How-to-do-it

Direct ostioplasty of the left main coronary artery using the right internal thoracic artery as patch material

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Abstract

Three female patients underwent operations for nonatherosclerotic isolated left main coronary artery stenosis. Transaortic patch angioplasty was performed via an anterior approach using the most proximal segment of the right internal thoracic artery as patch material. Six months after surgery coronary angiography revealed good results in all three cases. The internal thoracic artery can be used to enlarge the left coronary ostium safely, if heavy calcification is not present. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Idiopathic nonatherosclerotic coronary ostial stenosis is a rare condition most frequently seen in middle-aged women. It is characterized by rapid development of unstable angina refractory to medical treatment and a high incidence of sudden death due to the complete absence of collateral coronary circulation [1]. The morphologic basis is the progressive fibrous thickening of the ostial intima with otherwise normal coronary arteries and without the presence of aortic wall lesions [2].

The first attempts of the direct surgical approach of the left main coronary artery were performed in 1965 by Effler [3] and Sabiston [4]. These procedures were soon abandoned due to the unacceptably high operative mortality. However, in 1983, with the advent of improved myocardial protection and the bypass technique, Hitchcock successfully reintroduced the direct ostioplasty of the left main coronary artery [5].

Transaortic patch angioplasty of the left coronary ostium using the right internal thoracic artery as patch material was performed on three consecutive female patients (mean age 50 years) at our department. All three patients had progressive angina refractory to medical treatment. Coronary angiography showed severe (>90%) left coronary ostial stenosis with otherwise normal coronaries in all three cases (Fig. 1). Six months after surgery angiographic restudy revealed excellent results with all three patients (Fig. 2).

2. Technique

Median sternotomy was performed and the most proximal 5–6 cm of the right internal thoracic artery was harvested and stored in normal saline solution. Routine cardiopulmonary bypass (average bypass time 92 min) using single venous cannula and mild hypothermia (34°C) was used. The aorta was clamped (average cross-clamp time 65 min) and the left ventricle was vented via the right superior pulmonary vein. The heart was arrested by a single dose of cold crystalloid cardioplegia into the aortic root. To visualize the left main coronary artery the anterior approach was used: the main pulmonary artery was carefully separated from the ascending aorta and retracted to the left, then a transverse incision on the aortic root was extended to the left onto the proximal part of the left main coronary artery. Thereafter, the previously harvested internal thoracic artery was opened longitudinally, all connective tissue was removed and the widest portion without side branches was used as a patch cutting it to a diamond shape. The width of the patch was more than 1 cm in all three cases. The patch was sewn into the left main stem using 7/0 polypropylene suture to enlarge not only the left main coronary artery but also the adjacent 1–2 cm of the aortic incision. The aortotomy was closed by 5/0 polypropylene suture in two layers. During reperfusion the ECG was carefully monitored.

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cardiopulmonary bypass was discontinued without difficulties in all three cases. The chest was closed in the routine way.

3. Discussion

Left main ostioplasty is a technically demanding procedure, but it has several advantages over conventional revascularization: the blood flow remains physiologically antegrade in all coronary vessels, it avoids competitive blood flow and it allows percutaneous transluminal angioplasty later, if distal coronary disease develops. In selected cases, if heavy calcification is not present, long-term results are favourable in experienced hands [6].

The left main coronary artery can be approached either posteriorly or anteriorly [6]. In our cases the anterior approach has been used, which allowed a good exposure of the left main coronary artery. There was no need to divide the pulmonary artery in any of the cases.

At the first attempt to enlarge the left main coronary artery fresh autologous pericardium was used as a patch by Sabiston [4]. In 1970 Najafi reported the first transaortic venous patch ostioplasty [7]. In 1995 Panza performed a small series of coronary ostioplasty using glutaraldehyde-preserved pericardium to enlarge the left main stem [2]. In 1994 Suma used the distal flap of the left internal thoracic artery for left main ostial repair, but additionally he anastomosed the remaining proximal thoracic artery to the left anterior descending coronary artery [8]. There are no reports in the literature of the internal thoracic artery being used as a patch for isolated coronary angioplasty. The proximal segment of the internal thoracic artery is sufficient in size, it has a normal elastic arterial wall structure covered by endothelium, it has no tendency for early or late shrinkage and there is no need for separate incision to harvest it. Using the right internal thoracic artery leaves the left one intact as a potential graft for later procedures, if distal coronary stenosis develops.

We believe that the right internal thoracic artery is an ideal patch material for ostioplasty of the left main coronary artery with good early angiographic and functional results.

References