Term (Abbreviation)	Definition and examples Class	References
Ambulating ECMO	A concept for physiotherapy for the awake extracorporeal membrane oxygenation patient to A - Terminology in	
	AVCO2R is the provision of pumpless carbon dioxide exchange through the use of an	Conrad SA, Zwischenberger JB, Grier LR, Alpard SK, Bidani A. Total
Arteriovenous carbon dioxide removal (AVCO2R)	extracorporeal circuit consisting of an artificial lung, and venous and arterial vascular access cannulas using lower blood flows. Blood flow is driven by the patient's arterio-venous pressure aradiant (17) Compared with a compared by the patient's arterio-venous pressure	extracorporeal arteriovenous carbon dioxide removal in acute respiratory failure: a phase I clinical study. Intensive Care Med 2001; 27: 1340-
	gradient (17). Synonym: AV ECCO2R The use of extracorporeal membrane oxygenation as a bridge to cardiac assist device	1351.
Bridge to bridge	which would be destination therapy or a bridge to transplant when conventional intensive care is extracorporeal life support not sufficient	
Bridge to decision	The concept to offer extracorporeal membrane oxygenation as a support for hours to a few days for more information or diagnosis and then decide to continue or withdraw treatment. Most extracorporeal life support	
	commonly used in the neonatal population (, e.g. suspicion of capillary alveolar dysplasia). The use of extracorporeal membrane	
Bridge to transplant	Oxygenation as an organ supportive means with the utlimate goal of weaning and survival. A - terminology in extracorporeal life support The use of extracorporeal membrane oxygenation as a bridge to heart and/or lung A - Terminology in	
Bridge to transplant	transplant when conventional intensive care is extracorporeal life support not sufficient	
Cardiac ECMO (cECMO)	oxygenation with a primary indication for support of left and/or right ventricular failure by providing cardiac and gas exchange support. Does not imply any specific ECLS mode or cannulation configuration. cECMO is an abbreviation that can be used in a generic context when describing the type of organ support as cardiac. Synonym: cECLS	
ECMO transport	Transport of a patient between different healthcare facilities, i.e. hospitals. Most common modes of transport are ground ambulance and aircraft (fixed wing or helicopter). Also see:	
	A collective term for extracorporeal therapies	Developing The Second
Extracorporeal life support (ECLS)	A collective term for extracorporeal therapies used for the support of various presentations of cardiac and/or pulmonary failure through the use of an extracorporeal circuit (1) (Figure 1). ECLS includes therapies focusing on oxygenation, carbon dioxide removal, cardiac support, or a combination thereof. It excludes cardiopulmonary bypass for cardiothoracic or vascular surgical procedures.	Bartlett RH, Conrad SA. The physiology of extracorporeal life support. In: Brogan TV, Lequier L, Lorusso R, MacLaren G, Peek G, editors. Extracorporeal Life Support: The ELSO Red Book, 5 ed. Ann Arbor, MI: Extracorporeal Life Support Organization; 2017
	ECCO2R is the provision of carbon dioxide exchange through the use of an extracorporeal circuit consisting minimally of an optional blood	Gattinoni L, Kolobow T, Damia G,
Extracorporeal carbon dioxide removal ECCO2R)	pump artificial lung and vascular access cannulas using lower blood flows lower than required for oxygenation support (15). Peripheral cannulation for venovenous access using a blood nump would be the most common mode	carbon dioxide removal (ECCO2R): a new form of respiratory assistance. Int J Artif Organs 1979; 2: 183-185
Extracorperela organ support (ECOS)	ECOS is the collective name for all extracorprally A - Terminology in provided organ supportive methods extracorporeal life suppor	
		Bělohlávek J, Chen Y-H, Morimura N. Extracorporeal cardiopulmonary resuscitation in adults. In: Brogan TV, Leguier L. Lorusso R. MacLaren G.
		Peek G, editors. Extracorporeal Life Support: The ELSO Red Book, 5 ed. Ann Arbor, MI: Extracorporeal Life Support Organization; 2017; Conrad SA. RVCUS PT Extracorpored
		membrane oxygenation for refractory cardiac arrest. Ann Card Anaesth 2017; 20: S4-S10; Yam N, McMullan DM. Extracorporeal cardiopulmonary
	ECPR is the application of rapid-deployment	resuscitation. Ann Transl Med 2017; 5: 72; Jacobs I, Nadkarni V, Bahr J, Berg RA, Billi JE, Bossaert L, Cassan P, Coovadia A, D'Este K, Finn J, Halperin H, Handlev A, Herlitz J, Hickor D, Itti
	venoarterial extracorporeal membrane oxygenation, usually by peripheral cannulation, to provide circulatory support in patients in whom conventional cardiopulmonary resuscitation (CPR) is unsuccessful in achieving sustained	A, Kloeck W, Larkin GL, Mancini ME, Mason P, Mears G, Monsieurs K, Montgomery W, Morley P, Nichol G, Nolan J, Okada K, Perlman J, Shuster
Extracorporeal cardiopulmonary resuscitation (ECPR)	ROSC) (11-13). Sustained ROSC is deemed to have occurred when chest compressions are not required for 20 consecutive minutes and signs of	M, Steen PA, Sterz F, Tibballs J, Timerman S, Truitt T, Zideman D, International Liaison Committee on R, American Heart A, European Resuscitation C. Australia
	circulation persist (14). ECPR implies the application of ECLS during conventional CPR. Use of ECLS initiated for low cardiac output following sustained ROSC is considered	Resuscitation C, Australian Resuscitation C, New Zealand Resuscitation C, Heart, Stroke Foundation of C, InterAmerican Heart F, Resuscitation Councils of Southern A
	venoarterial (VA) ECMO.	Arrest ITFoC, Cardiopulmonary Resuscitation O. Cardiac arrest and cardiopulmonary resuscitation outcome reports: update and simplification of the
		Utstein templates for resuscitation registries: a statement for healthcare professionals from a task force of the International Liaison Committee on Resuscitation (American Heart
		Association (American Heart Association, European Resuscitation Council, Australian Resuscitation Council, New Zealand Resuscitation Council, Heart and Stroke Foundation
