LETTERS TO THE EDITORS

Regarding "Repair of large abdominal aortic aneurysm should be performed early after coronary artery bypass surgery"

To the Editors:

We congratulate the authors (Paty et al. J Vasc Surg 2000; 31:253-9) for this arduous and substantial study, which, however, only decreases the dilemma of the vascular surgeon when confronted with two potentially fatal diseases.

The authors present their complaisant experience in the management of abdominal aortic aneurysms (AAAs) early after coronary artery bypass (CABG), on grounds open to discussion regarding the early-staged tactics. The authors cite Durham,[1] who reported a 14% incidence of aneurysm rupture following CABG in a small sample of seven patients. Hertzer,[2] however, reported on 70 patients subjected to CABG, with one case of rupture (3%), and Acinapura[3] reported no postoperative rupture in 20 patients with AAA and CABG. These authors found no relationship between AAA rupture and recent major surgery. We add our experience on 13 patients with AAAs, subjected to laparotomy for nonvascular disease and observed for 6 to 72 months (mean, 2 years), also without rupture of any aneurysm.[4,5]

Thus, we reserved as to the proscribed passage of the authors that CABG may lead to increased occurrence of postoperative AAA rupture. Every explanation for increased risk of rupture due to major surgery is speculative; increased systematic collagenase activity is debated[6-8] because collagenase activity is not also increased in other collagenous tissues. Collagenase is produced locally in the aneurysmal wall, then circulates in the blood. Collagenolytic activity has been observed in the abdominal aorta and the common and hypogastric arteries (aneurysmal potential), but not at the external iliac arteries or in aortoiliac occlusive disease. Experimental studies also showed local collagenase activity in cases of direct injury of the aorta, but not after laparotomy.[9]

The authors state that seven patients (group 2) died of rupture of the aneurysm after post-CABG dismissal, an impressive number by all means; however, without correlation with the population and the CABG-operated patients, there is no actual help in decision making. The evidence regarding group 2 is not age adjusted, and it would also be useful to discuss combination methods such as minimally invasive direct bypass combined with AAA repair[10] and also with endoluminal repair of AAAs. The cost-effectiveness of the long hospitalization and the psychological and immunological encumbrance of the patients who undergo two major operations within 20 days and are hospitalized for a still longer time between surgery and the ICU probably do not justify the early repair. We have suggested that simultaneous management of AAA and other nonvascular disease should not be the general rule,[5] and in agreement with the authors, we support the idea that staged management of aortic aneurysms and coronary disease may reduce the overall postoperative complications. Nevertheless, the urgency of aneurysmal repair following CABG still remains a problem. Moreover, between 1976 and 1993, 10 investigators reported a total of 218 cases with other operations and coexisting AAAs not operated on. The postoperative observation showed an 8.7% incidence of rupture in a mean time of 4.3 months.[6] Thus, more studies are warranted for timing against such ambiguous situations, considering that clinical analysis strengthens decision making in surgery, which although it carries risks, should not be risky.

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Reply

We read with interest the letter expressing your opinion regarding the staged repair of patients with concomitant coronary artery disease and large abdominal aortic aneurysms with the pertinent literature supporting your position. As two of the references differed with the conclusions of our study, we read these papers and would like to summarize a few observations.

In Hertzer's[1] study of patients with abdominal aortic aneurysms (AAAs) undergoing coronary artery bypass, which is correctly cited at the end of this reply, 78 patients were identified with AAA with severe surgically correctable coronary artery disease. Within this group, 70 patients underwent myocardial revascularization. Of these patients, 56 had staged aneurysm resection usually within the same hospital admission. Only 28% of the total group underwent staged procedures. The 3% rupture mortality rate reported was for the total series of patients.

The patients with late aneurysm rupture were not those who

underwent the 70 staged procedures. Furthermore, Hertzer found that the diameter of unresected aneurysms documented by noninvasive means significantly influenced the risk for rupture. The cumulative incidence of rupture was 20% for patients with aneurysms less than 6 cm compared with 69% for those greater than 6 cm ($P = .0048$).

In the study by Acinapura,[2] 20 patients with severe coronary disease underwent myocardial revascularizations followed by staged abdominal aortic aneurysmectomy 7 to 12 days following. Two of these patients required emergency aortic replacement on the seventh and eighth day postoperatively because of spontaneous rupture.

