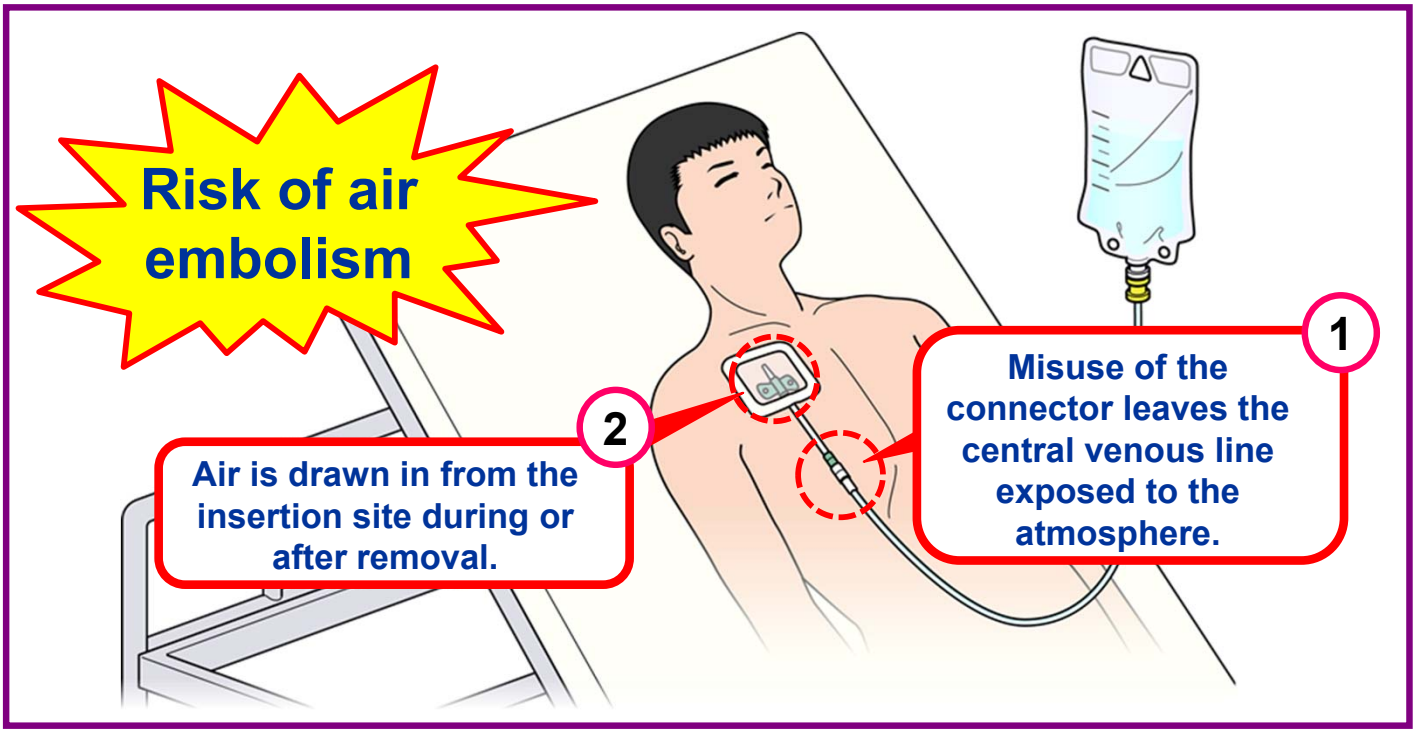
Medical Safety Information
Pharmaceuticals and Medical Devices Agency

No.71 February, 2025

Cases of Air Embolism Due to the Use of Central Venous Catheters

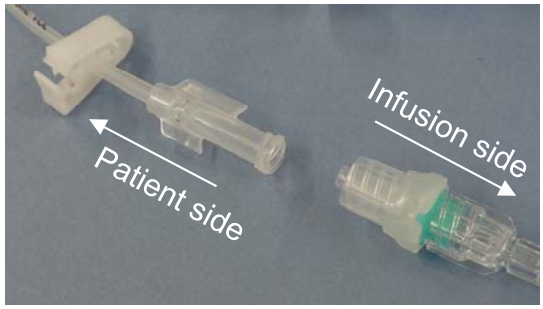
⚠ **CV catheter placement has a risk of air embolism in various situations!**



Short Quizzes for You

1 What is the problem with the photo on the right showing the state after a “closed-system connector” of the CV catheter has been removed?

The answer is shown on page 2.



2 What is the correct position when removing the CV or dialysis catheter?

A. Sitting position
B. Supine position

The answer is shown on page 3.

