

LETTERS TO THE EDITOR

Runoff dependence of inferior epigastric artery grafts in coronary artery operations

To the Editor:

In recent years the inferior epigastric artery (IEA) has been used by some authors as a second arterial graft along with the internal thoracic artery (ITA) to achieve total arterial myocardial revascularization.^{1,2} In a recent study Buche and associates³ reported an 86% midterm angiographic patency rate for IEA grafts, with 25 of 29 grafts patent after an average of 25 months.

This excellent result differs markedly from our experience in the use of the IEA in a series of patients comparable for incidence of risk factors and extension of the coronary disease. From July 1990 to October 1992 we used the IEA in 38 patients (mean age 50.7 ± 6.5 years, range 38 to 65 years) with a mean of 2.8 critically diseased coronary arteries. We performed 124 distal anastomoses (3.3 per patient): 41 with the IEA, 42 with the left ITA, 38 with the right ITA, and only 3 with the saphenous vein. No patient had bilateral IEA grafts. Proximal anastomoses of the IEA grafts were performed directly on a punched orifice in the ascending aorta. No perioperative deaths occurred; we recorded 2 perioperative myocardial infarctions that were not related to IEA graft malfunction. After giving informed consent, 23 of 38 patients underwent selective IEA angiography at a mean follow-up of 21.2 ± 11.2 months. In these patients the IEA was anastomosed as follows: in 3 cases to the left anterior descending artery, in 9 to a diagonal branch, in 1 to the first and second diagonal branches with a bifurcated conduit, in 6 to an obtuse marginal branch, in 2 to the first and second obtuse marginal branches with a bifurcated conduit, in 1 to the right coronary artery, and in 1 to the ramus medianus. We found IEA grafts patent or totally occluded, but no string sign was recorded. Total IEA patency rate was 52.2% (12/23). Correlating IEA patency rate with the coronary branch revascularized, we found a 100% patency whenever the IEA had been anastomosed to coronary branches of greater caliber (3 left anterior descending arteries, 1 ramus medianus, and 1 right coronary artery). Patency rate was much lower when the IEA was grafted to smaller-caliber coronary branches like diagonal (40%) and obtuse marginal branches (37.5%).

Buche and coauthors implanted IEA grafts mainly on coronary arteries with a presumably satisfactory runoff (126 right coronary arteries and 2 left anterior descending coronary arteries out of 157 anastomoses); midterm patency rate when the IEA was used to bypass occluded right coronary arteries was higher than that detected when the IEA was used to bypass mildly stenotic right coronary arteries. In our study we also found a good patency rate when the IEA was used to bypass good-caliber coronary arteries, but we recorded a marked runoff dependence of the graft when the IEA was used to bypass small coronary branches, according to the findings of other authors.⁴ The difference between our results and those reported by

Buche's group may be attributed at least in part to the different distribution of target coronary branches bypassed, with a prevalence in our series of obtuse marginal and diagonal branches.

In conclusion, the low patency rates of IEAs grafted to obtuse marginal and diagonal branches suggest that the IEA cannot be considered in an attempt to increase the application of arterial grafts as coronary bypass conduits or to perform a total arterial myocardial revascularization. As a consequence, we now take into consideration the use of IEA grafts only in patients who have a contraindication to bilateral ITA or right gastroepiploic artery grafting or in patients having unsuitable greater saphenous veins.

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Reply to the Editor:

We read the letter from Donatelli and associates with great interest. We wonder whether the disappointing results reported by this team might be due to the size of their experience with the inferior epigastric artery (IEA). We believe that more than 38 operations and 23 angiograms are needed to gain reliable experience with a new graft.

