and the LIMA graft was totally occluded (Figure 1A through 1C). The angiographic manifestation of MB was the same as that of the coronary angiography (Figure 2A through 2B) before the previous CABG operation.

Through a remedian sternotomy, a tight fibrous adhesion was dissected and the anterior wall of the heart was exposed. The location of the LAD was difficultly identified and was carefully confirmed by excising epicardial adipose tissue and epicardium. Surgical myotomy was performed during cardioplegic arrest under cardiopulmonary bypass. The proximal LAD was completely unroofed of MB to eliminate the phasic compression of the coronary vessel (Figure 1D).

The patient had an uneventful postoperative course and is asymptomatic at 22 months of follow-up. Four-months' follow-up catheterization was performed: No systolic narrowing of the LAD could be visualized (Figure 1E).

MB is a congenital anomaly, most common in the middle segment of the LAD, that may cause myocardial ischemia and infarction, cardiac arrhythmias, and sudden cardiac death.1 The current gold standard for diagnosing MB is coronary angiography with the typical systolic compression of the epicardial coronary vessel (milking effect). Recent studies have shown that coronary narrowing by MB may not only occur in systole but also result in a delayed and incomplete vessel diameter gain during mid-to-late diastole, thereby affecting the predominant phase of the coronary perfusion.2

In symptomatic MB that is unresponsive to medication, intracoronary stenting and surgical interventions may be adopted as an alternative treatment. However, stenting should not be recommended in MB because of the risk of stent thrombosis and restenosis.3 Moreover, although CABG is also an effective treatment of MB and LIMA as the first choice of autogenous graft has the best long-term patency rate, the procedure cannot cure the MB and remains the possibility of graft restenosis and spasm resulting in recurrent angina. Surgical myotomy is a radical correction and suitable for every patient with persistent ischemic symptoms despite intensive medication. It can not only treat the physiological abnormality of MB, but also can correct the congenital anatomical defect4 without the risk of graft restenosis and thrombosis. The key points during the intraoperative period are to find the exact location of MB to completely dissect it. It is much safer to perform the operation under cardiopulmonary bypass.

We recommend that supra-arterial myotomy should be the first-choice treatment in symptomatic patients with MB who have failed medical therapy. Even if the patient has previously received CABG with LIMA-LAD bypass for treatment of MB in LAD, myotomy may still be advocated as a rescue procedure.

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Disclosures
None.

References

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Figure 1. Repeat coronary angiography before myotomy shows systolic compression of the left anterior descending coronary artery (LAD) (A, arrow), almost complete recovery in the same area in diastole (B, arrow), and the left internal mammary artery (LIMA) graft occlusion (C). D (arrow), Intraoperative view reveals surgical dissection of LAD with myotomy. E (arrow), Follow-up angiography demonstrates complete relief of the narrowed LAD in systole.

Figure 2. Coronary angiography before coronary artery bypass grafting (CABG) shows systolic compression of the mid-LAD (left anterior descending coronary artery) (A, arrow) and almost complete recovery in the same area in diastole (B, arrow).
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