Out with the new and in with the old: Extracorporeal membrane oxygenation for massive hemorrhage after pulmonary endarterectomy

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In this issue of the *Journal*, Guth and colleagues¹ present their results after the use of venoarterial extracorporeal membrane oxygenation (VA-ECMO) for catastrophic pulmonary hemorrhage after pulmonary endarterectomy (PEA). The authors have a vast collective experience with PEA for chronic thromboembolic pulmonary hypertension: 396 patients over 3 years. The patients in this study are an extremely challenging group, with one third having Jamieson class III disease for which surgical extirpation of distal disease can be a daunting task. This study specifically focused on 8 patients who required a short course of VA-ECMO for massive endobronchial hemorrhage refractory to medical and ventilatory management after weaning of cardiopulmonary bypass after PEA. A heparin-coated circuit was used connected to the central cannulas used for cardiopulmonary bypass, which allowed for full reversal of heparin and aggressive correction of any coagulopathy to promote hemostasis of the endobronchial bleeding source. The average duration of ECMO support was 49 minutes, and all patients were weaned off ECMO in the operating room of the initial PEA operation. By using this strategy, bleeding sites were effectively sealed off and 7 of the 8 patients were discharged alive with good midterm outcome.

Uncontrollable endobronchial hemorrhage is a devastating complication after PEA. Published case series and isolated single-patient reports describing ECMO post-PEA tend to be confounded by type of ECMO (venovenous and VA) and indication (reperfusion injury, persistent pulmonary hypertension, pulmonary hemorrhage). This article shows that a short course of VA-ECMO with full reversal of coagulopathy can be a lifesaving maneuver for patients undergoing PEA complicated by pulmonary hemorrhage.

This remains a small series, and as the worldwide experience with not only PEA surgery but also PEA among patients with a high burden of distal disease increases, so will

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Central Message

Good, old-fashioned VA-ECMO prevails once again, this time as a lifesaving intervention in this series of massive hemorrhage after PEA.

See Article page 643.

our understanding of how to best approach these patients. Hospital systems are increasingly scrutinized for cost containment. If with further experience the duration of ECMO remains less than 1 hour in this subset of patients, the use of a less expensive nonheparin-coated circuit may be an option because clotting within the circuit would not be expected to occur. This hypothesis merits further investigation.

This study reinforces the notion that good, old-fashioned ECMO continues to be a key player in the field of short-term mechanical circulatory support (MCS). Despite the emergence of novel percutaneous and surgical MCS devices, the use of ECMO continues to increase in the United States.² Its versatility in terms of cannulation options and biventricular support, widespread availability, and relatively low cost are just some of the factors that continue to make it the primary short-term MCS device in many centers.

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