The midterm patency rate of the IEA that we recently published in this JOURNAL was based not only on the 29 postoperative angiograms that Donatelli and associates mentioned in their letter, but also on a total of 77 angiograms obtained between 6 and 43 months (average 14.8 months) after the operation. On this basis, we have

reported that the overall patency rate of the IEA used as a coronary artery bypass graft was 79%. We have also shown that the patency rate of the IEA remained stable after the first postoperative year (75% patency rate within the first postoperative year versus 86% after the first postoperative year).¹

It is correct that most of the IEAs that we have grafted were directed to the right coronary artery system; our choice of the right coronary artery as a target vessel for IEA grafting was certainly never made on the basis of the quality of its runoff. Our policy is to bypass the left anterior descending artery and its diagonal branches with the pedicled left internal thoracic artery (ITA) and to direct the pedicled right ITA to the circumflex artery rather than to the right coronary artery, which is often diffusely diseased. Therefore we believe we have tested the IEA on the most unfavorable coronary artery. To support this opinion, we would like to mention that the patency rate of free ITAs grafted to the right coronary artery was 75%, whereas it was 78% when the ITA was grafted to the circumflex and 84% when grafted to the left anterior descending coronary artery.²

We agree with Donatelli's group that the chances for the IEA to remain patent could be better if it was grafted to a coronary artery with a good runoff. However, it seems to us more important that the stenosis of the recipient coronary artery should be severe enough to avoid any risk of competitive flow. We have recently shown that the most important predictor for perfect patency of the IEA in our hands was the severity of the stenosis of the recipient artery. Most of the poor angiographic results (occluded or stringlike grafts) that we have observed in our study were found in the presence of only moderate coronary artery stenosis. In a recent study, Cremer and colleagues³ grafted 50 IEAs to either the left anterior descending or diagonal arteries. The patency rate of the IEA, taken from 23 angiograms obtained from 1 to 6 months after the operation, was 82.6%. In another study, Calafiore and associates⁴ grafted 86 IEAs. By using a conduit-to-conduit technique that permitted them to avoid the need to construct aortoepigastric anastomoses, they improved the midterm patency rate of the IEA to 95.2%.

On the basis of these results and our own experience, we believe, contrary to Donatelli and associates, that it is too early to draw a final conclusion about the role of the IEA. We believe there is at present no reason to reject this artery as a coronary artery bypass graft.

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Vascular reactivity of the gastroepiploic artery graft

To the Editor:

I read with great interest the article by He and Yang (*J THORAC CARDIOVASC SURG* 1995;109:707-15), in which they compared the pharmacologic reactivity of arterial grafts taken from patients undergoing coronary artery bypass grafting. They used segments of three types of arterial grafts: gastroepiploic (GEA), internal thoracic (ITA), and inferior epigastric artery arteries. They also compared the reactivity of coronary arteries taken from explanted hearts.

Their study revealed that the GEA had the highest contractility to various vasoconstrictors. However, He and Yang did not specify which segment of the arteries was used. This is a very important consideration, because the contractility of arterial grafts usually increases toward the distal end. In a previous publication, He¹ demonstrated that the contractility of the distal section of the ITA correlated inversely with its diameter; that is, the smaller the diameter, the greater the tendency for spasm. The implication is that the distal ITA, or its branches, should not be used for the anastomosis. A similar observation was made by Grandjean and associates,² that the distal segment of the GEA graft is more reactive and should be trimmed off.

Early in my experience with the GEA graft in 1992, I used longer grafts, usually 15 cm or even longer. The lumen at the distal end averaged 1 to 1.5 mm, and the measured flows were poor, barely 40 to 60 ml/min. Tendency for spasm at the distal end was frequently observed, and the vessel was extremely friable. With more experience, I found that shorter grafts (approximately 12 cm in length) correlated with better flows (100 to 270 ml/min) and with a larger lumen for the anastomosis, usually 2 to 3 mm in internal diameter. These larger, more proximal segments of the GEA are easier to handle, less friable, and have minimal or no tendency for spasm.

Furthermore, in the past I used to introduce papaverine hydrochloride into the lumen of the GEA graft routinely, a practice that I seldom use now, because it is not necessary with arterial grafts that are larger in diameter and, consequently, less reactive.

These shorter GEA grafts usually reach the posterior descending coronary artery without tension, if placed behind the stomach. The retrogastric route has the addi-