

Anesthesiology  
74:393, 1991

## Difficult Pulmonary Artery Catheterization in the Patient with Tricuspid Regurgitation

*To the Editor:*—The head-up and right-lateral tilt position has been shown to facilitate pulmonary artery (PA) catheterization in both the awake<sup>1</sup> and anesthetized patients.<sup>2</sup> The right ventricular outflow tract originates at the upper portion of the right ventricle and courses superiorly and to the left, and hence the head-up and right-lateral tilt position can facilitate floating of the air-inflated balloon from the right ventricle into the pulmonary artery. However, as shown by the following case report, this position may fail to facilitate passage of the air-inflated balloon from the right atrium into the right ventricle in the presence of tricuspid regurgitation. In this case, catheterization was readily achieved when the balloon was reinflated with saline instead of air.

The patient was a 21 yr-old woman scheduled for mitral valve and aortic valve replacement. Preoperative echocardiography and cardiac catheterization revealed severe mitral stenosis, aortic regurgitation, and tricuspid regurgitation. The right atrium and right ventricle were widely dilated. ECG showed right axis deviation, right atrial and right ventricular hypertrophy, and atrial fibrillation with slow ventricular response.

In the operating room, a PA catheter was introduced *via* the right internal jugular into the right atrium. The balloon of the catheter inflated with 1 ml air failed to float into the right ventricle, despite the frequent attempts with the patient in different positions, including the head-up and right-lateral tilt position. As a last resort, the balloon was reinflated with 1 ml normal saline instead of air. On the first attempt, the saline-filled balloon was easily introduced into the right ventricle. After a ventricular tracing was obtained, the saline solution was withdrawn, and the balloon, reinflated with 1.5 ml air, was easily advanced to the PA showing PA pressure of 50/23 mmHg and PA occlusion pressure of 29 mmHg.

Tricuspid regurgitation may create a whirlpool-type flow of blood in the right atrium, whipping back the balloon catheter as it approaches the tricuspid valve and denying it entry into the right ventricle.<sup>3</sup> This situation may be exaggerated in the presence of right atrial fibrillation and dilation.<sup>2</sup> Replacement of the air in the balloon with normal saline may facilitate advancement of the catheter<sup>3</sup> whenever there is difficulty in passage of the PA catheter from the right atrium into the right ventricle.

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(Accepted for publication November 19, 1990.)