Complete Heart Block Caused by the Swan-Ganz Catheter

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Complete heart block was caused by passage of a Swan-Ganz catheter into the pulmonary artery of a patient with acute myocardial infarction and complete left bundle branch block. This complication could be easily treated with the prophylactic insertion of a temporary pacing catheter.

The Swan-Ganz catheter has been recently introduced for the bedside monitoring of pulmonary artery and pulmonary artery wedge pressures in acutely ill patients. Although Forrester et al reported no serious complications in approximately 200 patients in whom this catheter was used, a number of complications were reported, including: thrombosis on the catheter; intra-cardiac knotting of the catheter; perforation of the pulmonary artery; rupture of the balloon; and ventricular beats induced by the catheter. Passage of the Swan-Ganz catheter in the patient reported here caused complete heart block. Knowledge of this potentially fatal complication is important because it is readily treatable with a pacemaker.

Case Report

A 64-year-old white man was transferred to the cardiac intensive care unit because of cardiac arrest at another hospital. He had progressive angina pectoris for nine months prior to admission, and pneumonia and pulmonary edema developed during the five days before admission.

On examination the blood pressure was 75 mm Hg by palpation, and the skin was cool, clammy, and cyanotic. The neck veins were distended, rales were present throughout the lungs, and a third heart sound was heard at the apex.

An electrocardiogram seven days before admission revealed complete left bundle branch block (QRS = 0.18 second, PR = 0.20 second). On admission, the electrocardiogram showed sinus tachycardia and persistence of the complete left bundle branch block (QRS = 0.18 second, PR = 0.17 second). Determinations of creatine phosphokinase and isograms of lactic acid dehydrogenase were consistent with an acute myocardial infarction.

After initially responding to treatment, the patient developed progressive shock on the third day. As an emergency measure, a Swan-Ganz catheter was passed at the bedside with continuous monitoring of the pressure at the catheter tip. As the catheter reached the pulmonary artery, complete heart block developed (Fig 1). The catheter was immediately withdrawn into the right arm, cardiopulmonary resuscitation was begun, and sinus tachycardia reappeared shortly. The catheter was again advanced into the pulmonary artery with the same sequence of events: complete heart block, resuscitation, then sinus tachycardia. Despite the fact that the catheter was not passed again and despite successful institution of pacing with a bipolar electrode catheter in the right ventricle, multiple cardiac arrests occurred over the next hour, and the patient died. No autopsy was performed.

Discussion

It is well known that cardiac catheterization may produce right bundle branch block and complete heart block. The presence of left bundle branch block, as in this patient, increases the chance of complete heart block resulting from the procedure. It would seem prudent to insert a pacing catheter prior to passage of the Swan-Ganz catheter in patients with left bundle branch block.

References


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Figure 1. Monitor ECG rhythm strips. Top strip shows sinus tachycardia with first degree atrioventricular (A-V) block abruptly leading to complete A-V block. Bottom strip shows complete A-V block with junctional or idioventricular rhythm followed by sinus tachycardia with first degree A-V block. Sequences in top and bottom strips associated with passage and removal of catheter.