

# Symposium

## Introduction

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### **Fiftieth Anniversary of the Swan-Ganz Catheter: From Then Until Now**

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Few monitoring devices have revolutionized the care of critically ill patients as much as the pulmonary artery catheter (PAC). The clinical need to better assess cardiac patients drove the creation of the catheter, which was developed by Drs H.J.C. Swan and William Ganz in a nearly serendipitous manner. Folklore tells how a sailboat in the Santa Monica Bay in southern California inspired the design of the catheter, which became known as the Swan-Ganz catheter.

The series articles authors' combined years of practice accounts for over 2 centuries of experiences in the critical care arena. The articles in this symposium were written to revisit the history of the development of the PAC and to explore the future direction of its use. A review of advanced critical care nursing evidence-based practices is provided as well as a description of the current gaps between the guidelines and practice. After decades of PAC use decline, the authors explore emerging conditions where PAC use is increasing and illustrate the value of the hemodynamic parameters obtained by PAC use through a complex mixed shock case.

Ahrens and Headley collaborated to provide a written narrative on the history of the Swan-Ganz catheter from 2 very different perspectives, one (Ahrens) from working in a large medical center and the other (Headley) from involvement with the industry that developed the device. Both authors, however, have a strong interest in education and hope by writing the article that some of the "tribal knowledge" acquired with the experience of the PAC introduction is not lost. PAC use has been declining over the past few decades due in part to pivotal papers questioning the efficacy of the catheter because its use had not been shown to improve patient outcomes. Despite the increasing acceptance of less invasive methods for assessing hemodynamics, such as those used for obtaining cardiac output measures, the PAC remains the clinical gold standard for comparative studies of the various newer technologies.

A full reprint of the 2016 AACN Pulmonary Artery/Central Venous Pressure Monitoring Practice Alert is included to continue to educate on the supporting evidence for competent hemodynamic monitoring. The alert provides an evidence-based approach to the best nursing practice in the care and interpretation of data from the PAC. Von Rueden addresses gaps between implementation of the AACN Practice Alert and clinical practice behaviors and provides tools to promote evidence-based practices at the bedside.

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Hemodynamic data provided by the PAC brought new cardiovascular knowledge on physiology, pathophysiology, and therapeutic interventions. In addition to the PAC changing bedside care, the rapid acceptance of its use was soon fraught with controversy. The controversy was, in part, a stimulus to reevaluate new technologies and develop evidence-based practice. Routine use of the catheter has declined over time, and with that decline in use there has been a decline in an educational focus on the technology, techniques, and clinical applications of the values obtained.

This issue looks in a forward fashion to newer applications for invasive hemodynamic monitoring using the PAC. Leeper explores the use in right ventricular failure as a critical mainstay for PAC. Powell and Leeper then use a case-study approach to discuss pulmonary hypertension as the backbone for exploring the value of PAC monitoring in that condition. In both pulmonary hypertension and right-sided heart failure, clinical use of the PAC has been on the rise. In the last article, Thurman explores a complex mixed shock state case presentation where the data obtained from a PAC is shown to be beneficial to optimizing management of the patient.

The year 2020 marks the 50th anniversary of the landmark publication reporting on the clinical use of a flow-directed catheter inserted and managed at the bedside. This device became the cornerstone of critical care hemodynamic data knowledge. Critical care nurses who cared for patients with the catheter honed their skills, as they were required to provide pristine care of not only the patient but also the device.



**Figure:** Dr H.J.C. Swan, Dr William Ganz, and Jan Headley during the 25th anniversary of the Swan-Ganz catheter in 1994.

The safety and efficacy of the use of the PAC had been, and remains, in the hands of the critical and acute care nurse. To recognize this important role, when Dr H.J.C. Swan received an honorary American Association of Critical-Care Nurses membership at the 1994 National Teaching Institute, he made the following comment: “I believe that the true impact of hemodynamic monitoring has been determined by the diligence, training, and practical application by the nursing profession.”

Today, the need for continued education and improvement of skills with all forms of hemodynamic monitoring is imperative to the care and understanding of the devices being used, their indications, applications, limitations, and nuances. As acute and critical care nurses, the onus is on us to continue to ensure safe and effective care in an evidence-based manner.