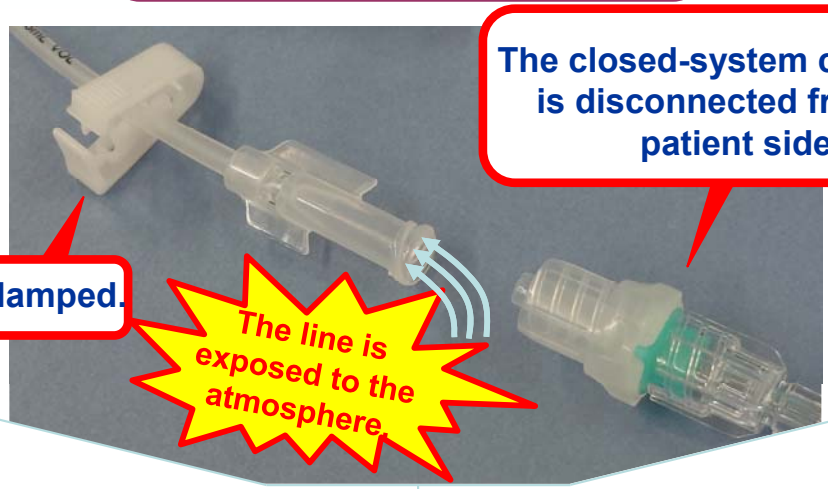
1 A Case of Air Embolism Due to Misuse of the Connector

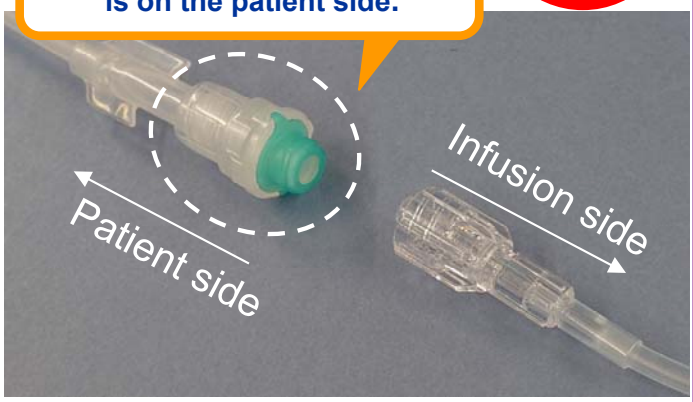
(Case 1) After completing an infusion with a central venous catheter, the clinician accidentally disconnected the line with the closed-system connector from the patient side, exposing that side of the line to the atmosphere and thereby causing an air embolism.

POINT Key points for safe use

- **When disconnecting the connector, even if it is a closed-system connector, ensure that the patient side of the line is clamped and/or that the closed-system connector is on that side, taking care not to expose the line to the atmosphere.**

Handling of Closed-System Connector





When a Closed-System Connector is Not Used

The use of closed-system connectors reduces the risk of central venous lines being exposed to the atmosphere!
Please be aware of the risk of misidentification caused by confusion between closed- and open-system connectors, and ensure to thoroughly check such items used in the hospital.

The products for photos were provided by Terumo Corporation.

Some closed-system connectors are introduced as devices that are expected to contribute to patient safety by the Japanese Society for Quality and Safety in Healthcare. Please visit the following web page for more details.
https://qsh.jp/wp/wp-content/uploads/2024/09/technology_exhibition.pdf (as of September 2024) (only in Japanese)

