Demonstration of Blood Flow by Color Doppler in the Femoral Artery Distal to Arterial Cannula during Peripheral Venoarterial-extracorporeal Membrane Oxygenation

Abstract

In spite of distal perfusion of the limb using a cannula, the limb can have ischemic events if there is an undetected kink or clot anywhere in the line or thrombus in the artery. There are several ways to monitor and assess the limb ischemia. Monitoring for clinical signs of limb ischemia like temperature change and pallor is reliable and mandatory. We report a method where we used color Doppler to document the blood flow. Curvilinear vascular probe of an echo machine is used to identify the flow in the distal femoral artery of the lower limb. As we have demonstrated in the video attached, once flow to the distal limb perfusion system is shut off by closing the three-way stop cock, we can appreciate the immediate cessation of flow in the artery by Doppler.

Keywords: Distal, Doppler, perfusion

Peripheral extracorporeal membrane oxygenation (ECMO) instituted through the femoral vessels has the risk of limb ischemia on the side of the arterial cannulation.\(^1,2\) Perfusion of the limb distal to the arterial cannulation point using a distal perfusion cannula will prevent the limb ischemia.\(^3\) Insertion of distal perfusion cannula and perfusing the limb have become a standard practice.\(^3\) Side port of the arterial cannula of ECMO is connected to the distal limb perfusion cannula using a quarter inch tubing [Figure 1].\(^3\)

In spite of distal perfusion of the limb using a cannula, the limb can have ischemic events if there is an undetected kink or clot anywhere in the line or thrombus in the artery. There are several ways to monitor and assess the limb ischemia.\(^1,2\) Monitoring for clinical signs of limb ischemia such as temperature change and pallor is reliable and mandatory.\(^1,2\)

We report a method where we used color Doppler to document the blood flow. Curvilinear vascular probe of an echo machine is used to identify the flow in the distal femoral artery of the lower limb. As we have demonstrated in the video attached, once flow to the distal limb perfusion system is shut off by closing the three-way stop cock, we can appreciate the immediate cessation of flow in the artery by Doppler.

The advantages of using a vascular probe of echo machine for confirmation of the flow, once the distal limb perfusion is established, are numerous. It will confirm the presence of the flow. The absence of the flow in the distal femoral artery in spite of having a distal limb perfusion system warrants looking for the reasons for the same. It can be due to the kink or clot in the circuit of the distal limb perfusion system, or it can be due to the dislodgement of the distal limb perfusion cannula. Another important reason for the absence of flow in the peripheral arteries of the lower limb can be due to the presence of thrombus or emboli in the arterial system of the lower limb. While the former two reasons need the adjustment of the circuit or repositioning of the cannula, the presence of the clot in the arterial system of the lower limb can be managed either medically with anticoagulation or needs a surgical intervention to prevent limb ischemia depending on the situation. Out technique is a simple, reliable, reproducible, bedside method.

How to cite this article: Suresh Rao KG, Muralikrishna T, Balakrishnan KR. Demonstration of blood flow by color doppler in the femoral artery distal to arterial cannula during peripheral venoarterial-extracorporeal membrane oxygenation. Ann Card Anaesth 2017;20:108-9.

Received: December, 2016. Accepted: December, 2016.
that will help in confirmation of the flow in the distal femoral artery of the lower limb and early identification of ischemia of the lower limb due to issues in the distal limb perfusion system. We recommend that this should be practiced at regular intervals for best outcomes.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Bisdas T, Beutel G, Warnecke G, Hoeper MM, Kuehn C, Haverich A, et al. Vascular complications in patients undergoing femoral cannulation for extracorporeal membrane oxygenation support. Ann Thorac Surg 2011;92:626-31.
2. Aziz F, Brehm CE, El-Banyosy A, Han DC, Atnip RG, Reed AB. Arterial complications in patients undergoing extracorporeal membrane oxygenation via femoral cannulation. Ann Vasc Surg 2014;28:178-83.
3. Roussel A, Al-Attar N, Khaliel F, Alkhoder S, Raffoul R, Alfayyad F, et al. Arterial vascular complications in peripheral extracorporeal membrane oxygenation support: A review of techniques and outcomes. Future Cardiol 2013;9:489-95.