		Foundation, From and Stroke Foundation of Canada, InterAmerican Heart Foundation, Resuscitation Councils of Southern Africa). Circulation 2004; 110: 3385-3397.
	The use of venoarterial extracorporeal membrane oxygenation to provide organ perfusion in non-heart-beating organ donors in the interval between declaration of death and	Dejohn C, Zwischenberger JB. Ethical implications of extracorporeal interval support for organ rational (FIGSE)
Extracorporeal interval support for organ etrieval (EISOR)	organ retrieval (18). EISOR has been described in the context of death due to cessation of cardiorespiratory function, and OP-ECMO in the context of brain death, but both are intended to	ASAIO J 2006; 52: 119-122; Dalle Ave AL, Gardiner D, Shaw DM. The ethics of extracorporeal membrane oxygenation in brain-dead potential
	preserve organ function prior to retrieval. Synonym: Organ-preserving extracorporeal membrane oxygenation (OP-ECMO) (19)	organ donors. Transpl Int 2016; 29: 612-618
	ECMO is the provision of oxygen and carbon dioxide exchange through the use of an extracorporeal circuit consisting minimally of a blood numn, artificial lung, and vascular second	Abrams D, Combes A, Brodie D. Extracorporeal membrane oxygenation
Extracorporeal membrane oxygenation	cannulae, using blood flows sufficient to support oxygenation and concomitantly enhance carbon dioxide removal (2, 3). The term ECLS has been used interchangeably with the term ECMO, but	in cardiopulmonary disease in adults. J Am Coll Cardiol 2014; 63: 2769-2778; Frenckner B. Extracorporeal membrane oxygenation: a breakthrough for respiratory failure. Unters Med 2015
	ECMO is the preferred term when the goal is oxygen and carbon dioxide exchange by means of a pumped extracorporeal circuit.	278: 586-598.
lobile ECMO rimary transport	see: ECMO transport A - Terminology in extracorporeal life support Transport of a patient where the transport team also performed the implantation of ECLS before A - Terminology in extractional support	
	transport atter a short period of stabilization. extracorporeal life support Also see: Secondary transport	Conrad SA, Broman LM, Taccone FS, Lorusso R, Malfertheiner MV
	A continuous episode of extracorporeal support with duration more than 28 days. It does not	Pappalardo F, Di Nardo M, Belliato M, Grazioli L, Barbaro RP, McMullan DM, Pellegrino V, Brodie D, Bembea MM, Fan E, Mendonca M, Diaz R, Bartlett
rolonged ECLS	Indicate type or mode of ECLS. Synonym: Prolonged ECMO, when used in context of ECMO	RH. The Extracorporeal Life Support Organization Maastricht Treaty for Nomenclature in Extracorporeal Life Support: A Position Paper of the Extracorporeal Life Sup
	The use of extracorporeal membrane	Criganization. Am J Respir Crit Care Med. 2018,198(4): 447-451
Respiratory ECMO (rECMO)	oxygenation with a primary indication for support of respiratory failure by providing gas exchange support. Does not imply any specific ECLS mode A - Terminology in or cannulation configuration. rECMO is an extracorporeal life support	
	abbreviation that can be used in a generic context when describing the type of organ support as respiratory. Synonym: rECLS	
econdary transport	I ransport of a patient who is already on extracorporeal membrane oxygenation support. The mobile transport team was not been involved in the cannualtion procedure with the aim to transfer the patient elsewhere. Also soci	
	Primary transport VA support is the application of extracorporeal circulation primarily for cardiac or circulatory	Gille JP, Bagniewski AM. Ten years of
/enoarterial (VA) support	support, in which the extracorporeal circuit drains blood from the venous system and returns into the systemic arterial system. Without qualification, VA support refers to support that	use or extracorporeal membrane oxygenation (ECMO) in the treatment of acute respiratory insufficiency (ARI). Trans Am Soc Artif Intern Organs 1976; 22: 102-109: Zanol WMA Spider MT
	returns blood to the systemic arterial system, operating in parallel with and providing partial or complete bypass of, the heart and lungs (4, 5). VA can be used to qualify the application of ECMO (VA ECMO).	Schneider RC. Extracorporeal membrane oxygenation for acute respiratory failure. Anesthesiology 1977; 46: 272-285.
		Stöhr F, Emmert MY, Lachat ML, Stocker R, Maggiorini M, Falk V, Wilhelm M.1. Extracorported march
	VVA is a hybrid configuration of VV and VA extracorporeal support in which the extracorporeal circuit drains blood from the	oxygenation for acute respiratory distress syndrome: is the configuration mode an important predictor for the outcome? Interact Cardiovasc Thorac
Venovenoarterial (VVA) support	venous system and reinfuses into both the venous and systemic arterial systems (8-10). VVA ECMO provides both pulmonary (VV component) and cardiac support (VA component) in patients with security in	Surg 2011; 12: 676-680; Biscotti M, Lee A, Basner RC, Agerstrand C, Abrams D, Brodie D, Bacchetta M. Hybrid configurations via percutaneous access for extraormerce
	component) in patients with combined cardiopulmonary failure. VVA can be used to qualify the application of ECMO (VVA ECMO). The abbreviation VVA is preferred over VAV since it is a contraction of 'VV' and 'VA' and is	tor extracorporeal membrane oxygenation: a single-center experience. ASAIO J 2014; 60: 635- 642; Werner NL, Coughlin M, Cooley E, Haft JW. Hirschl RB, Bartlett DU
	established in the literature (8).	Mychaliska GB. The University of Michigan experience with veno- venoarterial hybrid mode of extracorporeal membrane oxvaenation
	VV support is the application of extracorporeal	ASAIO J 2016; 62: 578-583
	which the extracorporeal circuit drains blood from the venous system and reinfuses into the venous system. VV support operates in series with the heart and lungs, and does not provide	Andrews AF, Toomasian J, Oram A, Bartlett RH. Total respiratory support with venovenous (VV) ECMO. Trans Am Soc Artif Intern Organs 1982; 28: 350-252: Andrews AT. 1982; 1982; 28:
/enovenous (VV) support	bypass of these organs (6, 7). VV can be used to A - Terminology in qualify the application of ECMO (VV ECMO). A variation of VV support is the use of a dual- lumen cannula inserted across the tricuspid valve into the nulmonage orten.	Venovenous extracorporeal membrane oxygenation in neonates with respiratory failure. J Pediatr Surg 1992:
	vare into the pulmonary artery that provides support of right ventricular function in addition to gas exchange.	18: 339-346
Venovenous extracornoreal carbon disuid	VV ECCO2R is the provision of carbon dioxide exchange through the use of an extracorporeal	Gattinoni L, Kolobow T, Agostoni A, Damia G, Pelizzola A, Rossi GP, Langer M, Solca M, Citterica R, Pesenti A, Fox U, Uziel L. Clinical application of low
moval (VV ECCO2R)	and venovenous vascular access cannulas using lower blood flows (16).	Inequency positive pressure ventilation with extracorporeal CO2 removal (LFPPV-ECCO2R) in treatment of adult respiratory distress syndrome (ARDS). Int J Artif Organs 1979: 2: 282-282
ccidental decannulation	see: Unplanned decannulation B - Terminology for cannulation concepts	
nterograde	Cannula directed / with flow direction same as during normal physiology B - Terminology for cannulation concepts	
i-caval cannula	A dual-lumen cannula designed for placement in, and drainage of, both the superior and inferior vena cavae. Used in the context of dual-lumen cannulation for venovenous support, with reinfusion into the right atrium	1
Sauce attrict and the	A dual-lumen cannula designed for placement in, and drainage of, the superior vena cava and right of time Load in the superior vena cava and	I
,avo-atrial cannula	right atrium Used in the context of dual-lumen cannulation for venovenous support, with reinfusion into the right atrium	
	Direct cannulation of the cardiac chambers (e.g. right atrium) or central vessels (e.g. aorta) through a thoracic incision, usually a median sternotomy. Central cannulation mav include	Napp LC, Vogel-Claussen J, Schäfer A, Haverich A, Bauersachs J, Kühn C, et
Central cannulation	cannulation through an open or partially closed sternum, or through the use of tunneled cannula with a closed sternum. Description of percutaneous access has been published [17], and thus, may be used in the fiture	A. THE SET THE THE THE THE THE THE THE THE THE T
Decannulation	The procedure of removal of a vascular cannula following termination of extracorporeal life	I
	Support A secondary cannula placed distal to a primary cannula used for distal arterial perfusion or distal venous drainage of limb vessels where	
Distal perfusion cannula	cannulation is performed. A distal cannula is typically connected to the associated primary cannula. Synonym: Distal perfusion cannula (when used for arterial perfusion), or distal	1
Double-lumen cannula.	drainage cannula (when used for venous drainage) see: Dual-lumen cannula. B - Terminology for cannulation concents	I
	A cannula with two internal lumens intended for placement in a major vein, one or both vena	
	cavae, the right atrium, and/or the humonary	I
Dual-lumen cannula	cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed B - Terminology for cannulatior for venovenous support. The alternative concepts application for dual-lumen cannulas is venoarterial for right ventricular support.	
Dual-lumen cannula Hybrid cannulation	cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. B - Terminology for cannulation concepts The combination of central and peripheral cannualtion of accesses of same circuit B - Terminology for cannulation	1
Dual-lumen cannula Hybrid cannulation Hybrid configuration	cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula.B - Terminology for cannulation conceptsThe combination of central and peripheral cannualtion of accesses of same circuitB - Terminology for cannulation conceptsThe combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA)B - Terminology for cannulation concepts	
Dual-lumen cannula Hybrid cannulation Hybrid configuration	cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula.B - Terminology for cannulation conceptsThe combination of central and peripheral cannualtion of accesses of same circuitB - Terminology for cannulation conceptsThe combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA)B - Terminology for cannulation conceptsThe M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula or cannula or cannula burger (dual human)	
Dual-lumen cannula -lybrid cannulation -lybrid configuration /l-number	 cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. The combination of central and peripheral cannualtion of accesses of same circuit The combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA) The M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula or cannula lumen (dual lumen cannula). The M-number can also be used for tubing flow and is then relater to length (per meter). Component M-numbers can be added for estimation of expected flow in the circuit 	
Dual-lumen cannula Hybrid cannulation Hybrid configuration	 cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. The combination of central and peripheral cannualtion of accesses of same circuit The combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA) The M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula. The M-number can also be used for tubing flow and is then relater to length (per meter). Component M-numbers can be added for estimation of expected flow in the circuit. Minimally invasive placement of a cannula into a vessel through the skin aided by the use of a cannula into a set of the skin aided by the use of a cannula into a	
