Supplementary Table 1. Case reports with characteristic brain imaging findings in patients with ECMO

Study	Patient age and sex	Type of ECMO	Indication for ECMO	Imaging findings	Lessons learned
Hendrikse et al. (2006) [1]	3 wk 4 day postnatal	VA-ECMO (occlusion of right CCA and right jugular vein)	Persistent pulmonary HTN of the neonate	Anatomical MRI: no hemorrhagic or ischemic lesions 2D PC MRA: total volume flow was 63 mL/min at the skull base and collateral flow via the anterior circle of Willis. TOF MRA: occlusion of the right ICA Flow-directional-sensitive MRA: contralateral filling of right MCA via the anterior part of the circle of Willis, with reversed flow in the A1 segment of the right ACA; no collateral flow detected in right PCom.	· 2D PCA MRA allows precise volume flow measurements and can detect alterations in vascular flow patterns post-ECMO. · Despite occlusion of the right ICA, collateral circulation can maintain perfusion via the anterior part of the circle of Willis.
	3 wk 3 day postnatal	VV-ECMO	Meconium aspiration syndrome	Anatomical MRI: small subcortical parietooccipital ischemic lesion on right side. 2D PC MRA: total volume flow was 86 mL/min at the skull base and collateral flow via the anterior circle of Willis. TOF MRA: fetal type circle of Willis Flow-directional-sensitive MRA: dominant feeding of the right PCA from the right ICA	· Small ischemic lesions can occur with VV-ECMO despite the absence of major ligation of vessels. · A fetal-type CoW can affect vascular flow dynamics, particularly in post-ECMO patients, with altered flow patterns in the right PCom.
Sonobe et al. (2019) [2]	6-Month-old male infant	VA-ECMO	Abrupt desaturation and hemodynamic collapse following admission for elective bidirectional cavopulmonary connection	Initial clinical assessment: pupillary assessment and TCD revealed no neurological abnormalities CT scan: widespread cerebral infarction involving the right hemisphere and the left ACA area after weaning off ECMO. MRA: bilateral hypoplastic proximal PCA and aplastic proximal left ACA A1 segment, with distal left ACA supplied by right ICA via the ACA.	· Cerebral infarcts can occur after ECMO despite no initial signs of abnormality during clinical assessments. · Pre-existing vascular anomalies, such as hypoplastic or aplastic arteries, can complicate neurological outcomes post-ECMO. · Early neuroimaging is critical, especially when there is delayed presentation of symptoms like myoclonus.
Sathyavadhi et al. (2022) [3]	41 Male	VV-ECMO	Severe respiratory failure due to COVID-19 pneumonia	Non-contrast CT: large intraparenchymal hemorrhage 3 days post-ECMO	· Neurological complications during ECMO require immediate neurosurgical intervention. · Anticoagulation use in ECMO must be carefully monitored.
Viamonte et al. (2021) [4]	20 Female	VA-ECMO	Cardiogenic shock following HF exacerbation in the context of pregnancy	Non-contrast CT: small bilateral patchy areas of gray-white matter loss of differentiation in the high frontal convexities, more noticeable on the left. Follow-up imaging (12 hours later) did not show any development of a right hemispheric infarct. CTA: lack of contrast opacification in the right brachiocephalic, subclavian, common, internal, and external carotid arteries, and right ACA and MCA CTP: increased time to peak with decreased blood flow and volume in the right MCA and ACA territories MRI: performed 3 days later showed small patchy bilateral areas of diffusion restriction, primarily in the supratentorial cortices, consistent with hypoxic-ischemic injury rather than a stroke.	· Transient neurological symptoms like extensor posturing and gaze deviation may occur during VA-ECMO and can prompt stroke alert, but careful imaging interpretation is necessary to exclude ECMO-related artifacts. · Artifacts in CTA and CTP imaging can mimic arterial occlusion due to ECMO. · Hypoxic-ischemic injury rather than large vessel stroke may be the cause of some neurological deficits in ECMO patients.

