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Thrombosis Associated with Pulmonary Artery Catheterization

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Abbreviations: PAC: Pulmonary Artery Catheter

Since it's introduction into clinical medicine by Harold Swan and William Ganz more than 5 decades ago, the pulmonary artery catheter (PAC) has been regularly used as a hemodynamic monitor in critically ill patients. Due to stasis and vessel wall injury, catheter associated thrombosis is a recognized complication with all vascular access devices including the PAC, and even Swan and Ganz described a case in which a thrombus developed in the superior vena cava and enveloped the shaft of their catheter **[1]**. As early as 24 hours after insertion, platelet aggregation and fibrin deposition have been identified, with a considerable increase in thrombus burden after 72 hours, possibly due to numerous balloon inflations causing additional endothelial damage and microscopic balloon fissures serving as a nidus for thrombus formation **[2]**. The image shows a four-centimeter-long thrombus retrieved from the distal end of a PAC after removal of the device from the internal jugular vein, three days post insertion. The catheter was placed due to hemodynamic instability and need for hemodynamic monitoring post cardiac surgery. With improvement in clinical condition, the catheter was no longer required, and, on removal, the thrombus was noted to be attached to the distal portion of the catheter. Interestingly, the incidence of life-threatening pulmonary embolism does not appear to be increased in patients with PAC use and the use of anticoagulation seems to have no influence on the formation of catheter thrombosis

[3]. Additionally, the ESCAPE and PAC-MAN randomized clinical trials of PAC-related complications show a higher incidence of other complications, such as, hematoma (4%), arterial puncture (3%), arrhythmia requiring treatment (3%), infection (2.5%), catheter knotting (1%), infarction/hemorrhage (1%) and ventricular arrhythmia (0.5%), compared to thrombus formation **[4,5]**. Although catheter related thrombus formation can be a risk factor for fatal infection, it is worth noting that none of these complications in either study led to any fatalities. We recommend judicious use of the PAC as a hemodynamic monitor in critically ill patients with early removal as soon as the device is no longer needed.

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