

Factors influencing graft patency

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Patency rates of coronary artery grafts depend on many factors: some, to be sure, relate to operative technique and surgical experience, but more influential perhaps are the quality of runoff, the graft flow rate, the type of bypass conduit, etc. On the other hand, while factors responsible for early graft closure (Vg thrombosis) may differ in some respect from those associated with late graft failure (Vg intimal hyperplasia, atherosclerosis), some conditions such as quality of arterial bed and, to a certain extent, surgical technique appear to influence both early and late results.

In comparing our early experience to our more recent one at the Montreal Heart Institute, it became evident that graft patency improved considerably over the years. Thus, cumulative patency rates at 2 weeks and 1 year were 65% in the first 300 patients and 80% in the next 300 patients. This was believed due to improvement in the surgical technique and not to the selection of patients who differed, for instance, in the quality of runoff, left ventricular function, or symptoms.

Factors which were found to intervene both early and late after operation, irrespective of surgical experience, were the following:

- a. arterial runoff (600 cases); good runoff, cumulative patency rate at 1 year: 80%; poor runoff, 38.1% ($p < 0.001$);
- b. size of artery >2 mm, 79.5%; <1.5 , 47.2% ($p < 0.001$);
- c. graft flow >50 ml/min, 89.1%; <50 , 50.2% ($p < 0.001$);
- d. site of anastomosis mid LAD, 78.7%; distal LAD, 46.4% ($p < 0.01$).

Conversely, degree of proximal arterial occlusion, left ventricular wall motion, presence of left ventricular failure, and serum lipid value had no effect on late patency rates. Also, the type of bypass conduit appeared to play little role; hence, cumulative patency rates at 1 year were 88% in IMA grafts and 84% in vein grafts.

Better surgical technique—preservation of the vein, tangential landing on the coronary artery, cobra-head aortic anastomosis—lead to virtual elimination of anastomotic narrowing both proximally and distally. Fur-

thermore, in patients receiving multiple vein grafts, the use of sequential anastomoses or of circular grafts leads to improved patency rates. Thus, in sequential grafts, only one of 44 grafts was completely occluded—occlusion of all coronary anastomoses—in a consecutive series of patients and none of 27 grafts studied later at 1 year showed total occlusion. In circular grafts (one graft looping around the heart from the right side and anastomosed to $\geq$ four coronary branches), early patency rate was 95.7%, 90 of 94 coronary anastomoses.

Lastly, recent studies conducted in 98 patients 6 years after operation and 5 years after a second study at 1 year had disclosed normal graft contour, showed atherosclerotic narrowing in 8% of grafts (half were $\geq 50\%$ narrowing) in addition to an occlusion rate of 10% in the 5-year interval.