

CORRESPONDENCE

Anesthesiology

1998; 89:1037

© 1998 American Society of Anesthesiologists, Inc.

Lippincott Williams & Wilkins

Adenosine-induced Transient Cardiac Arrest for Placement of Endovascular Stent-grafts in the Thoracic Aorta

To the Editor:—Kahn *et al.*¹ report the induction of ventricular fibrillation to facilitate precise placement of endovascular stent-grafts for transfemoral endovascular repair of thoracic aortic aneurysms.

Deployment of stent-grafts in the thoracic aorta is performed by balloon expansion. During this procedure, which usually is less than 20 s,² temporary asystole is helpful to prevent distal device migration caused by the propulsive flow during systole. This problem cannot be overcome by lowering the mean aortic blood pressure during stent-graft deployment in the thoracic aorta. In the case report of Kahn *et al.*,¹ temporary asystole is induced by controlled ventricular fibrillation. A different approach is induction of temporary cardiac arrest by high doses of adenosine.² However, Kahn *et al.*¹ noted that in their experience, the duration of adenosine-induced cardiac asystole was unpredictable.

We do not agree with this statement. Certainly, the bolus dose of adenosine necessary to produce a 20–30-s period of asystole varies widely (12–45 mg), but after the dosage is determined, the action of adenosine is predictable and reproducible.^{2,3,4} Therefore, the minimum dose of adenosine to produce transient asystole of ≥ 20 s has to be established for each patient. When the stent-graft device is in position, this bolus dose of adenosine is administered, and the device is deployed after the occurrence of cardiac arrest. Figure 1 shows the electrocardiograph tracing of a 77-yr-old man during endovascular stent-graft repair of a descending thoracic aortic aneurysm. Deployment of the stent-graft was performed after induction of transient asystole with a bolus dose of 42 mg adenosine applied through the central venous lumen of the pulmonary artery catheter. Spontaneous cardiac rhythm returned after 27 s. The precise positioning of the device across the orifice of the aneurysm was verified by fluoroscopy.

As a precautionary measure, a temporary venous pacemaker was placed *via* the right ventricular lumen of a pulmonary artery catheter, and the patient's temperature was allowed to cool to 34°C. In addition, the patient was given oxygen, 100%, for 1 min and heparin (5,000 IU), and a bolus dose of thiopental (4 mg/kg) for cerebral protection was applied before induction of transient asystole.

The bolus injection of adenosine may be more advantageous than the use of controlled ventricular fibrillation because adenosine is cerebroprotective⁴ and cardioprotective.⁵ The life-threatening side effects of adenosine are very rare. Controlled clinical studies have to delineate which technique is best to facilitate precise deployment of stent-grafts in the thoracic aorta.

Markus A. Weigand, M.D.

Johann Motsch, M.D.

Hubert J. Bardenheuer, M.D.

Department of Anesthesiology

University of Heidelberg

Heidelberg, Germany

Hubert_Bardenheuer@krzmail.krz.uniheidelberg.de

References

1. Kahn RA, Marin ML, Hollier L, Parsons R, Griep R: Induction of ventricular fibrillation to facilitate endovascular stent graft repair of thoracic aortic aneurysms. *ANESTHESIOLOGY* 1998; 88:534–6
2. Dorros G, Cohn JM: Adenosine-induced transient cardiac asystole enhances precise deployment of stent-grafts in the thoracic or abdominal aorta. *J Endovasc Surg* 1996; 3:270–2
3. White GH: Transient asystole for aortic endograft deployment: A technique justified only in highly selected cases. *J Endovasc Surg* 1996; 3:273–4
4. Rudolph KA, Keil M, Hinze HJ: Effect of theophylline on ischemically induced hippocampal damage in mongolian gerbils: A behavioral and histopathological study. *J Cereb Blood Flow Metab* 1987; 7:74–81
5. Ely SW, Berne RM: Protective effects of adenosine in myocardial ischemia. *Circulation* 1992; 85:893–904

(Accepted for publication June 10, 1998.)

Fig. 1. Electrocardiograph tracing (25 mm/s) during induction of transient cardiac asystole with a bolus of adenosine (42 mg intravenously) and spontaneous resumption of cardiac rhythm, which was obtained 27 s after induced cardiac asystole.

