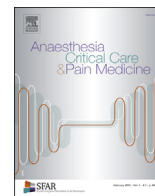




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## Letter to the Editor

**The larger the better: Tourniquet-facilitated popliteal vein cannulation for vascular access in prone position**


## ARTICLE INFO

## Keywords:

Pneumatic tourniquet  
 Popliteal vein cannulation  
 Vascular access  
 Prone position  
 Acute respiratory distress syndrome

## To the Editor,

Prone position as treatment for acute respiratory distress syndrome (ARDS) has been widely used during the coronavirus disease 2019 (COVID-19) pandemic.

In such position, central vein cannulation can be an issue as access to anterior structures is limited. Whenever required, it should be performed in advance before proning the patients. However, in some unpredictable situations, an emergent central line access may be needed while the patient is already in the prone position and may not tolerate returning to the supine position. There are few reports regarding vascular access in prone position [1–3].

To the best of our knowledge, this is the first case report describing the use of pneumatic tourniquet to facilitate a difficult popliteal vein cannulation in the prone position.

A 62 year-old-woman with history of obesity and hypertension was admitted to our intensive care unit for ARDS due to COVID-19 pneumonia. She was intubated and was put on mechanical ventilation due to respiratory failure. A central venous catheter was inserted in the left femoral vein along with an arterial line in the left radial artery. As the patient remained hypoxic, the staff decided that she should be placed in prone position. This manoeuvre allowed a clinical improvement but resulted in accidental central line dysfunction. A peripheral access was used to administer sedation and vasopressor before deciding to perform a vascular access via the popliteal vein.

Under ultrasound guidance, we obtained a poor view of the left popliteal vein (Figs. 1 and 2). As a consequence, we failed to puncture the vein at the first attempt. Trying to make the popliteal vein larger, we put the patient on reverse Trendelenburg position and performed some manoeuvres (abdominal compression, high level of pulmonary expiratory pressure). No increase in the vein size was observed and the second attempt was also a failure.

Ultimately, a pneumatic tourniquet was placed around the root of the left leg as a rescue plan. By gradually increasing tourniquet pressure up to 120 mm Hg, a better view of the popliteal vein was obtained (Fig. 3). We successfully inserted a triple-lumen catheter in the popliteal vein and then deflated the tourniquet after nearly 6 min (Fig. 4). There were no haemodynamic changes during the procedure. The next day, a central line was placed in the right jugular vein after 18 h of prone positioning. The patient condition improved. She was extubated after 8 days and was discharged from the ICU by day 16. During the follow up, there was no evidence of a deep vein thrombosis.

There are an increasing number of prone patients under mechanical ventilation who may require emergent central line access and could not be returned to the supine position.

In such conditions, some clinicians used a lift and pillows to elevate the patient's torso, while the patient body was slightly oblique to allow more clearance on the right side. By using ultrasound guidance (US), they successfully cannulated the right internal jugular vein [1].

Others have successfully placed the catheter in the popliteal vein under US [2,3]. However, this is a new approach, which is not yet widely mastered by all practitioners. Consequently, when the image is not good enough, low blood flow in bad haemodynamic condition or in obese patient, like in our case, the puncture and/or the cannulation can be difficult.

The vein size is an important predictor of successful ultrasound-guided vascular access. Similar to the traditional palpation



Fig. 1. US views of the popliteal vein before the application of a tourniquet.



Fig. 2. US views of the popliteal vein before the application of a tourniquet.



Fig. 3. US view of the popliteal vein during the application of a tourniquet.



Fig. 4. Popliteal vein cannulation by a triple-lumen catheter.

technique, the placement of a tourniquet or blood pressure cuff inflation increases vein diameter. These tools have been used to facilitate US-guided catheter placement in upper arm but have never been studied in the lower limb because popliteal vein is rarely used as a vascular access [4].

In our case, the manoeuvres suggested to increase femoral vein size to facilitate US central line placement [5] have failed to make popliteal vein larger while pneumatic tourniquet succeeded.

The ability of pneumatic tourniquet to facilitate US guided popliteal vein cannulation in prone position can be useful not only in the field of intensive care but also in anaesthesiology and during many vascular procedures.

Nevertheless, we should point out that placing central lines in the popliteal vein could increase the risk of deep vein thrombosis [2]. Further studies are needed to evaluate the efficacy and risk of this technique.

**Disclosure statement**

No conflicts of interest.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Authors' contribution

Mohammed RABI ANDALOUSSI and Rida TOUAB: Writing - original draft.

El Mehdi SAMALI and Hicham BALKHI: Writing - review & editing.

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Available online 24 June 2021