Is There A Role for the Pulmonary Artery Catheter in Cardiac Surgery?

The answer to this question is complex. It depends on how one interprets the existing literature, defines the role of monitoring, selects the right patient population, and determines the knowledge and skills of the users.

The simple answer- based on existing studies that looked at “mortality” as a primary outcome – No. Multiple articles in leading journals (e.g. Connor, JAMA 1996; Sandham NEJM 2003; Harvey, Lancet 2005; Schwann Anes Analg 2011) have respectively concluded there is no mortality benefit! But, do these studies appropriately answer the question. Multiple authors have questioned both the quality and validity of each of these (and other) studies (Murphy, Vender JCTVA 2007). In addition, multiple studies have questioned the competency of PA catheter users – for data interpretation and patient management (Ibeit, JAMA 1990; Gnaegi, Crit Care Med 1997).

What should be the role of a PA catheter? PA catheters are diagnostic tools. The role of a diagnostic tool is to provide clinical information to effect patient management to alter patient outcome! Remember, there are no positive mortality outcome studies for pulse oximetry. PA catheters do provide clinically useful information: thermodilution cardiac output, mixed venous oxygen, vascular pressure….. Outcome is dependent on the coupling of this diagnostic information with the timely administration of the appropriate therapeutic options.

What are the alternatives to PA catheter for CV surgery? CVP monitoring is universally used but with essentially no demonstrated utility for the management of preload assessment or fluid responsiveness. TEE has increased in popularity, is an excellent diagnostic tool but does not provide the same type of perioperative continuous monitoring capability (and necessitates significant training to utilize appropriately and there is limited (if any) mortality outcome studies).

With the progressive evolution of interventional cardiology, the patients coming for cardiac surgery are more complex. The need for multiple therapeutic interventions is significant. The ability to continuously monitor various hemodynamic indices can be an asset in both diagnosis (e.g. pulmonary/vascular pressures, C.O., Svo2) and therapeutic guidance. The PA catheter is helpful in the diagnosis and management of pulmonary hypertension; the evaluation of right ventricular function (Gayat, Cur. Opinion Crit Care 2011); the differential of cardiac versus pulmonary edema; and the monitoring of global oxygen delivery/consumption (Sv02).

At present overall utilization of PA catheters is decreasing, but cardiac vascular surgery continues to be a clinical area of use (especially in the US). The value of the PA catheter is predicated on its utilization in the right patients, for the right procedures, in the right clinical
settings (where user knowledge is adequate by “all caregiver” in the perioperative periods). Despite our present intrigue with new non–invasive devices – we should hold them to the same standards and expectations as the PA catheter and resist “throwing the baby out with the bath water” in our assessment of the role for the PA catheter in cardiac surgery.

References:

Schwann NM et al. Lack of Effectiveness of Pulmonary Artery Cather in Cardiac Surgery. Anesth Analg 2011;113:994-1002.