Dual-lumen cannula Hybrid cannulation Hybrid configuration A-number	 cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. The combination of central and peripheral cannualtion of accesses of same circuit The combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA) The M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula or cannula lumen (dual lumen cannula). The M-number can also be used for tubing flow and is then relater to length (per meter). Component M-numbers can be added for estimation of expected flow in the circuit. Minimally invasive placement of a cannula into a vessel through the skin aided by the use of a minimal skin incision, placement of a guidewire and sequential dilation of the insertion tract, based on the Seldinger technique (20). Percutaneous cannulation may be aided by the 	Seldinger SI. Catheter replacement of the needle in percutaneous arteriography; a new technique. Acta Radiol 1953; 39: 368-376.
ybrid cannulation ybrid configuration -number ercutaneous cannulation	 cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. B - Terminology for cannulation concepts 	Seldinger SI. Catheter replacement of the needle in percutaneous arteriography; a new technique. Acta Radiol 1953; 39: 368-376.
bual-lumen cannula lybrid cannulation lybrid configuration l-number ercutaneous cannulation eripheral cannulation	 Cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas is evenoarterial for right ventricular support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. The combination of central and peripheral cannualtion of accesses of same circuit The combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA) The M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula, The M-number can also be used for tubing flow and is then relater to length (per meter). Component M-numbers can be added for estimation of expected flow in the circuit. Minimally invasive placement of a cannula into a vessel through the skin aided by the use of a minimal skin incision, placement of a guidewire and sequential dilation of the insertion tract, based on the Seldinger technique (20). Percutaneous cannulation may be aided by the use of ultrasound and/or fluoroscopic imaging. Cannula directed / flow direction in the opposite B - Terminology for cannulation concepts 	Seldinger SI. Catheter replacement of the needle in percutaneous arteriography; a new technique. Acta Radiol 1953; 39: 368-376.
bual-lumen cannula lybrid cannulation lybrid configuration I-number ercutaneous cannulation eripheral cannulation etrograde	 Cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. B - Terminology for cannulation concepts Cannulation of a vessel accessible by percutaneous cannulation radiomatication of a vessel accessible by percutaneous or direct surgical access without entering the thoracic or abdominal cavities. Cannula directed / flow direction in the opposite direction to normal physiology A variation of percutaneous cannulation in which a surgical incision is made to expose the vessel, with the concon cannulation concepts 	Seldinger SI. Catheter replacement of the needle in percutaneous arteriography; a new technique. Acta Radiol 1953; 39: 368-376.
Dual-lumen cannula lybrid cannulation lybrid configuration A-number 'ercutaneous cannulation letrograde 'emi-percutaneous cannulation	 Cavae, the right atrium, and/or the pulmonary artery. Most dual-lumen cannulas are designed for venovenous support. The alternative application for dual-lumen cannulas is venoarterial for right ventricular support. Synonym: Double-lumen cannula. The combination of central and peripheral cannualtion of accesses of same circuit The combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA) The M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula). The M-number can also be used for tubing flow and is then relater to length (per meter). Component M-numbers can be added for estimation of expected flow in the circuit. Minimally invasive placement of a cannula into a vessel through the skin aided by the use of a minimal skin incision, placement of a guidewire and sequential dilation of the insertion tract, based on the Seldinger technique (20). Percutaneous cannulation may be aided by the use of ultrasound and/or fluoroscopic imaging. Cannulation of a vessel accessible by percutaneous cannulation a vigical incision is made to expose the vessel, with placement of the guidewire and guided into the vessel under direct visualization. Synonyms: Semi-open cannulation semi-Seldinger cannulation 	Seldinger SI. Catheter replacement of the needle in percutaneous arteriography; a new technique. Acta Radiol 1953; 39: 368-376.
Dual-lumen cannula Hybrid cannulation Hybrid configuration M-number Percutaneous cannulation Peripheral cannulation Retrograde Semi-percutaneous cannulation Single-lumen cannula	cavae, the right atrium, and/or the pulmonary B - Terminology for cannulation artery. Most dual-lumen cannulas is B - Terminology for cannulation application for dual-lumen cannula. B - Terminology for cannulation The combination of central and peripheral B - Terminology for cannulation cannualtion of accesses of same circuit B - Terminology for cannulation The combination of at least two of the VV, VP, VA modes (Hybrid modes: VVA, VPA) B - Terminology for cannulation The M-number is a reciprocal to flow for a pressure gradient of 100 mmHg for agiven cannula. B - Terminology for cannulation Cannula, The M-number can also be used for tubing flow and is then relater to length (per meter). Component M-numbers can be added for estimation of expected flow in the circuit. B - Terminology for cannulation agiven cannula sin incision, placement of a guidewire and sequential dilation of the insertion tract, based on the Seldinger technique (20). B - Terminology for cannulation concepts Cannulation of a vessel accessible by percutaneous cannulation moder allowing in incision, placement of a cannula reside. B - Terminology for cannulation concepts Cannula directed / flow direction in the opposite direction to normal physiology B - Terminology for cannulation concepts A variation of percutaneous cannulation B - Terminology for cannulation concepts Cannula directed / flow direction in the opposite direct visualization. Synonyms: Semi-op	Seldinger SI. Catheter replacement of the needle in percutaneous arteriography; a new technique. Acta Radiol 1953; 39: 368-376.

