



Pitfalls in peripheral venous access under ultrasound guidance

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To the Editor,

Ultrasound guidance is widely used for peripheral venous and arterial line placement, as well as for central venous cannulation. It enables secure peripheral venous cannulation even in patients in whom intravenous access is difficult [1, 2]. The ultrasound-guided peripheral venous cannulation is especially useful in major surgeries that require reliable venous access for bleeding management (e.g., cardiac or liver surgery), in cases where a peripherally inserted central catheter (PICC) is inserted from the upper arm or elbow, and in pediatric or obese patients with difficult-to-visualize superficial veins. Thus, the ability to perform ultrasound-guided peripheral venous cannulation is essential for the modern clinician.

Regarding this, we read with great interest the article “Appropriate tourniquet pressure for peripherally inserted central catheter placement in the upper arm” by Tsubota and colleagues [3]. The authors described that the appropriate tourniquet pressure for PICC insertion in the upper arm is between diastolic and systolic pressure and that the vein is less likely to collapse at this pressure. Their study has a significance in that it focused on venous collapse, and it is helpful in increasing the success rate of puncture of the identified vein.

However, the introduction of ultrasound guidance has created a pitfall that had not been observed before. That is, unlike central venous catheterization, it is difficult to distinguish between veins and arteries on ultrasound images

during peripheral venous catheterization [4], increasing the risk of accidental arterial puncture. Thus, a method to reliably distinguish between arteries and veins is required, along with techniques to facilitate puncture. Blood vessel collapsibility is one of the indicators used to distinguish veins from arteries, although a comprehensive assessment based on ultrasound imaging and anatomical knowledge should be performed. In this regard, the study by Tsubota and colleagues provides important insights, although they did not evaluate methods for distinguishing between the vein and the accompanying artery. They showed that while the diameter of the vein does not change drastically even if it changes slightly before and/or after the application of a tourniquet, the pressure at vein collapse changes drastically. In other words, the difference in pressure at which the blood vessel collapses, rather than blood vessel diameter before and after the application of a tourniquet, should be used to distinguish between arteries and veins, because the pressure at which the artery collapses is not typically affected by the tourniquet.

To take full advantage of the ultrasound-guided vascular puncture technique, we should not only focus on the technique itself but also be aware of the collapsibility of the vessel while adjusting the tourniquet pressure when identifying the target vein.

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Declarations

Conflict of interest The authors declare that they have no competing interests.

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