risk of mortality for platinum-based chemotherapy (the very unlikely scenario), the overall estimate would still significantly favor chemotherapy.

In the past there have been many instances in which the failure to adapt significant advances in treatment has led to delays in passing on the benefits to the patient in the clinic. Examples include thrombolytic therapy or beta-blocker therapy after myocardial infarctions.^{7,8} These non-IPD-based systematic reviews highlighted that each year of delay may cost thousands of lives worldwide and were influential for the development of evidence-based medicine. We believe that delay in the case of postoperative chemotherapy may have the same consequences and be interpreted as reflecting clinician uncertainty and potentially lead to the design and conduct of further clinical trials in which the question has been clearly answered.^{9,10} As Sir Austin Bradford Hill pointed out in his presidential address at the Royal Society of Medicine (January 14, 1965), "All scientific work is incomplete—whether it be observational or experimental. It is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that appears to demand at a given time." In this regard the evidence is very strong that adjuvant chemotherapy improves patient survival postresection. Optimizing therapy and targeting those patients most likely to benefit from treatment are clinically important questions that the IPD study may address. Further trials in the already studied population randomizing patients to a "no chemotherapy" arm are, however, unlikely to contribute to existing knowledge and are ethically questionable.

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Single-stage repair of extensive thoracic aortic aneurysms

To the Editor:

I congratulate Dr Kouchoukos and colleagues¹ for their excellent results with the single-stage repair technique of extended thoracic aortic aneurysms. We originally introduced this technique² in 1994 with a limited series of 16 patients and a hospital mortality of 12.5%. Ten years ago axillary artery cannulation, branched arterial grafts, and antegrade cerebral perfusion were not routinely used. As a consequence, cerebral ischemia was longer than today, and pa-

tients had to undergo operation with deep hypothermia and circulatory arrest. In our first series cerebral ischemia averaged 55.7 minutes. A further consequence of deep hypothermia was more frequent respiratory complications than observed today. During recent years, we also improved our technique by adding antegrade cerebral perfusion, either through retrograde axillary artery perfusion or the "aortic arch (or branch) first" technique, as suggested by Dr Kouchoukos and colleagues.¹ Body temperature is generally decreased to no more than 25°C. Our series now includes approximately 53 patients with an overall hospital mortality of 9.4%. Among the last 30 patients, hospital mortality was 6.7%; neurologic and respiratory complications accounted for 3.3% and 6.7%, respectively. In regard to the "clamshell" access, we still use an approach through a limited right anterior thoracotomy through the third intercostal space and an anterolateral left thoracotomy through the fourth intercostal space with the patient banked 45 degrees on the right side. In our opinion, this access gives an easier approach to the aortic root along with the arch branches and to the most distal portion of the thoracic aorta. Reimplantation of lower intercostal arteries is not a problem in this way. Contrary to some of Dr Kouchoukos' discussants, I fully agree with the author on the strategy of the single-stage approach in complex cases of thoracic aortic aneurysms. This often is the case in patients who have undergone operation for acute type A aortic dissection, in whom the aortic valve had been repaired and the ascending aorta had been replaced by a tube graft, even though it was extended in some cases to a proximal hemiarch. In such acute instances, the Bentall or equivalent techniques will not be used universally, and the elephant-trunk technique will be used even less. A common late observation in such cases is aneurysm development in the aortic root, often associated with valve incompetence, and distal part of the arch and descending aorta. Conventionally, the treatment of these patients would include a repeat sternotomy with Bentall or valve-sparing procedures, arch replacement with the elephant-trunk technique, and followed later by a second procedure with replacement or endostenting of the descending portion of the aorta whenever possible. Actually, endovascular stenting of the descending aorta is not always a

guarantee against secondary disruption or leakage. Except for the discomfort experienced by the patients, the cumulative risk for the multiple-stage approach can reasonably be presumed to be higher than that reported by Dr Kouchoukos et al and ourselves for the single-stage approach. For these reasons I strongly recommend Dr Kouchoukos and colleagues' suggestions to trust the single-stage techniques in selected cases whenever indicated.

