

Knotting of two central venous catheters: a rare complication of pulmonary artery catheterization

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To the Editor:

A unique complication of pulmonary artery (PA) catheter use is knotting. We describe a case of a knot between a central venous catheter and a PA catheter, and the successful nonsurgical unknotting and removal of the catheter.

A 31-year-old pregnant woman in cardiogenic shock resulting from a tachycardia-induced cardiomyopathy was transferred to the intensive care unit. On admission, a triple-lumen central venous catheter was introduced via the right internal jugular vein. Despite sufficient hydration and continuous infusion of inotropic agents, her blood pressure was unstable.

Circulatory supports by intraaortic balloon pump (IABP) and percutaneous cardiopulmonary support system (PCPS) were introduced for severe heart failure (ejection fraction was 10%). On the 6th ICU day, a PA catheter was inserted through the left internal jugular vein to monitor hemodynamic status during weaning from PCPS. The catheter was inserted without difficulty and advanced easily, and the correct position was confirmed on the chest X-ray. Weaning from the PCPS was completed on the 6th ICU day, and the IABP was removed on the 7th ICU day because her hemodynamic status became relatively stable. However, as she still had multiple organ failure, we retained the PA catheter. Although a chest X-ray showed normal configuration of the catheters on the morning of the 11th ICU day, monitoring failure of pulmonary arterial

pressure happened abruptly about 9 p.m. without any catheter manipulations. We attempted to remove the PA catheter in the usual manner. However, resistance was felt during withdrawal of the catheter, and repeated traction was unsuccessful. Then, we confirmed a loose knot between the central venous catheter and the PA catheter in the superior vena cava on the chest X-ray (Fig. 1). As the knotting was relatively loose, we pushed the PA catheter forward to unknot the catheters, and then the catheter was successfully removed.

The case of knotting of two catheters is rare [1–3]. Cases of knotted catheters functioning normally for several days have not been previously reported. We suspected that the catheter knotted when sudden malfunction of the catheter was found; in fact, the catheter was in normal configuration in the morning. The cause of knotting was not clear, and the catheter was not manipulated before discovery of the knotting.

Several technical methods for removal of the knotting have been developed in cases that are more difficult to handle. One approach is to tighten the knot as much as possible so that it may be removed through the vein insertion site. Alternative approaches are to use a retrieval basket, a loop snare formed by a double-over guide wire or loop snares, endomyocardial biopsy forceps, or an inflated angiography balloon to expand the diameter of the knot [4]. Open surgical removal of knotted catheters is reserved for large, multiple loop knots or knots that are fixed within the cardiac chamber.

In summary, we experienced a case of a spontaneous knotting between a central venous catheter and a PA catheter several days after placement. A catheter knotting should be considered when malfunction of the catheter is encountered. Withdrawal of a PA catheter should be performed cautiously, and a chest X-ray should be taken

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Fig. 1 Chest radiographic film showing the knotting of the two catheters. *White arrow* central venous catheter, *black arrow* pulmonary artery catheter

when any difficulty is encountered during a PA catheter manipulation.

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