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Procedure and Technical Developments of Pulmonary Artery Catheter

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INTRODUCTION

A Pulmonary Artery Catheter (PAC), also known as a Swan-Ganz catheter or right heart catheter, is a balloon-tipped catheter that is inserted into the pulmonary artery in a procedure known as a pulmonary artery catheter or right heart catheter. Pulmonary artery catheterization is a useful measure of overall cardiac function, especially in patients with complications from heart failure, myocardial infarction, arrhythmia, or pulmonary embolism. It is also suitable for those requiring intravenous fluid therapy such as heart surgery, shock, and severe burns. This method can also be used to measure pressure in the ventricles of the heart. A pulmonary artery catheter allows direct and simultaneous measurement of right atrial, right ventricular, pulmonary artery and left atrial filling pressures (pulmonary wedge pressure) [1]. The pulmonary artery catheter is often called the Swan-Ganz catheter, in honor of its inventors, Jeremy Swan and William Ganz of Cedars-Sinai Medical Center. Catheters are inserted through the vena cava (commonly the internal jugular, subclavian, or femoral veins). Simple placement of a pulmonary artery catheter, from easy to difficult, is as follows: Right internal jugular vein>left clavicle>left internal jugular vein>right clavicle. This entrance leads to the heart's right atrium, right ventricle, and pulmonary artery [2]. Catheter passage can be monitored by dynamic pressure measurements at the catheter tip or by fluoroscopy. A standard pulmonary artery catheter has two lumens (Swan-Ganz) and ends with an inflatable balloon to facilitate placement through the bloodstream into the pulmonary artery. When the balloon is inflated, the catheter "grabs" into small blood vessels in the lungs. Catheters calibrated in this way can indirectly measure the pressure in the left atrium of the heart and indicate the mean pressure. Left ventricular end-diastolic pressure (LVedp) is measured using another method, with a catheter passed directly through the aortic valve and properly positioned in the left ventricle. LV EDP reflects an individual's fluid status in addition to cardiac health. See also pulmonary wedge pressure and ventricular pressure. Details of the patient's body mass index (height). A comprehensive flow-pressure map can be calculated by entering core temperature, systolic, diastolic, central venous pressure CVP (measured simultaneously from the atrium to the third lumen), and pulmonary artery pressure. Broadly speaking, this measurement compares left and right heart activity and calculates preload and afterload flow and pressure. In theory, it can be stabilized or regulated with drugs that constrict or dilate blood vessels (raise or lower blood pressure, respectively) [3]. A feature of pulmonary artery catheters that has been largely ignored in clinical practice is the ability to monitor systemic oxygen extraction by measuring mixed venous oxygen saturation. Mixed venous oxygen saturation is an accurate parameter of systemic blood flow and hence cardiac output, regardless of the value obtained from cardiac output measurements. The assumption that a low mixed venous oxygen saturation (normal=60%, except for the coronary sinus, which is approximately 40%, reflecting the high metabolic rate of the myocardium) represents an insufficient oxygen supply is a physiological consistent with clinical and metabolic observations [4].

CONCLUSION

High oxygen extraction is associated with reduced cardiac output and mixed venous oxygen saturation. With the exception of hypothermia and severe sepsis, low mixed venous oxygen saturation indicates inadequate hemodynamic. The ability of the pulmonary artery catheter to aspirate mixed venous blood is highly beneficial in managing conditions of low cardiac output. Noninvasive echocardiography and pulse wave cardiac output monitoring are more consistent (and much safer), if not better than invasive methods of defining right and left heart function. The emergence of MRSA and similar nosocomial catheter infections has clearly limited the usefulness of this type of invasive cardiac ICU intervention.

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CONFLICT OF INTEREST

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