direct vision following incision of the skin, B - Terminology for cannulation surgical exposure of the vessel(s), venotomy or/or arteriotomy, and placement of the cannula(s). Synonym: Open cannulation Surgical cannulation concepts

Vascular cannula

Vascular cannulation

Arterial filter

Bladder

Blood pump

Bridge

(FSCO2)

Heat exchanger

Heater-cooler unit

Loop

Sweep gas flow

Centrifugal blood pump

Device inlet carbon dioxide fraction

The unintended or accidental partial or complete removal of a vascular cannula during extracorporeal life support prior to intended termination. Synonym: Accidental decannulation B - Terminology for cannulation concepts Unplanned decannulation

Placement of a cannula into a vessel under

A plastic tube, inserted into the vascular system for drainage or reinfusion of blood, typically over for drainage or reinfusion of blood, typically over a trocar or dilator and optionally using a guidewire. Vascular cannulas may have metal reinforcement to assist in preserving its shape and prevent kinking. Often used interchangeably, B - Terminology for cannulation 'cannula' is preferred over 'catheter' since the latter does not typically involve a trocar or loading dilator, and the former is fully established in cardiovascular surgery and extracorporeal life support. Synonyms: Cannula (when the context of vascular cannula is understood)

The procedure of insertion of a vascular cannula into a patient for purposes of extracorporeal circulation. 'Cannulation' is preferred over concepts 'catheterization'. Synonym: Cannulation

A filter placed in the blood phase, typically as the last component in the circuit, that can capture particulates such as micro blood and gas emboli and prevent their infusion into the patient.

