

台灣體外維生系統學會

2026 基礎考照課程

DAY 1: FUNDAMENTAL KNOWLEDGE OF ECLS



2026/08/22 (W6) 08:00-16:30



台大醫院臨床研究大樓9樓外科部會議室 (台北市中正區中山南路7號)

Time	Topic	Speaker
08:00 08:30	報到	
08:30 08:40	Welcome and opening	周迺寬 榮譽理事長
08:40 09:20	Introduction, course overview, and current status in Taiwan	周迺寬 榮譽理事長/台大醫院
09:30 10:10	History of Extracorporeal Life Support (ECLS)	周迺寬 榮譽理事長/台大醫院
10:10 10:30	Break	
10:30 11:10	Physiology of respiratory system, respiratory failure and ARDS (Diagnosis and medical management)	廖庭涓 醫師/台大醫院
11:20 12:00	Physiology of circulatory system, cardiac failure and cardiogenic shock (Diagnosis and medical management)	葉育彰 教授/台大醫院
12:00 13:00	Lunch	
13:10 13:50	The circuit, configuration, nomenclature and physiology of ECLS	韋凌亦 醫師/台大醫院
14:00 14:40	Inflammation, coagulation pathway and anti- coagulation in ECLS patients	許博順 主任/三軍總醫院
14:40 15:00	Break	
15:00 15:40	Cannulation and vascular access	蔡孝恩 主任/台大新竹分院
15:50 16:30	Nutrition support	賴聖如 營養師/台大醫院

[活動內容若有異動，請依當日議程公告為主]



台灣體外維生系統學會

2026 基礎考照課程



2026/08/23 (W1) 08:30-15:30



台大醫院臨床研究大樓9樓外科部會議室 (台北市中正區中山南路7號)

DAY 2: SPECIAL CHAPTERS OF ECLS

Time	Topic	Speaker
08:30 08:40	報到	
08:40 09:20	ECMO in neonatal and pediatric patients	周恒文 醫師/台大醫院
09:30 10:10	Extracorporeal cardiopulmonary resuscitation (ECPR)	李紹榕 主任/雙和醫院
10:10 10:30	Break	
10:30 11:10	Mechanical dysfunction of ECLS	賴建亨 護理師/台大醫院
11:20 12:00	Complication of ECLS	曹乃文 醫師/仁愛醫院
12:00 13:00	Lunch	
13:10 13:50	Air transport of ECLS	陳琬琳 醫師/雙和醫院
14:00 14:40	The TEAM: how to work as a ECMO team	李紹榕 主任/雙和醫院
14:50 15:30	Q and A and closing remarks	王植賢 秘書長

【活動內容若有異動，請依當日議程公告為主】

摘要

Introduction, course overview, and current status in Taiwan 周迺寬 榮譽理事長

ECMO has accepted as bail-out procedure for all critical conditions, and it already becomes a daily medical procedure. The course of the training in ECMO is designed basic knowledge in ECMO. The invited speakers are all well-known speaker with excellent experience. These lectures include history of ECMO and the development, VA ECMO physiology, VV ECMO application, ARDS pathophysiological change, and the configuration of ECMO. You will learn more about the latest device and the pump in the market in Taiwan.

We also require the registration program in Taiwan since we are the leading role in Asia, but we still do not have good registration program. The good registration is mandatory for our society, and hop all the members will join to the program.

History of Extracorporeal Life Support (ECLS) 周迺寬 榮譽理事長

體外維生系統的技術是心臟外科手術延續過來。1960 年他在波士頓兒童醫院擔任住院醫師。先天性心臟病死亡率達到 50%，回溯起來知道這是因為心臟冬眠，如果讓這些病童開心手術所用的人工心肺機轉換為床邊體外循環維生持續照顧幾天。ECLS 對於成年的急性呼吸窘迫症候群，臨床實驗研究計畫停止了 20 多年，但是臨床還是在進行，在 1990 年義大利 Luciano Gattinoni 醫師繼續使用體外維生系統 ECLS 治療成年的急性呼吸窘迫症候群，其中基本上沒有進行 ECLS 治療成年的臨床實驗研究計畫，在美國國家衛生研究院 NIH 支持，ECLS 治療大小朋友的心臟手術，成果非常好。

Physiology of respiratory system, respiratory failure and ARDS (Diagnosis and medical management)

廖庭洳 醫師

這門課程將探討呼吸生理學與重症照護。我們將從肺泡氣體交換的基礎生理機制出發，介紹不同型態的呼吸衰竭。課程重點聚焦於臨床常見的急性呼吸窘迫症候群 (ARDS)，依據最新的治療準則，討論診斷與嚴重度分級。治療上將從氧氣治療、高流量氧氣裝置、非侵入性通氣，到 ARDS 關鍵的「保護性肺通氣策略」(低潮氣容積、高 PEEP 等) 與俯臥通氣治療。

Physiology of circulatory system, cardiac failure and cardiogenic shock (Diagnosis and medical management) 葉育彰 教授

本課程介紹循環系統生理、血流動力學監測、心臟衰竭與心因性休克之診斷與處置。內容涵蓋心輸出量、平均動脈壓、氧氣輸送與微循環概念，並說明 CVP、MAP、ScvO₂ 等靜態指標限制，強調乳酸清除率、PPV、SVV、心輸出量監測與床邊心臟超音波之臨床應用。課程亦探討心因性休克的低血壓、低灌注表現與可逆病因處理，最後提出以實證、個別化及多參數整合為核心的未來重症照護方向。

