

**Invited Commentary to:
“What can be learned from the postoperative angiographic result in
off-pump coronary artery bypass surgery on the beating heart?”****(Eur Surg (2004) 36/3: 180–184)****M. Thalmann**

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Cardiopulmonary bypass (CPB) with aortic cross-clamping and cardioplegic arrest remains the gold standard but is associated with several effects related to manipulation of the aorta and CPB. Since Benetti and colleagues [1] and Buffollo and associates [2] introduced the off-pump operation as a less invasive technique, coronary bypass grafting without the use of extracorporeal circulation has been accepted as an alternative technique in many centres [3], but with significant differences in the percentage of OPCAB-cases in different cardiosurgical centres and within the surgical teams.

During the last decade the invention of new stabilization devices has led to improvement in the quality of anastomoses in OPCAB surgery. Concern still exists regarding the quality of anastomoses to marginal and posterolateral branches of the circumflex artery, the issue of short and long-term patency is a subject of fierce debate and there have been no major long-term follow-up studies.

Intra-operative Doppler flow measurements, such as those routinely carried out on our OPCAB patients, can be helpful for detecting major impairments of the anastomosis or graft-like kinking but they fail to delineate exact morphology.

Consequently, intra-operative angiography is still the only useful strategy for confirming the surgical result quickly in OPCAB surgery and for redoing a stenosed anastomosis immediately during the operation. Using a combination of OPCAB and PTCA as a hybrid-procedure would be an interesting new approach for complete revascularization, combining the superiority of the mammary graft to the LAD and dilatation and stenting of marginal branches of the circumflex artery. There are very few cardiosurgical centres that are equipped with these facilities and nowadays finding the financial resources to

adapt the operating room for the hybrid technique (it would be, of course, the most cost intensive procedure!) could present a major problem.

Interpretation of intraoperative as well as immediate post-operative catheterization can be difficult because of significant native vessel and graft spasm [4].

It reliably determines patency but its value is suspect for determining long-term graft adequacy. Interestingly in Zehr's study, no patient with occluded graft showed any clinical signs or recurrence of angina. The benefit of intra-operative angiographic control is that it permits valuable information concerning the quality of anastomoses and grafts to be obtained in the operating room, and allows the anastomosis to be redone immediately. The patient is still under general anaesthesia and the additional procedure is not as time consuming. However, there are some disadvantages. Bonatti [5] performed transfemoral angiography intra-operatively and encountered a significant percentage of spasms of the grafts and/or target vessels.

Postoperative angiographic control before hospital discharge, as the authors described in the underlying work, might be beneficial with regard to the incidence of graft and target vessel spasms. Puskas et al. reported similar findings.

There are no major studies comparing the angiographical result and the development of stenosis of an anastomosis in the follow-up. Multi-catheterisations in the post-operative first year would be required. Cardiac magnetic resonance imaging might be the solution in the near future.

The authors studied a group of 30 consecutive patients who underwent revascularization without extracorporeal circulation. In these patients 49 grafts were performed (1.6 grafts/patient), the preferred target vessels being vessels of the anterior wall and the right coronary artery. The number of grafts per patient represents the patient selection criteria for the OPCAB technique, excluding patients needing grafting of the circumflex territory.

A number of authors were able to demonstrate the feasibility of OPCAB surgery in multi-vessel coronary

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artery disease in bigger series with routine grafting of marginal branches [6] and similar numbers of grafts per patient in the on-pump and off-pump groups [7]. However, the indication for OPCAB surgery and the patient selection have to be carried out very carefully.

OPCAB imparts some survival benefit to most patient subgroups [8].

Higher risk patients, diabetics, patients with multi morbidity and the elderly may benefit most.

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