Title: THE PATIENT'S POSITION INFLUENCES THE INCIDENCE OF DYSRHYTHMIAS DURING PULMONARY ARTERY CATHETERIZATION

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Introduction The production of dysrhythmias is the most frequent complication of pulmonary artery (PA) catheterization. Although usually benign, these dysrhythmias can occasionally progress to severe rhythm disturbances such as supraventricular tachycardia with rapid ventricular response, sustained ventricular tachycardia or ventricular fibrillation. In certain patients such as those with aortic stenosis or myocardial ischemia, these severe dysrhythmias can be lethal. The current prospective study was undertaken to define whether the incidence of dysrhythmias would be influenced by the patient's position during flotation of the PA catheter.

Methods Thirty-four adult patients scheduled for elective coronary artery bypass graft surgery and PA catheterization were included in this investigation, which fulfilled the requirements of the Institutional Review Board. Written informed consent was obtained from each patient. Patients with associated valvular heart disease and baseline rhythms other than normal sinus were excluded. All patients were in normal sinus rhythm on arrival to the operating room. A modified V, ECG and an arterial line were placed prior to PA catheterization. The PA catheters were 7.5 Fr. Could catheters and were introduced via the right internal jugular vein before induction of anesthesia. Each PA catheter was floated twice: once in a 5° Trendelenburg (T) position and once in the 5° Reverse Trendelenburg with right lateral tilt (R) position. The sequence of positions was randomized. Electrocardiographic and arterial tracings were recorded as the catheter passed from the right atrial to the wedge position. The PA catheters were advanced at an approximate speed of 1.5 cm/second by the operators who were the anesthesiologists assigned to the case. The severity of dysrhythmias was classified as benign (atrial premature contractions, ventricular premature contractions, fusion beats and accelerated idioventricular rhythm) or malignant (couplets, ventricular tachycardia) by a "blinded" cardiologist. The time necessary for advancing the catheter to the wedge position was also evaluated. Statistical significance was evaluated by chi-square analysis and Student's t-test; p < 0.05 was considered significant.

Results There were a total of 66 PA catheter passages in 34 patients. In 13 of 68 (19%) PA catheter passages no dysrhythmias were noted (5 T, 8 R) while in 3 patients the PA catheter could only successfully be floated from the right ventricle into the PA when the patient was in the R position. The incidence of malignant dysrhythmias was significantly higher in the T position (see Table).

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<thead>
<tr>
<th>Position</th>
<th>Benign</th>
<th>Malignant</th>
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<tbody>
<tr>
<td>R</td>
<td>18</td>
<td>8</td>
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<tr>
<td>T</td>
<td>12</td>
<td>17*</td>
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In 13 patients a change in dysrhythmia classification was noted between the R and T position. In 85% of these patients (11/13), the dysrhythmia was malignant in T and benign in R. In two patients, the reverse was noted. The mean insertion time in the R position was 21±10 seconds while it was 22±10 seconds in the T position (N.S.)

Discussion Malignant dysrhythmias during PA catheterization result from irritation of the PA outflow tract and interventricular septum in the region of the conduction system. They can be minimized by placing the patient in 5° Reverse Trendelenburg with right sided tilt. The pulmonary outflow tract originates at the upper portion of the right ventricle and courses superiorly and to the left. By placing the patient in the R position rather than the T position, the PA outflow tract is most superiorly located and allows prompt flotation of the catheter. The R position is the reverse of the position recommended for the treatment of venous air embolism. In venous air embolism the patient is placed in a left lateral and head down position to make the PA outflow tract the most inferiorly located structure.

Therefore, in any patient who is likely to poorly tolerate dysrhythmias, we recommend inserting the PA catheter in the R position and advocate the use of this position in those patients in whom the catheter cannot be passed in any other position.

References