An optional venous reservoir in an ECLS circuit characterized by 1) small size, 2) completely enclosed design and 3) absence of air-blood interface. The term 'bladder' is historically well establiched and encourse winging to the second seco established and appears unique to extracorporeal life support.

A mechanical device, typically powered by an electric drive motor, that produces blood flow by creating a hydrodynamic pressure gradient between an inlet and outlet port.

A segment of circuit tubing component inserted between the drainage and reinfusion limbs near the cannulation connections, acting as a shunt for recirculating circuit blood when the cannulas are clamped or disconnected. It is commonly used to facilitate weaning from VA ECLS (21). The term 'bridge' is historically well established and appears unique to extracorporeal life support.



An axisymmetric blood pump that produces a hydrodynamic pressure gradient through rotational kinetic energy through the use of an impeller assembly. The impeller is sealed within an operating chamber and magnetically coupled to the drive motor.

The carbon dioxide fraction of the sweep gas supplied to the membrane lung, usually ranging from 0.01 to 0.05. The fraction is controlled by a rotameter or gas blender. Carbon dioxide may be mixed into the sweep gas in a physiologic concentration to manage respiratory alkalosis not amenable to sweep gas flow reduction, or as a means to assess the native lung's capacity for carbon dioxide clearance. Synonyms: FDCO2 (device inlet carbon dioxide fraction) C - Terminology for devices

A device which transfers heat between a recirculating water phase and the blood phase of the ECLS circuit, separated by a heat exchanging material, usually metal or plastic. Modern artificial membrane lungs have heat exchangers integrated into their design. C - Terminology for devices

A device which provides recirculating water at a controlled specified temperature to the heat c - Terminology for devices exchanger.

A membrane lung in which the membrane is formed into capillaries, or hollow fibers. In modern hollow fiber membrane lungs use extracapillary blood flow, in which blood flows in the region exterior to the fibers and gas flows in the region interior to the fibers. Hollow fiber membrane lung

A segment of narrow-diameter tubing inserted between the reinfusion and drainage limbs close to the inlet side of the pump and the outflow side of the membrane lung, acting as a low-flow shunt with the purpose of monitoring, blood sampling and administration of pharmaceuticals. C - Terminology for devices The loop is continuously open for low-flow oxygenator-to-pump recirculation. The loop allows for outlet blood gases assessments without risk for emboli being injected into the circuit after the membrane lung. Broman LM, Eriksson C, Frenckner B, Palmér K. Introducing the Loop for Circuit Access during Extracorporeal Membrane Oxygenation: Feasibility and Safety. J Extra Corpor Technol. 2019 Sep;51(3):175-178. An extracorporeal gas exchange device for transfer of oxygen and carbon dioxide by diffusion across a membrane between a blood phase and a gas phase. The term membrane lung is preferred since it describes the fundamental gas exchange interface (membrane) and the analogy with the natural lungs for exchange of both oxygen and carbon dioxide. Synonyms: Artificial lung, membrane oxygenator Membrane lung C - Terminology for devices oxygenator A peristaltic blood pump that produces a hydrodynamic pressure gradient through compression of a circular segment of tubing with C - Terminology for devices a roller (wiper) that rotates and positively displaces the fluid in the tube. Roller blood pump C - Terminology for devices Surface coating see: Surface modification see: Surface modification Surface lining C - Terminology for devices The application of compounds to the blood-

contacting surfaces of an extracorporeal circuit or circuit component for purposes of improving biocompatibility during extracorporeal support. Synonym: Surface coating, coated circuit Surface modification

The gas applied to the gas phase of the membrane lung. Oxygen, air, or air blended with oxygen are used for the sweep gas. In specialized circumstances, other gases such as carbon dioxide, volatile anesthetics or nitric oxide may be added. Sweep gas

The volumetric flow rate of sweep gas applied to the membrane lung. The volumetric sweep gas flow is controlled by an external flowmeter. Synonym: Sweep flow

The oxygen fraction of the sweep gas supplied to the membrane lung, usually ranging from 0.21 to 1.0. The fraction is controlled by a gas blender. The abbreviation is intended to distinguish it from FiO2, which is the inspired oxygen fraction provided to the patient through the airway. Synonyms: FDO2 (device inlet oxygen fraction) Sweep gas inlet oxygen fraction (FSO2) C - Terminology for devices

The ratio of sweep gas flow to blood flow in a membrane lung, usually expressed relative to unit blood flow. A sweep gas:blood flow ratio of C - Terminology for devices 1:1 indicates a volumetric sweep gas flow equal Sweep gas:blood flow ratio (QG/QB) to the volumetric blood flow.

