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LETTER TO THE EDITOR

Response to "Pitfalls in ultrasound-guided peripheral venous access"

Mami Tsubota[1,2] · **Hiroshi Sasano**[1]

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To the Editor:

Thank you for your valuable feedback on our article. We appreciate your agreement with our finding that tourniquet pressure, which prevents vein collapse, is useful when inserting peripheral central venous catheters (PICC).

As you noted, differentiating between an artery and a vein during PICC insertion is crucial for preventing accidental arterial puncture.

In our study [1], there was no artery adjacent to the basilic vein, so we were unable to evaluate this aspect. However, in a previous study [2], we examined the collapse of both the vein and the adjacent artery in the cubital fossa.

In that study, the upper arm of seven participants was tied at various tourniquet pressures using an adult blood pressure cuff. An ultrasound probe was applied to the peripheral side of the arm until the vessel collapsed. The probe pressure, which was the pressure exerted by the probe on the arm, was measured for both the vein and the adjacent artery. The results indicated that the probe pressure for the artery was higher than that for the vein, from a tourniquet pressure of 0 up to the pressure calculated as the sum of systolic and diastolic pressures divided by two (Fig. 1). This suggests that vascular collapse, as an indicator of arteriovenous distinction, may be useful when the tourniquet pressure is below systolic pressure.

In addition, when the upper arm was tied at various tourniquet pressures and the forearm was further constricted with a wrist-type digital blood pressure cuff, we were able to measure forearm blood pressure when the tourniquet pressure on the upper arm was below the pressure calculated as the sum of systolic and diastolic pressures divided by two. However, blood pressure measurements were not feasible when the tourniquet pressure was at systolic pressure or higher [2]. This implies that pulsation pressure in the radial artery is maintained at tourniquet pressures up to the systolic pressure, but disappears at higher pressures.

Based on these findings, even with a tourniquet such as a rubber band, which does not allow for precise tourniquet pressure measurements, it may be possible to maintain the difference between venous and arterial collapse. When the rubber band applies a pressure that allows palpation of radial artery pulsation, the tourniquet pressure would be below systolic pressure.

These secondary outcomes, though promising, have limited statistical significance and require further investigation.

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✉ Mami Tsubota
mamitsubota@gmail.com

[1] Department of Advancing Acute Medicine, Nagoya City University, Graduate School of Medical Sciences and Medical School, 1 Kawasumi, Mizuho-Cho, Mizuho-Ku, Nagoya, Aichi 467-8601, Japan

[2] Department of Emergency and Critical Care, Nagoya City University, Graduate School of Medical Sciences and Medical School, Nagoya City, Aichi, Japan

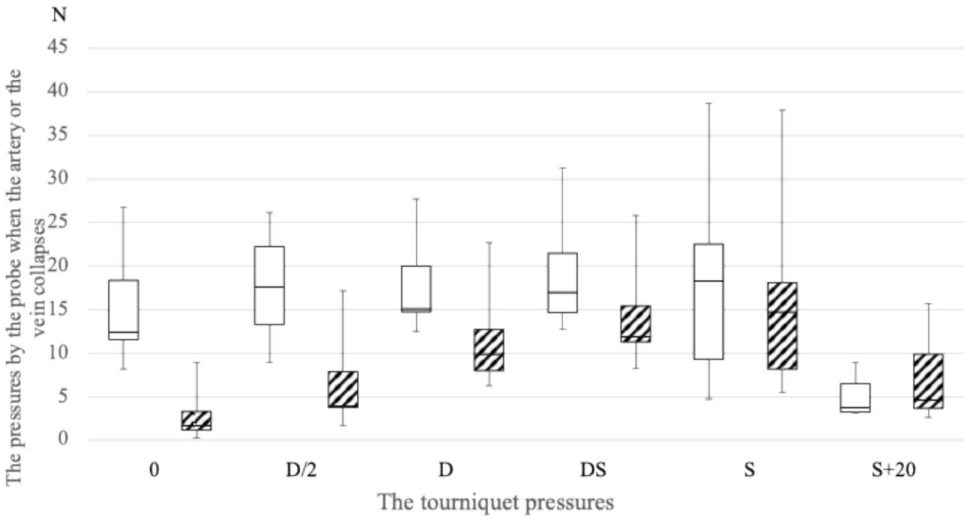

Fig. 1 Box plot of the probe pressure at the time of artery or vein collapse at each tourniquet pressure. N is Newton. 0 is 0 mmHg, D/2 is half the diastolic pressure, D is the diastolic pressure, DS is the pressure obtained by combining the systolic and diastolic pressures and dividing by 2, S is the systolic pressure, and S + 20 is the systolic pressure plus 20 mmHg. Plain color represents the artery, and the diagonal line represents the vein. The box indicates the 25th and 75th percentiles, the center line marks the median, and the whiskers represent the maximum and minimum values

Data availability All data supporting the contents of this letter are available within the references.

References

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