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Erroneous Cardiac Output Determination Due to Pulmonary Artery Catheter Proximal Port Dysfunction

To the Editor:—We recently encountered a problem with the use of a pulmonary artery catheter due to the location of the proximal (VIP and CVP) ports in our patient, a 162-cm-tall woman having aortic valve replacement. We placed an introducer (USCI-8 French) in the right internal jugular vein using the anterior approach, inserted a pulmonary catheter (American Edwards with a venous infusion port [VIP]), and advanced it to the wedge position. This placed the catheter at the 40-cm mark at the hub of the introducer. When we injected solution into the VIP for a cardiac output, the CVP trace showed a rapid and sustained pressure elevation, and fluid backed up into the introducer port. We advanced the catheter 4 cm (at which point the pulmonary artery trace was still normal) and could then inject fluid into the VIP without disturbing the CVP trace or having fluid flow back into the introducer. The cardiac output value obtained with the catheter advanced was 2 l lower than the previous output, while other hemodynamic parameters were unchanged from the previous values. The cause of the above problem is that with the catheter tip inserted 40 cm, the proximal ports which are 30 cm from the tip were within the introducer sheath.

The initial CVP trace was normal but with injection

through the catheter proximal port (VIP) pressure was transmitted to the CVP port, which was also within the introducer. The cardiac output was falsely elevated because the volume of injectate was less than anticipated from the computation constant used.

We now know that if the pulmonary artery catheter wedges at 43 cm or less at the hub, then the proximal ports may indeed be inside the introducer sheath. We are now attempting to find shorter introducers; meanwhile, if the problem occurs, the sheath can be withdrawn slightly to allow more usable length of catheter.

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Frozen Pulmonary Artery Catheter: A Complication Associated with Cryoablation of the Ventricle

To the Editor:—Pulmonary artery catheter monitoring during the period of cardiopulmonary bypass can be both potentially valuable and harmful during the course of open heart surgery.^{1,2} Abnormal elevations of pulmonary artery pressure during bypass may result from inadequate venting of the left ventricle or forcible wedging of the catheter tip during manipulation of the heart.^{1,2} Recently, during the course of cryoablation of an irritable ventricular focus, marked elevation of the pulmonary artery pressure was observed that was not due to inadequate venting or forcible wedging but the result of freezing a segment of the pulmonary artery catheter.

REPORT OF A CASE

The patient is a 69-yr-old white man with a 2-month history of recurrent ventricular tachycardia refractory to medical management,

who was scheduled for endocardial mapping, ventricular resection, cryoablation of anomalous conduction pathways, and a coronary artery bypass grafting (CABG). A 14-g intravenous and a 20-g right radial artery catheter were inserted percutaneously. The right internal jugular vein was cannulated with a #7 French introducer (Arrow®) using the Seldinger technique, after confirmation of a venous waveform. A pulmonary artery catheter (Opticath®) was advanced without complications into the pulmonary artery and to a wedge position at a distance of 50 cm from the insertion site. A normal pulmonary artery pressure and waveform was present with the balloon deflated. Pulmonary artery, central venous pressure (CVP), and radial arterial lines were attached to a continuous high pressure (300 mmHg) flush system.

The patient was anesthetized with isoflurane, N₂O, and O₂ by mask. Pancuronium was given to facilitate tracheal intubation. Normothermic cardiopulmonary bypass was initiated, and epicardial mapping was performed. The right ventricle was opened in order to locate the irritable focus *via* endocardial mapping. A portion of myocardium was excised, and the adjoining myocardium was treated with a cryoprobe (Frigitronics® Cryosurgical System) to a temperature of -60° C. During this period it was noted that the pulmonary artery pressure was rising.