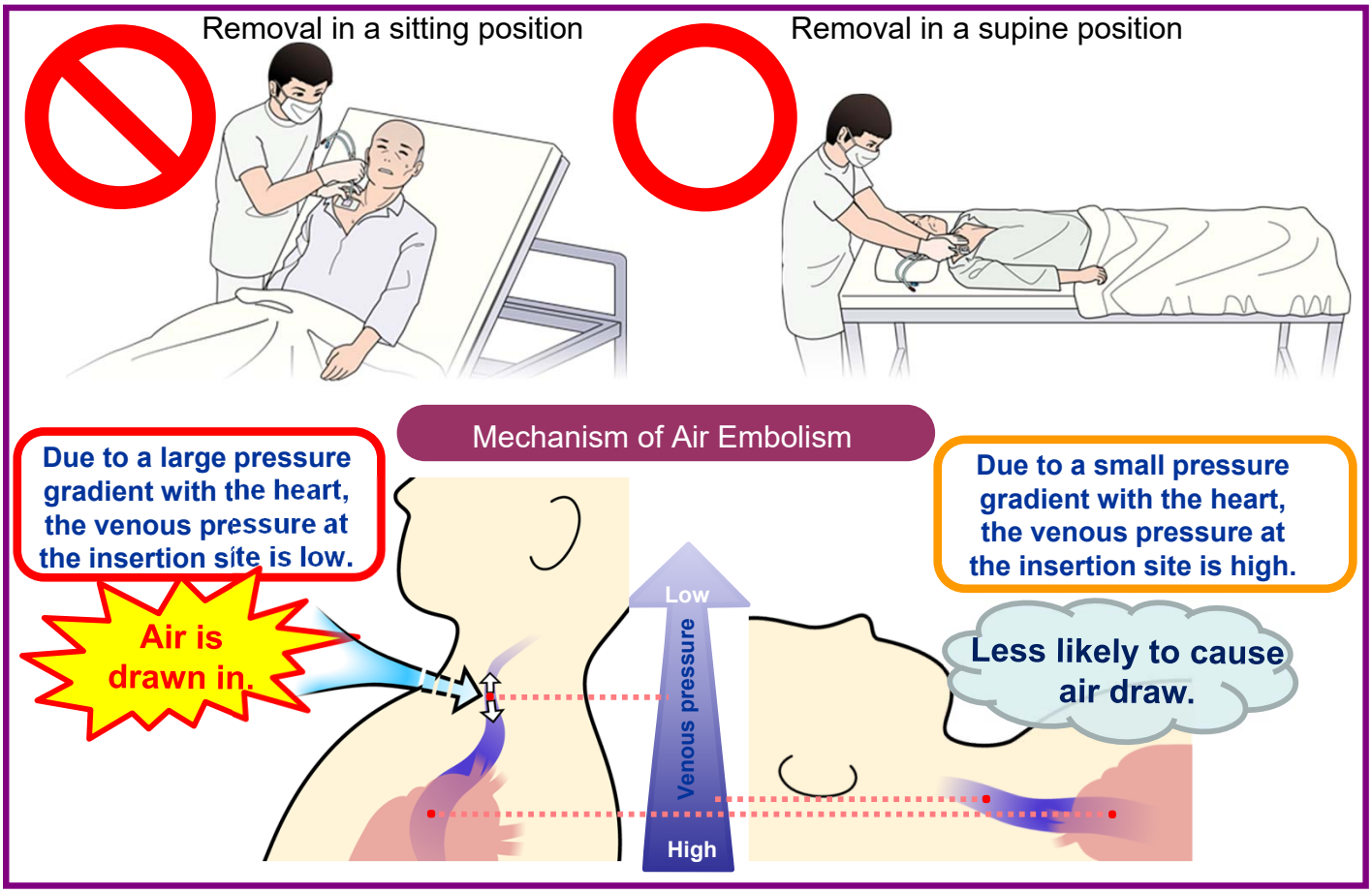
2 Cases of Air Embolism During Removal of Catheter

(Case 2) When a clinician removed the dialysis catheter while the patient was in a sitting position, SpO_2 decreased and the patient lost consciousness. Head CT and MRI scans revealed an air embolism.

(Case 3) After removing the central venous catheter, a clinician was using gauze for pressure protection. However, the patient's condition suddenly worsened 1 hour later. Radiography revealed findings of air embolism.

POINT Key points for safe use

- **When removing the catheter placed in the internal jugular vein or subclavian vein, it is advisable to remove the catheter with high venous pressure at the insertion site, for example, by stopping the patient's breathing temporarily in a low head position.**
- **After catheter removal, immediately cover the insertion site with an airtight dressing and apply pressure for at least 5 minutes to prevent air from being drawn in when breathing resumes.**



- In preparing this "PMDA Medical Safety Information No. 71," we have referred to "Recommendations for the prevention of recurrence of medical accidents Number 17: Analysis of Deaths Related to "Insertion/Removal of Central Venous Catheters" - Second report (Revised edition) -" published by the Japan Medical Safety Research Organization. Please access the link below for more details.
- https://www.medsafe.or.jp/modules/advocacy/index.php?content_id=137 (in Japanese)
- https://www.medsafe.or.jp/modules/en/index.php?content_id=15 (in English)

About this information

* PMDA Medical Safety Information is issued by the Pharmaceuticals and Medical Devices Agency for the purpose of providing healthcare providers with clearer information from the perspective of promoting the safe use of pharmaceuticals and medical devices. The information presented here has been compiled, with the assistance of expert advice, from cases collected as Medical Accident Information Reports by the Japan Council for Quality Health Care, and collected as Adverse Drug Reaction and Malfunction Reports in accordance with the Act on Securing Quality, Efficacy and Safety of Products Including Pharmaceuticals and Medical Devices.
* We have tried to ensure the accuracy of this information at the time of its compilation but do not guarantee its accuracy in the future.
* This information is not intended to impose constraints on the discretion of healthcare professionals or to impose obligations and responsibility on them, but is provided as a support to promote the safe use of pharmaceuticals and medical devices by healthcare professionals.
* This English version is intended to be a reference material to provide convenience for users. In the event of inconsistency between the Japanese original and this English translation, the former shall prevail.

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