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12/8/83413

Reply to the Editor:

My colleagues and I are pleased with the endorsement of the video-assisted thoracoscopic (VAT) technique for thymectomy by Mineo, Pompeo, and Ambrogi. It is heartening to see preliminary confirmation of the safety and efficacy of the technique in another institution.

Regarding the issues raised in their letter, we also began the VAT approach for thymectomy from the left side because preoperative computed tomographic assessment indicated that the thymus gland was usually more prominent and larger on the left side. As a result of the experience of one of our colleagues (Anthony Yim), we gradually adopted the right-sided approach. Although it is a matter of surgical preference, we routinely have found the right-sided approach technically easier than the left-sided approach for a number of reasons.

1. From the left side, the recess medial to the superior vena cava and inferior to the innominate vein was the most difficult area to visualize and dissect. This portion of the procedure is more easily accomplished from the right side.

2. Identification of the innominate vein from the left side occasionally presented some difficulties. Initial identification of the superior vena cava from the right side allows easy identification of and dissection along the innominate vein from the right side.

3. For right-handed surgeons, performing a VAT operation beginning inferiorly and working cephalad is ergonomically simpler from the right side of the patient than from the left side.

4. A neck dissection is equally easy to accomplish from either side.

In the final analysis, however, we believe that the surgeon's preference should rule—whichever side he or she feels most comfortable on is the one that should be used. Although we rarely use carbon dioxide insufflation for most VAT procedures, we do think that VAT thymectomy is an instance in which the adjuvant pneumomediastinum facilitates visualization and dissection, especially when crossing to the opposite side and performing the dissection in the aortopulmonary window. It also facilitates identification and dissection of the superior horns of the gland in the cervical area. As mentioned in the manuscript and by Mineo, Pompeo, and Ambrogi, we totally agree that removal of all anterior mediastinal tissue is necessary to assure a complete thymectomy.

We congratulate Mineo, Pompeo, and Ambrogi on their experience with 12 cases. We believe that the technique, whether performed by the right- or left-sided approach, needs to be evaluated by longer follow-up in larger series first. We further believe that a multiinstitutional study to determine which side is more appropriate is a lesser issue that should be studied after efficacy of the procedure has been definitively proved by long-term follow-up. In the 14 months since completion of our reported study, our results, although still intermediate, continue the early trends.

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12/8/83412

Treatment of heparin-induced thrombocytopenia

To the Editor:

In the November 1996 issue of the Journal (1996;112: 1390-92), Ganjoo, Harloff, and Johnson reported the case of a patient with heparin-induced thrombocytopenia (HIT) treated by enoxaparin. They concluded that cardiac operations can be safely done with the use of a circuit coated with Carmeda Bioactive Surface (Medtronic, Anaheim, Calif.) in combination with low-molecular-weight heparin in patients with HIT. I would like to comment on this conclusion.

If thrombocytopenia develops as a result of heparin, the heparin infusion should be stopped immediately. It is, however, difficult to choose an alternative anticoagulant. Initial reports have described the use of low-molecular-weight heparin instead of unfractionated heparin.[1] Recently Warkentin,[2] Peters,[3] Magnani.[4] and their associates emphasized that low-molecular-weight heparin is not indicated for the treatment of patients with HIT because of extensive cross-reactivity (80% to 90%). Patients with HIT who were treated by the heparinoid danaparoid sodium (ORG 10172; Orgaran) had lower cross-reactivity (10%). However, before the heparinoid danaparoid sodium (ORG 10172) or eventually low-molecular-weight heparin is substituted for heparin, the plasma of the patients should be tested for cross-reactivity toward one or more of these agents (platelet aggregation or 14-seratonin release test). The alternative anticoagulant is safer if no cross-reactivity has been detected. If acute replacement of heparin is necessary, the best option is danaparoid sodium (ORG 10172). Other approaches to the treatment are not conclusive.

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[Response declined]

12/8/83416

Angiographic and electron-beam computed tomography studies of retrograde cardioplegia via the coronary sinus

To the Editor:

We read with great interest the article "Angiographic and Electron-Beam Computed Tomography Studies of Retrograde Cardioplegia via the Coronary Sinus" authored by Farge and associates.[1] Since 1993 our laboratory has been addressing the distribution of cardioplegic solution delivered via the coronary sinus using explanted human hearts. Many of the authors' findings are similar to our previously published results; however, there are significant differences that we believe are worthy of discussion.