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Supplementary Table 1. Continued

Study	Patient age and sex	Type of ECMO	Indication for ECMO	Imaging findings	Lessons learned
Osman Amer et al. (2023) [5]	53 Male	VV-ECMO	COVID-19–related ARDS	CT: initial imaging showed multiple cavitary lesions with air-fluid levels and hemorrhagic transformation. Subsequent imaging revealed worsening ICH with IVH, SAH, and herniation with inferior displacement of cerebellar tonsils.	· ICH is a serious and potentially fatal complication of ECMO. · Monitoring of coagulation is critical for ECMO patients, with complications still possible in patients with acceptable coagulation profiles.
Xu et al. (2024) [6]	61 Male	VA-ECMO	Cardiac arrest and circulatory failure	Initial CT: no obvious signs of stroke CTP: large ischemic hypoperfusion in the right frontotemporal lobe, suggesting cerebral infarction and poor compensatory blood flow. Repeat CTP showed symmetric perfusion in both cerebral hemispheres, suggesting that initial findings were likely related to differential flow due to ECMO. CTA: sparse blood flow in right CCA, M1 segment of right MCA, and vertebral artery	· Differential blood flow in ECMO can cause imaging findings that mimic cerebral infarction. · Continuous EEG and NIRS can support the diagnosis of artifact-related findings.
Rangappa et al. (2024) [7]	29 Female	VV-ECMO	Prolonged hypoxemia and hypercapnia due to community-acquired pneumonia	MRI and MR venogram: extensive CVST in the proximal and sagittal sinuses, right sigmoid sinus, and bilateral transverse sinuses, with involvement of the cavernous sinus. Clinical assessment post-ECMO: bilateral papilledema, complete loss of light perception in left eye, and mild blurring of vision in right eye following ECMO weaning.	· Development of CVST shortly after ECMO weaning is a serious complication, indicating the need for careful coagulation management post-ECMO. · Patients with neurological complications post-ECMO may have residual neurological deficits.
This study	54 Male	VA-ECMO	Primary graft dysfunction following orthoptic heart transplant, complicated by air embolism in RCA	CTA: multifocal embolic-appearing infarct throughout the right MCA, bilateral PCA territories, and cerebellar hemispheres; occlusion of all major right-sided vasculature was seen; the left vasculature was patent without significant stenosis. CTP: large volume of elevated Tmax with corresponding decreased CBF and CBV throughout the right cerebral hemisphere, demonstrating hypoperfusion that is suggestive of a large cerebral infarction. DSA: no significant occlusion within the right ICA at its origin or within the intracranial compartment –– the entire right cerebral hemisphere is being perfused.	· Cardioembolic stroke is a serious risk in post-transplant patients, particularly in patients with VA-ECMO. · Imaging findings may not always correlate with the clinical neurological exam in ECMO patients, making careful interpretation of diagnostic imaging important. We also highlight the importance of neurological assessment in complex patients, despite limitations like sedation. · Multidisciplinary care is essential to manage complex patients on ECMO, as these patients may require the management of multiple organ support systems.

ECMO, extracorporeal membrane oxygenation; VA, venoarterial; CCA, common carotid artery; HTN, hypertension; MRI, magnetic resonance imaging; 2D, two-dimensional; PC, posterior circulation; MRA, magnetic resonance angiography; TOF, time-of-flight; ICA, internal carotid artery; MCA, middle cerebral artery; ACA, anterior cerebral artery; PCom, posterior communicating artery; PCA, posterior cerebral artery; VV, venovenous; CoW, circle of Willis; TCD, transcranial Doppler; CT, computed tomography; COVID-19, coronavirus disease 2019; HF, heart failure; CTP, computed tomography perfusion; ARDS, acute respiratory distress syndrome; ICH, intracerebral hemorrhage; IVH, intraventricular hemorrhage; SAH, subarachnoid hemorrhage; EEG, electroencephalography; NIRS, near-infrared spectroscopy; CVST, cerebral venous sinus thrombosis; RCA, right coronary artery; CBV, cerebral blood volume; DSA, digital subtraction angiography.

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