

# Impact of Patients' Positions on the Incidence of Arrhythmias During Pulmonary Artery Catheterization

Tanyong Pipanmekaporn, MD, Nuchanart Bunchungmongkol, MD, Pathomporn Pin on, MD, and Yodying Punjasawadwong, MD

**Objective:** The complication of cardiac arrhythmias during pulmonary artery catheterization (PAC) may be related to the position of the patient. Therefore, the purpose of this study was to determine the effects of patients' positions on incidence of arrhythmias and the time required to place the pulmonary artery catheter.

**Design:** A prospective, double-blind, randomized, controlled study.

**Setting:** A tertiary university hospital.

**Participants:** One hundred forty patients undergoing elective coronary artery bypass graft surgery.

**Interventions:** Patients were divided into 2 groups. In the study group (n = 70), patients were positioned with their head down at 10° first and then 10° up and tilted right laterally when the PACs were passed from the right atrium to the right ventricle and then the right ventricle to the pulmonary capillary wedge position, respectively. In the control group (n = 70), patients remained in a supine position during pulmonary artery catheterization.

**Measurement and Main Result:** During the catheterization, arrhythmias were recorded and classified into benign (1-3 premature ventricular contractions) and severe (more

than 3 premature ventricular contractions or nonsustained ventricular tachycardia). The time for PACs to pass from the right atrium to the right ventricle and the right ventricle to the pulmonary capillary wedge position was measured as T1 and T2, respectively. The incidence of benign arrhythmias between groups was not significantly different (49% for study and 34% for control group,  $p = 0.196$ ), whereas the incidence of severe arrhythmias was significantly higher in the control group (20% v 5.8%,  $p = 0.036$ ). The time used for each technique (T1 and T2) in both groups was not significantly different ( $p = 0.362$  and  $0.468$ , respectively). One patient in the study group was excluded because of difficulty in passing the catheter from the right atrium to the right ventricle.

**Conclusions:** Adjusting patients in the head-up and right lateral position while passing the PAC can reduce the incidence of severe arrhythmias, but not in the time taken to place it. This position may have clinical implications, particularly in high-risk patients.

© 2012 Elsevier Inc. All rights reserved.

**KEY WORDS:** pulmonary artery catheter, arrhythmias, catheterization, complications, patient positioning

PULMONARY ARTERY CATHETERIZATION is not without risks, including arrhythmias of which ventricular arrhythmias are the most common.<sup>1,2</sup> The incidence of ventricular arrhythmias during pulmonary artery catheterization varies between 13% and 70%,<sup>1-7</sup> with most of them being transient, self-limited, and without hemodynamic consequences.<sup>2-5</sup> However, the placement of a pulmonary artery catheter (PAC) in high-risk patients may induce significant arrhythmias and cause severe hemodynamic instability.

The length of time taken to place the PAC may play a role in the incidence of arrhythmias, as found in a previous study showing that the longer time of PAC placement (from the right ventricle to pulmonary artery) the higher frequency of severe arrhythmias.<sup>4</sup> Several methods have been studied to reduce and prevent arrhythmias during pulmonary artery catheterization.<sup>8-10</sup> Reports from experienced clinicians suggested that certain positions of patients during pulmonary artery catheterization can enable flotation of the PAC and thereby reduce the incidence of arrhythmias.<sup>9</sup> Several previous studies to determine the effect of patients' position on the incidence or severity of arrhythmias during pulmonary artery catheterization were either descriptive, crossover studies or a small randomized clinical study.<sup>8,9</sup> Therefore, this study hypothesized that adjusting the patient's head up in a right lateral position during pulmonary artery catheterization would reduce the time required to place the PAC and thus decrease the incidence of arrhythmias.