Using their experimental technique, the authors could not demonstrate flow to the right ventricular free wall, regardless of whether the experimental contrast solution was delivered with the coronary sinus occluded at its ostium or not. In our article, "Gross and Microvascular Distribution of Retrograde Cardioplegia in Explanted Human Hearts,"[2] we found clear anatomic gross and microvascular histologic evidence for right ventricular free wall perfusion when cardioplegic solution was delivered with the coronary sinus occluded (Fig. 1). In that study we used an inert intracapillary marker (NTB-2) to qualitatively examine retrograde distribution. In another manuscript, "Coronary Sinus Ostial Occlusion During Retrograde Delivery of Cardioplegic Solution Significantly Improves Cardioplegic Distribution and Efficacy,"[3] we also found clear evidence of capillary perfusion of right ventricular free wall myocardium. In this experiment colored microspheres were added to cardioplegic solution, which was delivered retrogradely with the coronary sinus either open or occluded, to quantitatively determine regional microvascular flow. Right ventricular flow, as well as posterior intraventricular septal flow, was greatly augmented as a result of coronary sinus occlusion. Even without occlusion, however, right ventricular flow was documented.

We believe these differing experimental conclusions are likely the result of differing experimental models. Flow through the coronary venous system and subsequent capillary or thebesian systems is governed by the resistance of the vascular beds and the viscosity of the fluid delivered. In our model, explanted human hearts are arrested by cold cardioplegia, excised and transferred to the laboratory, and subjected to experimental cardioplegic solutions within 20 minutes. We believe this model properly mimics the clinical situation, and normal operative coronary venous vascular resistance is anticipated. The authors use cadaveric hearts for experimentation, but they do not state how these are obtained and preserved and within what time frame they are examined. Such conditions, particularly if ischemia is involved, can greatly alter vascular resistance. In our microsphere studies, the microspheres are delivered within human blood cardioplegic solution. In our anatomic NTB-2 studies, the experimental solution was prepared so that its pH, viscosity, and osmolality all resembled blood cardioplegic solution. These properties of the authors' experimental solution are not mentioned within the article. Such variables, particularly viscosity, can significantly affect flow. We have found that to maintain a coronary sinus pressure of 30 to 40 mm Hg, with the coronary sinus occluded, blood cardioplegic solution needs to be delivered at a rate of approximately 0.5 ml/gm of heart tissue per minute. The authors' finding of a coronary sinus pressure of 40 mm Hg with a flow rate of 100 ml/min suggests either an unusually high vascular resistance or very small experimental hearts. Finally, when one considers the relative mass differences between the left and right ventricles, is it possible that some right ventricular perfusion is occurring during these experiments but that its identification is below the sensitivity of electron-beam computed tomography?

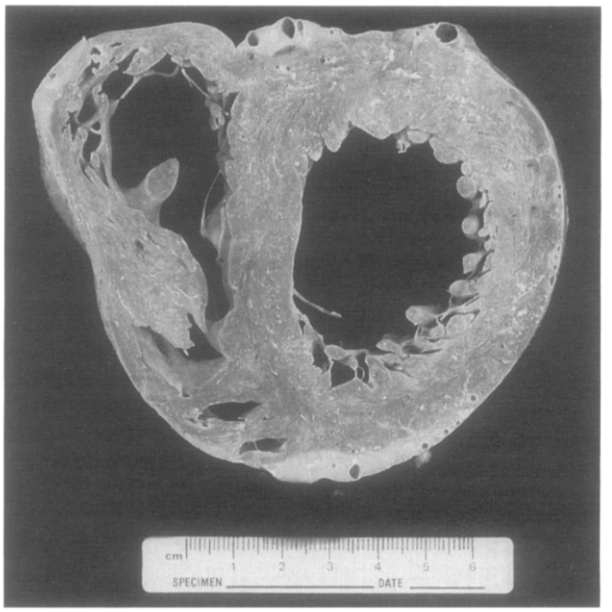

Fig. 1. Transverse section of an explanted human heart near the apex after coronary sinus perfusion of the inert intravascular marker NTB-2. Note that the material is seen in the vasculature of both the left and right ventricles.

Despite our disagreement regarding right ventricular perfusion, this article contains two pieces of anatomic information that we have also found to be true. The first is the highly variable number of venovenous anastomoses between veins arising from the coronary sinus (most notably, the left anterior descending vein) and the posterior descending vein. We believe the quantity and quality of these anastomoses determine the amount of cardioplegic solution delivered to the posterior intraventricular septum and right ventricle when a transatrial coronary sinus cannula is being used, whether it is