mind the patient of his disease, and people immediately recognize the patient as ill. In addition, personal mobility is limited because of the extracorporeal driving unit. All of these factors limit quality of life.

The greater power of pulsatile devices is often considered an advantage compared with axial-flow pumps. However, experience shows that a flow of 3 to 5 L/min, which is easily provided by axial-flow devices, is sufficient support for daily activities. The continuous flow is well tolerated. This fact may be, at least in part, explained by the flow characteristics. Patients on axial-flow pumps have a less pulsatile flow pattern because the activity of the native heart at rest transmits pulse waves through the pump. This activity is obviously sufficient to reestablish and maintain normal organ function.

Taking all of these factors into account, the authors prefer axial-flow devices for long-term support. For destination therapy, the authors currently use the Berlin Heart Incor, which is being evaluated for this indication in the INDESTINY trial. The management of anticoagulation and platelet inhibition in patients with axial-flow devices still remains an unsolved problem. Experience with the DeBakey VAD, which was the first axial-flow pump on the market, showed that, in such pumps, platelet inhibition in addition to anticoagulation is even more important than in pulsatile devices. In our own experience with the DeBakey VAD, administration of clopidogrel (75 mg) in addition to aspirin (300 mg) and dipyridamol (75 mg) as well as intensification of oral anticoagulation (INR 3.5 to 4.5) reduces the frequency of thromboembolic events.7 In patients with the Berlin Heart Incor, the regimen was modified. Anticoagulation is titrated at an INR of 2.0 to 3.0, and platelet inhibition consists of aspirin (100 mg) and clopidogrel (75 mg). Antiplatelet therapy is individually guided by different platelet function tests.

We do not yet have the optimal pump for destination therapy. We need pumps with better flow characteristics and fluid dynamics that cause less damage to platelets and reduce the risk of thrombus formation. It will be interesting to see if the implantable centrifugal devices that will soon be on the market have an advantage in this respect. The pumps are required to run reliably and service-free for many years, and their design should allow exchange of worn parts in a minimally invasive intervention. Completely implantable devices with controller and energy supply inside the body, which are currently in development, will further increase quality of life and reduce the risk of infection.

Markus J. Wilhelm, MD
Christof Schmid, MD
Hans H. Scheld, MD
Department of Cardiovascular Surgery
University Hospital Zurich
Zurich, Switzerland

References

doi:10.1016/j.ejcts.2006.02.059

Is off-pump therapy really the right choice in urgent coronary grafting?

To the Editor:
I read with interest the article by Stamou and colleagues,1 wherein they compare the early outcomes in nonelective myocardial revascularization in patients undergoing on-pump and off-pump bypass. However, it is arguable as to whether the conclusions drawn from this report will have an enduring and widespread influence on this issue.

First, even though recent studies are increasingly documenting better outcomes among patients undergoing off-pump procedures, a number of well-designed trials in the past and present (including both elective and urgent cases) have yielded conflicting results in this regard. Also, it is unclear as to why the urgent cases should be handled on a separate basis because the inflammatory effects associated with cardiopulmonary bypass are likely to be the same in both elective and nonelective scenarios, and the greater risks faced by these patients might solely be a result of their emergency nature of presentation, not having anything to do with cardiopulmonary bypass use.

Second, the authors state the superiority of off-pump surgery in urgent cases on the basis of the former decreasing the rate of intra-aortic balloon pump placement and renal failure. As regards intra-aortic balloon pump placement, studies have shown that off-pump surgery reduces the need for its use in elective cases. However, even as this evidence might tilt the balance toward off-pump surgery in elective cases, the argument is unlikely to have a significant influence on decision making in urgent cases, in which hemodynamic instability is often an issue and balloon pump placement is frequently mandated on purely clinical grounds. Also, although cardiopulmonary bypass is shown to have a detrimental influence on renal function in this report, recent propensity score study with univariate and multivariate analysis shows that off-pump grafting itself might not have any influence in reducing the rate of postoperative renal dysfunction in patients at risk for nephrologic compromise, raising doubts regarding the validity of using the kidney-sparing argument in support of off-pump surgery.2

Finally, before off-pump surgery is adapted as the primary approach in urgent coronary revascularization, it must be kept...
in mind that a small but significant percentage of patients undergoing off-pump procedures do require conversion to cardiopulmonary bypass, and in case of urgent conversion, disastrous consequences are recorded at a significant level, marking the scope for urgent off-pump use in a selected group of coronary artery bypass grafting patients. ³

Omer Ashraf, MBBS
Aga Khan University
School of Medicine
Karachi 74800
Pakistan
E-mail: warraiach@yahoo.com

References

Reply to the Editor:
We appreciate the interest of Dr Ashraf in our article comparing the outcomes of nonelective on-pump with those of off-pump myocardial revascularization. Dr Ashraf is concerned that our results are not confirmed by well-randomized trials comparing the 2 techniques. However, we are not aware of any randomized controlled trials comparing the outcomes of patients having nonelective off-pump coronary artery bypass grafting (CABG) with those of historical control subjects. Such an endeavor might require randomized trials of impractical size to prove whether statistically significant differences really exist between these 2 techniques of myocardial revascularization in this subset of high-risk patients. The authors also question whether urgent or emergency cases should be handled on a separate basis compared with elective cases. The answer is yes, with the main reason being that urgent and emergency myocardial revascularization poses a greater challenge and has consistently been associated with worse outcomes compared with first elective CABG. ¹ Thus a separate and more focused analysis on this subgroup of patients is able to determine the factors that result in a better or worse clinical outcome.

In regard to the issue of decreased rate of postoperative intra-aortic balloon placement and renal failure after off-pump CABG demonstrated in our study, Dr Ashraf quotes a recent article not showing any benefit of off-pump compared with on-pump CABG in regard to the occurrence of postoperative renal function. The study he quotes, ² however, is a not well-balanced study, including only 158 patients in the off-pump arm and comparing those with 2869 patients having on-pump CABG in the same period of time. One might wonder whether the authors of the study were equally comfortable with both techniques because they performed only about one tenth the off-pump cases compared with on-pump cases. In contrast, our 2-institution study compared 2273 patients undergoing off-pump procedures with 3487 undergoing on-pump procedures and, after a robust statistical methodology, was able to document a lower rate of intra-aortic balloon pump placement and a decreased rate of postoperative renal failure, as well as a decreased length of stay after off-pump compared with on-pump nonelective CABG. Moreover, multiple previous studies, including some randomized controlled studies, ³-⁵ have documented a lower rate of postoperative renal dysfunction after off-pump compared with on-pump CABG. Finally, we tend to agree with Dr Ashraf that a conversion to cardiopulmonary bypass in cases of urgent myocardial revascularization will be associated with worse outcomes, and thus a careful selection of patients chosen for off-pump surgery by surgeons comfortable with both approaches would be necessary to optimize clinical outcome.

Sotiris C. Stamou, MD, PhD
Department of Thoracic and Cardiovascular Surgery
The Cleveland Clinic Foundation
27562 Remington Circle
Westlake, OH 44145

References