A crystalloid circuit prime with added albumin. It is free of banked blood products. Synonym: D - Terminology for Circuit Colloid prime Albumin prime A crystalloid or albumin circuit prime with added D - Terminology for Circuit banked red blood cells, optionally with plasma. Operation Blood prime

The occurrence of vapor cavities or voids in the blood phase that result from a rapid decrease in fluid pressure. In the ECLS circuit these voids can occur where negative pressures develop, such as near or at the blood pump inlet, and are usually transient (inertial cavitation). Cavitation The physiologic solution introduced into the ECLS circuit prior to initiating support, displacing D - Terminology for Circuit Operation Circuit prime all air in the circuit.

A circuit prime consisting of isotonic, usually balanced electrolyte, crystalloid solutions, optionally with additional electrolytes such as calcium. It is free of albumin or banked blood products. Synonym: Clear prime, Saline prime D - Terminology for Circuit Operation Crystalloid prime

Differential hypoxemia	A pattern of hypoxemia in which arterial saturation differs between circulatory beds and is low in at least one of the regions, usually between the lower body and all or part of the upper body (27). This pattern of hypoxemia is exclusively associated with VA ECMO via peripheral, and in particular femoral, cannulation. Synonyms: Regional hypoxemia, Dual-circuit circulation on VA ECMO, North-South phenomena, Harlequin phenomena	D - Terminology for Circuit Operation	Kitamura M, Shibuya M, Kurihara H, Akimoto T, Endo M, Koyanagi H. Effective cross-circulation technique of venoarterial bypass for differential hypoxia condition. Artif Organs 1997; 21: 786-788; Hou X, et al. Superior vena cava drainage improves upper body oxygenation during veno-arterial extracorporeal membrane oxygenation in sheep. Crit Care 2015;19:68
Differential hypoxia	see Differential hypoxemia	D - Terminology for Circuit Operation	
Discontinuation trial	The procedure of temporarily removing a patient from extracorporeal support for the purpose of assessing continued need for support. The discontinuation trial procedures will vary depending on the type of support, type of blood pump, and presence or absence of a bridge. Synonym: Trial off	D - Terminology for Circuit Operation	
Drainage	Drainage is the process of removal of blood from the vascular system for purposes of extracorporeal circulation. The cannula(s) used to effect drainage are referred to as drainage cannulas. The term drainage is preferred over alternative terms such as 'venous limb' or 'venous cannula' since drainage may occur from cannulation of either a vein or an artery.	D - Terminology for Circuit Operation	
ECLS discontinuation	Removal of extracorporeal circuit flow to the	D - Terminology for Circuit	
FCI S explantation	The procedure encompassing both discontinuation of extracorporeal support and	D - Terminology for Circuit	
	decannulation.	Operation D - Terminology for Circuit	
ECLS initiation	and initiation of extracorporeal circuit flow. Initiation of extracorporeal circuit flow to the patient following cannulation and circuit connection to cannulas.	Operation D - Terminology for Circuit Operation	
Effective extracorporeal flow (QEFF)	The fraction of total extracorporeal blood flow that contributes to oxygen delivery to the patient, calculated as QEFF = QEC(1-Rf), representing the recirculation flow subtracted from total extracorporeal flow.	D - Terminology for Circuit Operation	
Extracorporeal flow fraction (EFF)	The fraction of total systemic blood flow captured by the extracorporeal circuit.	I D - Terminology for Circuit Operation	
Global hypoxemia	A pattern of hypoxemia in which arterial saturation is low and consistent throughout the arterial circulation. This pattern of hypoxemia is usually associated with VV ECMO. Synonym: Systemic hypoxemia	D - Terminology for Circuit Operation	
Gravity drainage	The use of a hydrostatic column of blood in the venous drainage limb to assist venous drainage. It is achieved by elevating the patient relative to the level of the blood pump. Gravity drainage produces a positive pressure at the pump inlet relative to ambient pressure. It can be used with any blood pump technology, but is the only drainage assist that can be used with roller blood pumps.	D - Terminology for Circuit Operation	
Harlequin syndrome	see Differential hypoxemia	D - Terminology for Circuit Operation	
Inlet saturation (SPREO2)	The oxygen saturation of hemoglobin measured at the inlet of the membrane lung. Synonym: drainage saturation, pre-membrane lung saturation, pre-oxygenator saturation	D - Terminology for Circuit Operation	
Kinetic drainage	The use of a pump-generated controlled suction on the venous drainage limb of the circuit to assist venous drainage. At present this is only a capability of centrifugal blood pumps, and is achieved and controlled through the rotational speed of the blood pump.	D - Terminology for Circuit Operation	