## METHODS

Approval from the institutional review board and written informed consent were obtained. One hundred forty American Society of Anesthesiologists III patients, aged 18 and 80 years, undergoing scheduled coronary artery bypass graft surgery between July 2008 and March 2010 were enrolled. Patients with severe left ventricular dysfunction (defined as left ventricular ejection fraction  $\leq 30\%$  by transthoracic

echocardiography), recent myocardial infarction, preoperative arrhythmias other than sinus rhythm, and the inability to tolerate the study position during catheterization were excluded. All patients were administered 0.1 mg/kg of midazolam orally 1 hour before the induction of anesthesia. During the study, these patients were supplemented with an oxygen mask with a bag flow of 8 L/min. Intraoperative monitoring was established, including noninvasive blood pressure, electrocardiography using the 5-lead electrode system, peripheral oxygen saturation, and radial artery catheterization. Before passing the PAC, the patients were randomized into control (n = 70) and study (n = 70) groups. A block of 4 randomizations was generated, with each randomized number concealed in a sealed opaque envelope until the pulmonary artery catheterization commenced. The same well-trained nurse, who was not involved in the assessment, opened the envelope and adjusted the table for all patients according to their group assignments. All patients had central venous catheterization via their right internal jugular vein by using the landmark-based technique. A 7.5-F balloon-tipped flow-directed catheter (model 744HF75; Edwards Lifesciences LLC, Irvine, CA) was advanced under sterile conditions via the introducer sheath before the induction of anesthesia by 2 anesthesiologists (TP and NB) who were blinded to group assignment by putting a large hanging screen masking the body of the patient from the neck. Therefore, the operators could only see the neck portion without knowing the patient's position. After the PAC was passed into the right ventricle, the oper-

---

From the Department of Anesthesiology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand.

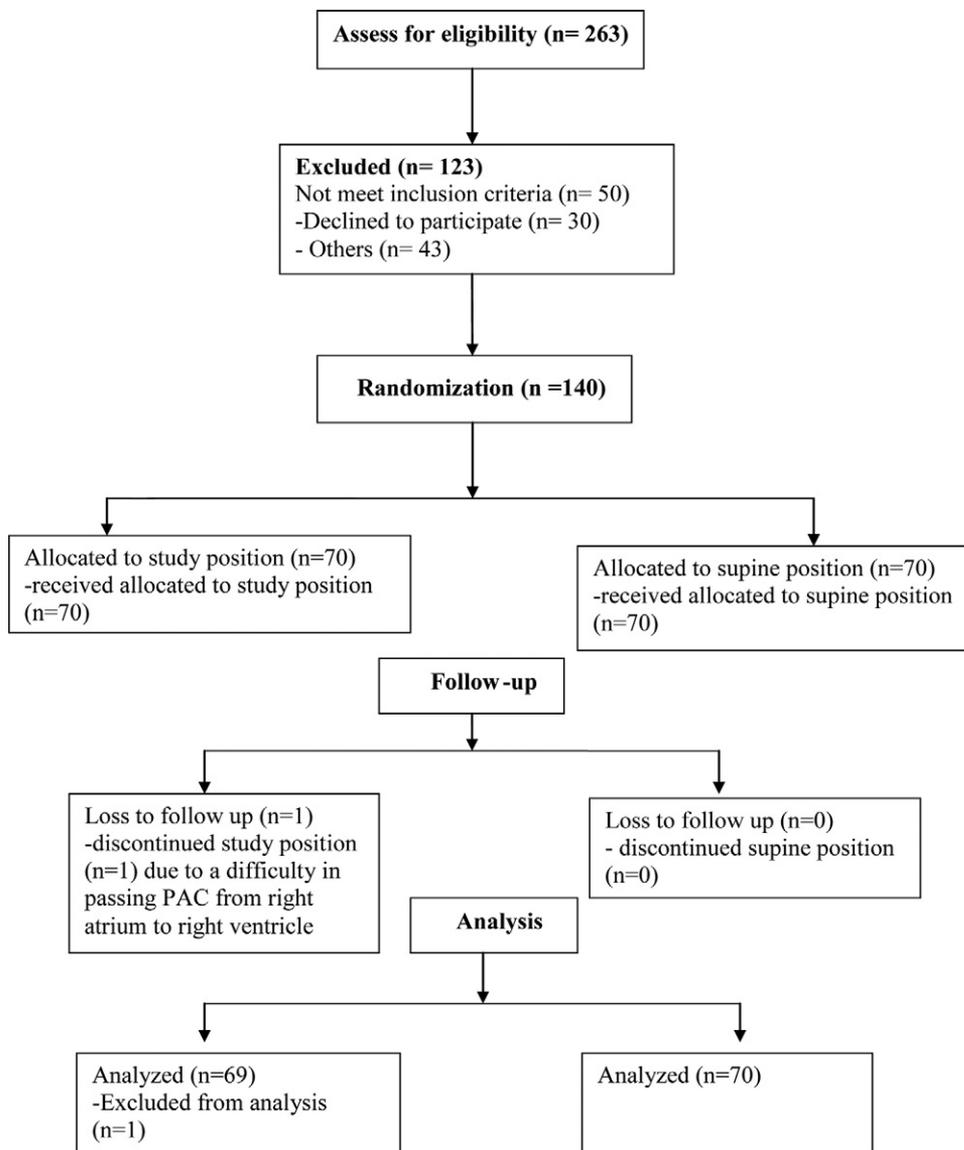
Supported by the Faculty of Medicine Research Fund, Chiang Mai University, Chiang Mai, Thailand.

