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Detachment of a venous cannula into a blood vessel

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To the editor: There have been a number of reports of catheter breakage, but none describing detachment of a venous cannula from the hub. We recently experienced such a detachment during acute normovolemic hemodilution. Hemodilution enables collection of autologous blood that helps limit complications from homologous blood transfusion. We cannulate a large vein, such as the external jugular vein, with a Wallace Y-Can catheter and then insert the needle attached to a blood collection bag (NiproC400) into the catheter's rubber seal. In this way, we are able to collect more than two bags of blood without repeat venipuncture.

An incident occurred in a 51-year-old woman undergoing modified radical hysterectomy for a malignant ovarian tumor. After lumbar epidural block, general anesthesia was initiated with fentanyl and thiamylal. Oral intubation was facilitated with the administration of vecuronium bromide. Anesthesia was maintained with nitrous oxide and isoflurane in oxygen. Acute normovolemic hemodilution was started by collecting a first aliquot of 400 ml of blood through the Y-Can catheter inserted at the left external jugular vein, while lactated Ringer's solution was infused through the left radial vein. No difficulty was encountered with this first extraction. However, with the insertion of the needle of the second bag into the catheter's rubber seal, there was no backward flow of blood. When the tape covering the puncture site was removed, the cannula portion of the catheter was found to be missing. Palpation of the puncture site revealed that the dislodged fragment was still present. Pressure on the external jugular vein prevented it from being liberated into the bloodstream. Retrieval was performed surgically with little difficulty. Close examination of the broken Y-Can catheter revealed that the cannula portion was not cut but had completely detached from the hub. In a test with another Y-Can catheter, we inserted a needle through the rubber seal to where the cannula was glued to the hub (Fig. 1). The same detachment recurred. Cannula detachment in our case could have resulted from inserting the needle too deeply or from inadequate glueing of the cannula to the hub.

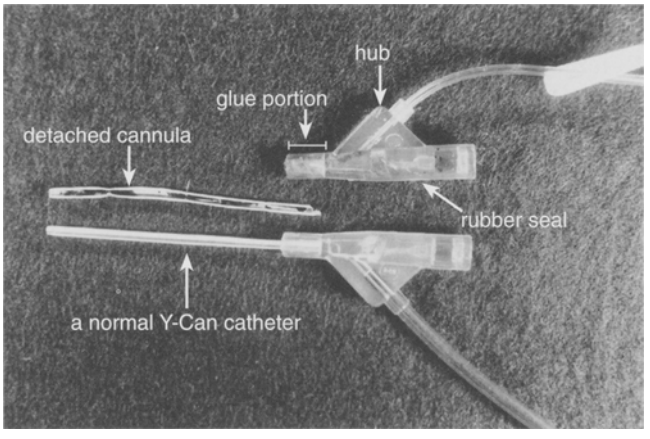

Fig. 1. Y-Can catheter

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An unusual cannister defect detected by an airway gas monitor

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To the editor: We experienced an elevation in inspiratory carbon dioxide tension during general anesthesia with a standard semiclosed anesthesia circuit (anesthesia machine: MERA MD-800, Senko-Ika-Kogyou, Tokyo, Japan) while the end-tidal carbon dioxide tension was maintained around 40 mmHg by adjusting the minute ventilatory volume. Nonzero inspiratory CO_2 invariably indicates a circuit malfunction [1]; but no abnormalities in the anesthetic circuit, respiratory valves, or the gas monitor (OMA-8103, Nihon-Kohden, Tokyo, Japan; nondispersive infrared analyzer for N_2O, CO_2, and anesthetic gases) were found. However, it was observed that increasing the flow of fresh gas to the anesthesia circuit reduced the inspiratory CO_2 tension. Finally, it was found that a rubber connector between the expiratory gas conduit from the patient and the conduit inside the cannister which carries the expiratory gas to the bottom of cannister had been lost. As the connector between the conduits could hardly be seen from the outside of the cannister and no elevation in end-tidal CO_2 was produced by adjusting the minute volume, no one had noticed its misplacement, which had possibly occurred during soda lime exchange. Fortunately, the patients were not seriously affected; however, patients with poor pulmonary function would have been exposed to a hazardous situation.