Left ventricular unloading	A procedure intended to mechanically assist ventricular ejection into the aorta during ECLS. Unloading procedures include intra-aortic balloon counterpulsation and trans-aortic axial pump support.	D - Terminology for Circuit Operation	
Left ventricular venting	Drainage of blood flow from the left heart during ECLS through a route other than the primary drainage cannula. Venting techniques include left atrial venting catheter placement, atrial septostomy, pulmonary valve stenting, pulmonary artery drainage catheter placement, and left ventricular apical drainage. Venting procedures drain blood into the circuit or right heart, but do not return blood to the aorta.	D - Terminology for Circuit Operation	
Membrane pressure drop (ΔP)	The pressure gradient between the inlet and outlet of the membrane lung, calculated as the difference between the post-membrane and pre- membrane pressures (PPRE - PPOST). The term transmembrane pressure has been used in this context, but this technically refers the pressure gradient across the diffusion membrane itself between the gas and blood phases. Synonym: Delta P	D - Terminology for Circuit Operation	
North-South phenomenon	see Differential hypoxemia	D - Terminology for Circuit Operation	
Outlet saturation (SPOSTO2)	The oxygen saturation of hemoglobin measured at the outlet of the membrane lung. Synonym: post-membrane lung saturation, post-oxygenator	D - Terminology for Circuit Operation	
	saturation he fluid pressure in the blood phase at the outlet	D - Terminology for Circuit	
Post-memorane pressure (PPOST)	of the membrane lung.	Operation	
Pre-membrane pressure (PPRE)	to the membrane lung.	Operation	
Pump inlet pressure (PINLET)	roller or centrifugal pump. Synonym: Pre-pump pressure	D - Terminology for Circuit Operation	
Pump-controlled retrograde discontinuation trial	A discontinuation trial during VA support in which the centrifugal blood pump speed is reduced to allow a small, controlled amount of retrograde blood flow (28). This type of discontinuation trial requires a non-occlusive (centrifugal) blood pump.	D - Terminology for Circuit Operation	Westrope C, Harvey C, Robinson S, Speggiorin S, Faulkner G, Peek GJ. Pump controlled retrograde trial off from VA-ECMO. ASAIO J 2013; 59: 517-519.
Rated flow	An industry-standard rating of membrane lung oxygen transfer performance. It is defined as the blood flow at which a specified inlet blood saturation (typically 75%) is raised to a specified outlet blood saturation (typically) 95% under conditions of a specified hemoglobin (typically) 12 g/dl, a sweep gas:blood flow ratio of 1:1 (25, 26).	D - Terminology for Circuit Operation	Holdefer WF, Tracy WG. The use of rated blood flow to describe the oxygenating capability of membrane lungs. Ann Thorac Surg 1973; 15: 156- 162; Lequier L, Horton SB, McMullan DM, Bartlett RH. Extracorporeal membrane oxygenation circuitry. Pediatr Crit Care Med 2013; 14: S7-12.
Recirculation	Recirculation is the phenomenon observed during venovenous ECLS in which a portion of the reinfused blood from the circuit is returned to the circuit through the drainage cannula instead of flowing to the patient (22, 23). Recirculation is limited to venovenous (or venovenoarterial) cannulation only, since the other modes reinfuse into a separate portion of the circulation.	D - Terminology for Circuit Operation	Abrams D, Bacchetta M, Brodie D. Recirculation in venovenous extracorporeal membrane oxygenation. ASAIO J 2015; 61: 115-121.; Broman M, Frenckner B, Bjallmark A, Broome M. Recirculation during veno-venous extra-corporeal membrane oxygenation- -a simulation study. Int J Artif Organs 2015; 38: 23-30.
Recirculation fraction (Rf)	The fraction of total extracorporeal flow (Qec, as measured by reinfusion flow to the patient) that is recirculated (Qrec, flowing directly from the reinfusion cannula into the drainage cannula), calculated as Rf = Qrec/Qec (24).	D - Terminology for Circuit Operation	Palmer O, Palmer K, Hultman J, Broman M. Cannula Design and Recirculation During Venovenous Extracorporeal Membrane Oxygenation. ASAIO J 2016; 62: 737-742.
Return	Return is the process of returning blood from the extracorporeal circuit to the vascular system for purposes of extracorporeal circulation. The cannula(s) used to effect blood return are referred to as return or reinfusion cannulas. The term return is preferred over alternative terms such as 'arterial limb' or 'arterial cannula' since return may occur using cannulation of either an artery or a vein. Synonym: Reinfusion	D - Terminology for Circuit Operation	
Weaning trial	The procedure of a reduction in circuit flow with assessment of patient response with the intention of discontinuation of ECLS.	D - Terminology for Circuit Operation	