Blood Gas Analysis Result Suggestive of Arterial Blood but no Pressure Wave: Is this an Arterial Line?

To the Editor,

Common complications resulting from insertion of an arterial pressure line to the radial artery in an intraoperative setting include ischemia, infection, and aneurysm.[1] We herein report a case in which an attempt to insert a radial artery line resulted in the formation of an arteriovenous shunt, making it difficult to determine whether the line was inserted into an artery or a vein.

A 43-year-old male was scheduled for femoral flap transplantation for scar contracture of the left hand. After induction of anesthesia, we attempted to insert an arterial pressure line to the right radial artery. We used a 22G catheter going through posterior wall of the artery and pulled the catheter back to the position where there was a backflow of blood and inserted the catheter in a blood vessel. Blood withdrawal was successful, but the arterial pressure waveform was not displayed on the monitor. Given the absence of an arterial pressure waveform, we had a concern that the catheter might have been placed in a vein. However, blood gas analysis showed a partial arterial oxygen pressure (PaO2) of 96.8 mmHg at a fraction of inspired oxygen of 35%, which was consistent with arterial blood. In addition, venous blood drawn centrally from the puncture site showed a PaO_2 of 62.3 mmHg. Based on the successful drawing of blood, the depth from the skin at the puncture site, and blood gas analysis, we suspected that the lack of arterial pressure waveform delineation was an instrumental error. However, blood gas analysis from an arterial line inserted in the dorsal foot showed a PaO_2 of 160.2 mmHg, indicating that the catheter in the upper extremity was placed in a vein. Echography revealed that the catheter was placed in a vein near the radial artery from a long-axis view and also showed shunt blood flow from the artery to the vein [Figure 1]. Therefore, the catheter was removed, and after compression hemostasis for 90 minutes, the shunt blood flow disappeared.

In cases of arteriovenous shunt due to peripheral arterial catheterization, blood gas analysis alone cannot be used to reliably determine whether the catheter was placed in an artery or vein. Echography is useful for confirming the locations of the catheter and the shunt if there is any doubt about it.

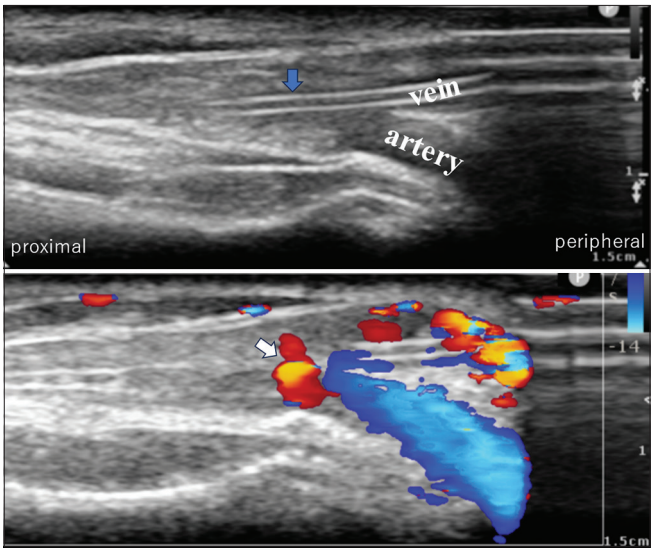

Figure 1: Blue arrow indicates a catheter. White arrow indicates arteriovenous shunt blood flow

Declaration of patient consent

Written consent for the presentation of this case was obtained from the patient.

Acknowledgement

The authors would like to thank the Scientific English Editing Section of Fukushima Medical University for editing this manuscript.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Jun Honda, Keisuke Yoshida, Miho Ogawa, Yukihiro Fukuhara[1], Satoki Inoue

Departments of Anesthesiology, [1]Clinical Engineering Center, Fukushima Medical University Hospital, Fukushima, Japan

Address for correspondence: Dr. Jun Honda, Department of Anesthesiology, Fukushima Medical University Hospital, Fukushima - 960-1295, Japan.
E-mail: j.honda1984@gmail.com

Submitted: 26-Oct-2023 **Revised:** 10-Nov-2023
Accepted: 11-Nov-2023 **Published:** 12-Apr-2024

REFERENCE

1. Scheer B, Perel A, Pfeiffer UJ. Clinical review: Complications and risk factors of peripheral arterial catheters used for haemodynamic monitoring in anaesthesia and intensive care medicine. Crit Care 2002;6:199-204. doi: 10.1186/cc1489.

Access this article online

Quick Response Code:

Website: https://journals.lww.com/aoca

DOI: 10.4103/aca.aca_169_23

How to cite this article: Honda J, Yoshida K, Ogawa M, Fukuhara Y, Inoue S. Blood gas analysis result suggestive of arterial blood but no pressure wave: Is this an arterial line? Ann Card Anaesth 2024;27:177-8.