Address reprint requests to is Tanyong Pipanmekaporn, MD, Department of Anesthesiology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand 50200. E-mail: tanyong24@gmail.com

© 2012 Elsevier Inc. All rights reserved.

1053-0770/2603-0007\$36.00/0

doi:10.1053/j.jvca.2011.10.013



**Fig 1. The Consolidated Standards of Reporting Trials flow diagram of the study.**

ators had to leave the room and, when informed, they returned to continue the procedure. In the study group, the patients' heads were placed 10° down (Trendelenburg position) when the PAC was passed from the right atrium to the right ventricle according to the characteristic of their waveforms. Then, the patients' heads were positioned 10° up and tilted 10° to the right (the head-up and right lateral tilt position) while the catheter was passed from the right ventricle to the pulmonary capillary wedge position. By contrast, the control group received the conventional technique, whereby the patients remained in a supine position. The resident anesthesiologists who were not in the investigator team measured the time taken from the catheter to pass from the right atrium to the right ventricle and the right ventricle to the pulmonary capillary wedge position as T1 and T2, respectively. The required time to change from the Trendelenburg position to the head-up and right lateral tilt position did not include that required to place the PAC. The degree of arrhythmias during catheterization was recorded by changing the electrocardiographic tracing in a display monitor and classifying into benign ( $\leq 3$  premature ventricular contractions) and severe (more than 3 premature ventricular contractions or short period

of ventricular tachycardia) ventricular arrhythmias.<sup>2</sup> The presence of arrhythmias was determined by the anesthesiologists who performed the catheterization and a research nurse with no knowledge of the group assignment. The flow diagram of the study, recommended by the Consolidated Standards of Reporting Trials, is presented in Figure 1.

The primary endpoint was the incidence and the severity of arrhythmias when the catheter was passed from the right atrium to the pulmonary capillary wedge position. The secondary endpoint was the difference of T1 and T2 between each group. Statistical analysis was performed using the chi-square test, unpaired Student *t* test, or Wilcoxon rank sum test as appropriate. The polytomous logistic regression was used to determine the relationship between T2 and the degree of arrhythmias. In addition, the effect of modification between T2 and the degree of arrhythmias according to their assigned groups had been explored and reported as the risk ratio and the 95% confidence interval. Data were presented as the mean  $\pm$  standard deviation, the median (interquartile range), and the number (percentage) as appropriate. The level of statistical significance was set at  $p < 0.05$ . The required sample size was calculated to detect the reduction of severe arrhythmia inci-

Download English Version:

<https://daneshyari.com/en/article/2760484>

Download Persian Version:

<https://daneshyari.com/article/2760484>

[Daneshyari.com](https://daneshyari.com)