Still legwork to do

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There has been a dramatic increase in the use of venoarterial extracorporeal membrane oxygenation (ECMO) to support patients in severe cardiopulmonary failure.¹ It is a potentially life-saving intervention, but remains high risk and fraught with latent complications. One such complication is limb ischemia: Patients undergoing peripheral cannulation via the femoral artery are at risk for ipsilateral limb ischemia, and use of a distal perfusion cannula (DPC) is often warranted.² Different cannulation techniques exist, including an open cut-down or image-guided percutaneous approach into the common femoral artery or superficial femoral artery (SFA), or cannulation of the posterior tibial or dorsalis pedis with retrograde perfusion.³ Approach is operator and center dependent, and clinical best evidence is based on case reports and case series. Yet supplying adequate distal perfusion is critically important; we know that leg ischemia is an independent risk factor for in-hospital death, and amputation unequivocally affects the patient's quality of life.⁴

Ghodsizad and colleagues⁵ describe 5 patients who underwent endovascular crossover bypass for distal limb perfusion. In this technique, ultrasound-guided common femoral artery access is obtained in the limb contralateral to the venoarterial ECMO cannulation site. Then, using fluoroscopy, a 5F Omni Flush catheter (AngioDynamics, Inc., Queensbury, NY) is advanced up and over into the contralateral artery distal to where the ECMO cannula is inserted. Although this innovative technique provides another option to this difficult clinical entity, there appears to be a cost: SFA thrombosis. In addition, how much flow can actually be achieved through their 5F or 1.6-mm, 65-cm long catheter? Of note, ECPPELLA, a combined use of ECMO and Impella (Abiomed, Inc., Danvers, Mass), is becoming more popular, and this support system occupies both femoral arteries.⁶

At our institution, DPC is placed with surgical cut-down at the bedside, and the SFA is directly cannulated with an 8F, wire-reinforced arterial cannula that is 2.5 mm in diameter and just 20 cm long and provides flow of greater than 150 mL per minute.

Authors with our ECMO team.

Central Message

Venoarterial ECMO use has substantially increased over the past several years. It is essential to have a reproducible, rapid, and reliable method of providing distal perfusion to the cannulated leg.

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Prevention and surveillance for this devastating complication are critical. Venoarterial ECMO cannulation is usually performed in the middle of a clinical disaster under hectic conditions and a chaotic atmosphere, and nonemergency procedures, such as placement of a DPC, are not the primary focus until the emergency situation is better controlled. Our strategy is to use a small-caliber (15F or 17F) ECMO arterial cannula with immediate assessment of arterial Doppler signals in the foot, followed by close observation with serial Doppler examinations and continuous bilateral lower-extremity tissue saturation monitoring.⁷ If Doppler signals are weak, cannulation leg tissue saturation is less than 60%, or there is more than a 15-point difference in tissue saturation between the legs, we would place a DPC. We also continuously monitor blood flow through the DPC via a flow probe connected to the ECMO circuit. Flow decrease in the DPC may suggest a need for revision or catheter thrombectomy.

We must pay close attention to the legs after ECMO cannulation and resuscitation work, and none of the DPC techniques for the leg are perfect. Literally, there is still legwork to do.

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