We examined the relationship between the respiratory CO_2 tension and various levels of fresh gas flow in two patients using the same anesthesia machine with a rubber connector removed. A 6 l·min^{-1} flow of fresh gas was supplied to a semiclosed circuit while the minute volume of the ventilator was adjusted to maintain the end-tidal CO_2 tension at 35 mmHg. The same minute volume was maintained regardless of the value of the fresh gas flow. Each level of fresh gas flow was maintained for at least 15 min until no further change in respiratory CO_2 tension was observed. When the fresh gas flow was changed from 6 to 3, 9, and 12 l·min^{-1}, the

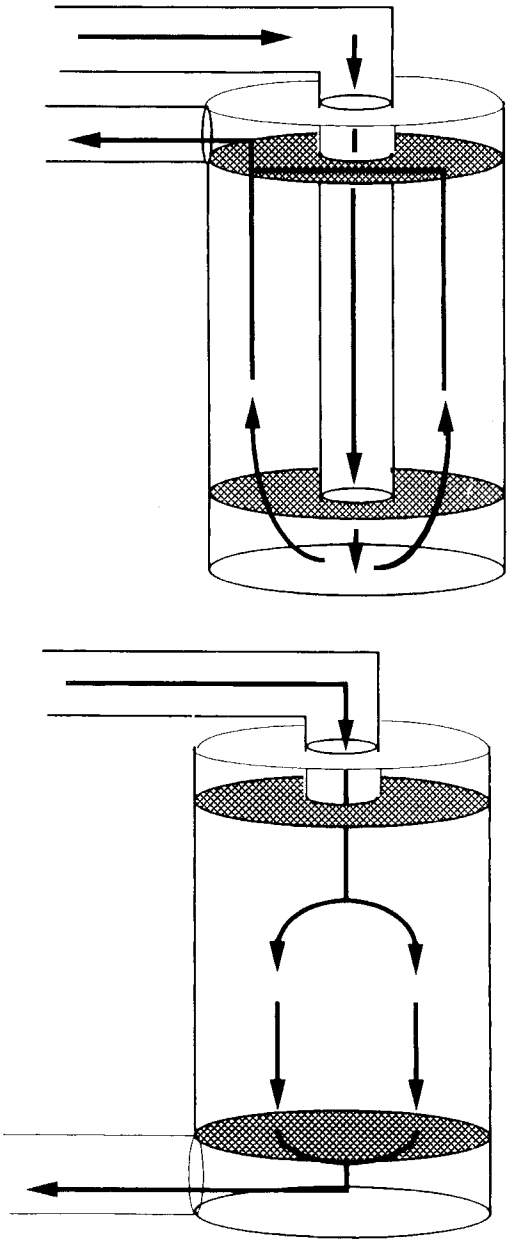

Fig. 1. Two types of gas flow through the cannister. *Upper panel*, central pole type in which the expiratory gas flows downward to the bottom through a central pole, and upward from the bottom of the cannister. *Lower panel*, downward type in which the expiratory gas flows downward from the surface of the cannister. *Arrows* show the gas flow through the cannister

inspiratory/expiratory CO_2 tension (mmHg) changed from 7/35 to 12/38, 3/33, and 2/30 (mean of two measurements).

The expiratory gas flow through the cannister can be classified into two patterns depending on the type of anesthesia machine (Fig. 1). (1) central pole type: the expiratory gas flows downward to the bottom through a central pole, and then upward from the bottom of the cannister (MERA MD-800, Senko-Ika-Kogyou, Tokyo, Japan; Cicero, Dragerwerk, Lubeck, Germany); (2) downward type: the expiratory gas flows downward from the surface of the cannister (most available anesthesia machines at present are of this type).

There does not appear to be any major difference in the efficacy of anesthesia machine when these two types are compared. However, checking for faulty conduit connection is recommended whenever a central pole type is used. Without a gas monitor, this kind of fault would not have been detected.

Reference

1. Philip JH, Feinstein DM, Raemaer DB (1995) Monitoring anesthetic and respiratory gases. In: Blitt CD, Hines RL (eds) Monitoring in anesthesia and critical care medicine, third edition, Churchill Livingstone, New York, pp 363–383

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