We realize that this is a controversial area and not all surgeons would agree with the viewpoint expressed within our study. Our primary goals in staging these patients within the same hospitalization were to limit the mortality and morbidity associated with combined procedures and to attempt to reduce the risk of postoperative aneurysm rupture in patients with severe coronary disease by performing aortic replacement with a short interprocedure interval within the same hospital stay. Ideally, a controlled prospective randomized trial would be best to sort out this controversy as was alluded to in the paper.

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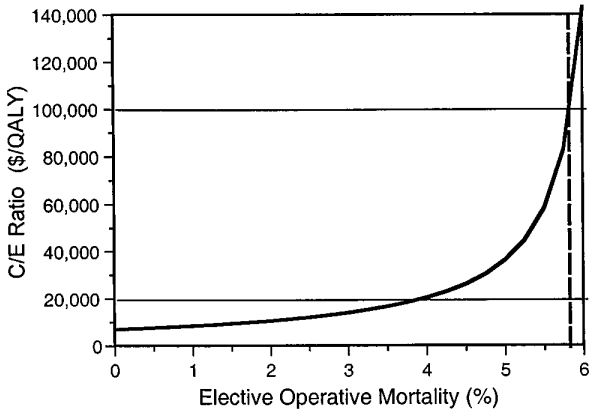
The UK small aneurysm trial

To the Editors:

The UK Small Aneurysm Trial showed no survival benefit of early surgery compared with surveillance and possible subsequent repair of 4.0- to 5.5-cm diameter AAAs. Using data from this trial, we found that early surgery was, in fact, cost-effective when compared with surveillance if calculated over the entire life expectancy of the population (J Vasc Surg 2000;31:217-26). This was due to a small difference in mortality rates between the two groups (7.0% per year for early surgery vs 7.4% per year for surveillance), which became significant when projected over the patients' entire lifetime, rather than the 6-year follow-up of the UK Trial. Our analysis was intended to show that a small difference in mortality rate can have a substantial impact on decision analysis, even though the clinical trial could not be powered to statistically validate this difference. However, since the mortality rates were not statistically significant between groups in the UK trial, Dr K. Craig Kent, in his thoughtful discussion of our paper, asked us to model the scenario of equal mortality rates between the groups. We have subsequently done this and, in this letter, report the impact of this different assumption on our cost-effectiveness calculation.

We used the same model described previously, taking data directly from the published UK Trial.[1,2] However, rather than using the observed annual mortality rates (7.0% for early surgery and 7.4% for surveillance), we used an annual mortality of 7.0% for both groups. We again subtracted operative mortality from both the early surgery and surveillance groups. As before, we used operative mortality rates taken from the UK trial (5.8% for early surgery and 7.2% for surveillance) for the base case analysis. With sensitivity analysis, operative mortality was again varied across a plausible range (0%-10%); the same relative change in operative mortality was applied to both groups. Our analysis shows that with equal annual mortality rates, in the base case analysis, with an operative mortality of 5.8%, early surgery is not cost-effective (marginal cost-effectiveness ratio $90,400 per quality-adjusted life year [QALY]). However, as shown in the Figure, lower operative mortality renders early surgery cost-effective, with marginal cost-effectiveness ratios below $20,000 per QALY at operative mortality rates below 4%. Such rates are achievable in selected patients. Among US Medicare patients undergoing elective AAA repair in 1995, the 30-day mortality rate was 3.0% for ages 65 to 69, and 4.0% for ages 70 to 74.



Marginal cost-effectiveness ratio of early surgery compared with surveillance as a function of operative mortality rate, with data from UK Small Aneurysm Trial. The *dashed line* indicates operative mortality (5.8%) observed in UK Trial, at which early surgery is not cost-effective, assuming equal late mortality rates between the groups (see text). However, at operative mortality of 4% or less, early surgery is clearly cost-effective with this model.

Thus, even assuming equal long-term mortality rate, our analysis again demonstrates that early surgery for small abdominal aortic aneurysms can be cost-effective, if low operative mortality can be achieved.

We would like to thank Dr Kent for prompting this analysis.

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