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Reply to the Editor:

My coauthors and I are indebted to Dr Minale and colleagues for reporting their initial experience with the single-stage technique for extensive thoracic aortic resections in 1994,¹ which stimulated us to use and evaluate it in our surgical practice. We also appreciate the update of their experience with this technique, which indicates outcomes very similar to those that we have reported.² We prefer, however, to cool to systemic temperatures lower than 25°C to provide additional protection in the event that the ischemic intervals for the brain and spinal cord are prolonged beyond the usual safe intervals. We do not believe that the lower temperatures are associated with increased morbidity. We have found that an incision through the fourth intercostal space bilaterally provides excellent exposure of the aortic root, entire aortic arch, interatrial groove, and most distal portion of the descending thoracic aorta.

We agree with Dr Minale that the single-stage technique is of particular value in patients who require reoperation after previous repair of an acute type A aortic dissection or who have a type A dissection after previous coronary artery or valve sur-

gery. Chronic type A dissection was the indication for use of the single-stage procedure in 30 of the 46 patients in our series, and the procedure remains our technique of choice in this setting.² It permits, as Dr Minale has emphasized, easy access to both the aortic root and the distal descending thoracic aorta.

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Total aortic arch replacement and limited circulatory arrest of the brain To the Editor:

We read with great interest the article by Kouchoukos and Masetti¹ titled "Total Aortic Arch Replacement With a Branched Graft and Limited Circulatory Arrest of the Brain," published in the August 2004 issue of the *Journal*. The article describes the authors' experience with total arch replacement (TAR) for various pathologic conditions of the aortic arch (except acute type A dissection) with branched aortic prostheses and unilateral antegrade cerebral perfusion through the right axillary artery. The article generally attests to the appropriateness of the use of branched aortic prosthesis and antegrade brain perfusion for TAR surgery. Since 1986, we have been routinely using antegrade selective cerebral perfusion and a branched aortic graft for TAR procedures.² The results we have achieved through the years give us reason to be convinced that the use of the branched grafts rather than tube prostheses and antegrade brain perfusion for cerebral protection represent the optimum surgical strategy for this complex surgery.³ The branched aortic graft allows easier bleeding control at arch-vessel anastomotic sites and has been found to be associated with a lower incidence of postoperative strokes, making it a better option than tube graft. Similarly, selective cerebral perfusion, when used to its

full potential, basically relieves the surgeon from the psychologic burden of a limited brain protection time and thus allows meticulous arch repair. It is good to see that more and more aortic surgeons all over the world are realizing the advantages of these techniques, which once were thought to be cumbersome.

Concerns have been expressed by some authorities, including Kouchoukos and Masetti,¹ regarding the potential hazards of direct cannulation of the arch vessels in the form of cerebral embolization of air or debris. In our experience, such concerns are mostly unwarranted. Our arch vessel cannulation technique involves transecting the arch vessels distant from their origins, at sites where they are free from atherosclerotic debris or dissection, and then cannulating them under direct vision. Blood flow through the arch vessels is continued until just before the cannulation with the patient in a Trendelenburg position. These measures help to avoid air embolism.⁴

For patients with acute type A aortic dissection and degenerative arch aneurysm requiring TAR in whom the ascending aorta is not suitable for arterial inflow because of atheromas, we first cannulate the right axillary artery through an 8-mm graft attached to it in an end-to-side fashion. Then, after cooling of the patient with cardiopulmonary bypass and initiation of circulatory arrest, the left common carotid artery is also cannulated, ensuring bihemispheric antegrade brain perfusion during the arch repair. Although some authors have advocated the use of unilateral cerebral perfusion for aortic arch replacement surgery,⁵ our experience with that technique is limited to cases requiring a less radical aortic repair, such as ascending aortic replacement with open distal anastomosis or hemiarch replacement. In 10 patients (acute type A dissection n = 7, chronic type A dissection n = 1, degenerative arch aneurysm n = 1, and mycotic arch aneurysm n = 1), hemiarch replacement was carried out with right axillary artery perfusion as the only brain protection method under moderate hypothermic circulatory arrest (mean rectal and tympanic temperatures 22.3°C ± 1.6°C and 16.9°C ± 2.4°C, respectively). Mean perfusion flow rate and pressure were 5.1 ± 1.9 mL/(kg · min) and 27.8 ± 9.4 mm Hg, respectively. Mean selective cerebral perfusion time was 35.8