

Coronary Revascularization: Then, Now, Future Trends

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Then

A small trial of 50 patients showed a composite safety event rate of 10% (0 mortality, 5 emergency coronary artery bypass grafts [CABGs], 0 strokes) and only a partial success rate (residual stenosis, 34%) with complete failure in 36% of patients. The authors predicted that the new percutaneous coronary intervention (PCI) technique might be suitable for 10% to 15% of patients needing coronary revascularization. Because the PCI complications were sudden and severe, they also recommended that the procedure should only be performed in facilities with competent and emergent surgical capabilities. This small trial was reported by Gruntzig and colleagues in 1979.¹ At that time, the authors' recommendations and predictions were entirely appropriate in estimating the potential uses and restrictions of this novel technique.

Now

A trial of 153,950 PCI patients showed a composite safety event rate of only 2.33% (1.8% death, 0.29% emergency CABG, 0.26% stroke) and a PCI success rate of 91% (residual stenosis < 20%).² Because the emergency CABG rate (0.29%) was very low and stents, perfusion catheters, left ventricular assist devices, and emergency transfers were readily available, the PCI procedures performed at hospitals without cardiac surgery (*off-site*) were just as safe and successful as PCI procedures performed at hospitals with cardiac surgery (*onsite*). The prior mandatory need for onsite surgery backup for PCIs was no longer required.

Today, PCI has largely replaced CABG for revascularization in much of the world. PCI accounted for over 80% of all revascularizations in California last year (60,000 PCIs vs 12,399 CABGs). The early

PCI techniques have evolved, producing safer and more effective results in an ever-widening group of patients and conditions. PCI can now be routinely performed at hospitals without an onsite cardiac surgery unit. The safety and success of qualified offsite PCI have also been demonstrated in multiple single-center, multicenter, statewide, and national trials and registries. The requirements for onsite surgery have now been removed or eliminated in almost all states.

Future Trends

PCI will continue to dominate the coronary revascularization landscape. It will continue to represent the fastest way to re-perfuse acutely ischemic myocardium and provide convenient relief of symptoms for patients with chronic partial or total coronary occlusions. The shift towards PCI will also result in a shift away from CABG and their

requisite cardiac surgery programs. With a smaller number of patients requiring CABG surgery and little need for emergency PCI backup surgery, the number of cardiac surgery hospital programs will shrink. California currently has 122 cardiac surgery programs at acute care hospitals with an annual isolated CABG volume of 12,399 patients per year. However, 19 of these 122 hospitals averaged < 1 CABG/wk and 62 hospitals averaged < 2 CABGs/wk. As many as 80 of these 122 hospitals performed < 2 isolated CABG/wk.³ If California Senate Bill 906 (SB906) passes, these hospitals might consider closing their very low volume cardiac

surgery programs and consolidating these CABG patients at higher volume central hospitals.⁴

If SB906 passes, the number of offsite PCI hospitals in California will continue to increase, leading to a predominance of offsite PCI hospitals. It is not surprising that in the United Kingdom, the majority of PCI hospitals are offsite (58%), not onsite (42%).⁵ If SB906 passes, California may well head in that direction.

The rapid progress in PCI safety, success, and usage has led to major changes in recommendations, guidelines, and the revascularization landscape that would truly surprise the pioneers of this technique. ■

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