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

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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,^{3,4} have documented a lower rate of postoperative renal dysfunction after off-pump compared with on-pump CABG.⁵ 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.

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Atrial ablation and esophageal injury: Comments on an experimental study

To the Editor:

In the December issue of the *Journal*, we read with enormous interest the article entitled "Ablation of atrial fibrillation and esophageal injury: effects of energy source and ablation technique" by Aupperle and colleagues.¹ The authors performed in vivo experiments on 39 sheep to evaluate the histologic changes induced in the esophagus by using atrial fibrillation ablation with different energy types, such as cryoablation, microwave, laser, and unipolar or bipolar radiofrequency, through 2 different approaches, endocardial and epicardial. They observed esophageal alterations in numerous cases and concluded that the most significant lesions (moderate and severe damage) were principally induced by endocardial unipolar radiofrequency and cryoablation. We would like to comment on a number of issues.

The esophageal thermal lesion, which is similar to those found in myocardial thermal lesions, is mainly based on the quantity of energy absorbed by the tissue, the type of energy, and the distance between the ablation electrode and the esophagus. Aupperle and colleagues¹ have compared different types of energy applications with standard clinical protocols. However, they do not consider the distance between the electrode and the esophagus or the individual variations in myocardial thickness; that is, no allowance was made for these parameters in the groups under study. Several clinical studies have shown a short anatomic distance between the left atrium and the