The circuit, configuration, nomenclature and physiology of ECLS 韋凌亦 醫師

Introduction

- **ECLS (Extracorporeal Life Support)**：一種用於替代患者心肺功能的體外循環支持技術。主要應用於心肺功能衰竭無法通過常規治療恢復的患者。

Circuit

- **Basic Components :**
 - **Pump** : 通常使用離心泵或軸流泵，以驅動血液循環。
 - **Oxygenator** : 用於進行氣體交換，提供氧氣並去除二氧化碳。
 - **Heat Exchanger** : 調節血液溫度。
 - **Cannulae and Tubing** : 用於連接患者和 ECLS 系統，確保血液在體內外之間循環。

Configuration

- **Veno-Arterial (VA) ECLS** 。
- **Veno-Venous (VV) ECLS** 。

Nomenclature

Physiology

- **Hemodynamics :**
 - **VA ECLS** : 提供系統性血液循環，減少心臟負擔，穩定血流動力學。
 - **VV ECLS** : 增強肺部氧合，不影響心臟負擔，改善氧氣供應。
- **Gas Exchange :**
 - **Role of the Oxygenator** : 模擬肺部功能，實現氧氣和二氧化碳的交換。
 - **Patient Management** : 需要持續監測血氣和調節氧合器參數。

Conclusion

- ECLS 是一種複雜但極為重要的生命支持技術，在重症醫學中扮演關鍵角色。了解其迴路、配置、命名及生理學有助於更好地應用和管理這一技術，從而提高患者的生存率和生活質量。

Inflammation, coagulation pathway and anti-coagulation in ECLS patients 許博順 主任

Anticoagulation is crucial during mechanical circulatory support (MCS). Its purpose is to prevent blood from clotting within the extracorporeal circulation system, ensuring smooth blood flow and avoiding complications such as embolism. During extracorporeal circulation, blood leaves the body and comes into contact with nonphysiological surfaces, which can easily trigger coagulation reactions and form thrombi. These thrombi might block the oxygenator or other components, leading to malfunction of the MCS and even endangering the patient's life. Coagulation reactions increase blood viscosity, impairing blood flow within the extracorporeal circulation system, reducing the efficiency of oxygen and nutrient delivery, and thus compromising the effectiveness of extracorporeal circulation support. Thrombi will also break off and enter the patient's body with the bloodstream, causing embolism and leading to serious complications such as pulmonary embolism and cerebral embolism, which can be life-threatening. Effective anticoagulation measures ensure the proper functioning of the extracorporeal circulation system, provide adequate cardiopulmonary support, buy patients valuable treatment time, and prevent thrombus formation. This lecture is aim to educate clinical physicians and perfusionist about anticoagulation measures to optimize the benefit of MCS, and to improve the patient survival and quality of life.

Cannulation and vascular access 蔡孝恩 主任

Extracorporeal Membrane Oxygenation (ECMO) is a critical intervention for patients with severe cardiac and/or respiratory failure, relying on precise cannulation and vascular access. This speech compares echo-guided cannulation and surgical cannulation.

Echo-Guided Cannulation: Utilizes real-time ultrasound to visualize structures, guiding needle puncture for accurate cannula placement. This method enhances accuracy, reduces complications, and allows faster insertion, making it ideal for peripheral access.

Surgical Cannulation: Involves direct vessel exposure via a cutdown approach, allowing clear identification and cannulation. It offers greater control and is preferable for central cannulation, especially in complex anatomies or surgical settings.

Comparison: Echo-guided cannulation is favored for peripheral access due to its minimally invasive nature and efficiency. Surgical cannulation remains vital for central access and challenging cases. The choice depends on patient-specific factors and clinical context.

Conclusion: Mastery of both techniques is essential for optimal ECMO initiation, ensuring the best patient outcomes.

Nutrition support 賴聖如 營養師

ECMO 是一種用於重症患者的生命支持技術，能夠在心肺功能衰竭時提供氧合和血液循環支持。然而，這些患者可能合併組織損傷、凝血障礙、器官灌注不足、休克、免疫失衡以及感染風險，對生命構成重大挑戰，同時是營養不良高風險者，由於代謝需求增加，需全面考量代謝壓力下的生理變化、組織修復需求以及病人個別的差異。近年來，營養治療在各方面取得了突破性的進展，包括各營養素介入時間、使用劑量、達成目標等將在課程中予以解析。最後，我們將強調多學科團隊合作在提供有效營養支持中的角色，包括醫生、營養師和護理人員的協作。通過這場演講，我們希望提升對 ECMO 患者營養需求的認識，並促進最佳的臨床應用。

ECMO in neonatal and pediatric patients 周恒文 醫師

Extracorporeal membrane oxygenation (ECMO) is a well-known means of advanced life support in patients with significant cardiorespiratory impairment refractory to conventional therapeutic interventions. Due to favorable results and a steady decline in absolute contraindications, its use is increasing worldwide. Indications in children differ from those in adults. The ECMO circuit as well as cannulation strategies also are individualized, considering their implications in children. The aim of this talk is to review the clinical indications, different circuits, and cannulation strategies for ECMO in neonatal and pediatric patients.

Extracorporeal cardiopulmonary resuscitation (ECPR) 李紹榕 主任

本課程將介紹 ECPR 的基本概念及臨床應用，說明其在難治性心跳停止患者中的角色與重要性。課程將回顧目前相關研究證據，探討 ECPR 對病人存活率及神經學預後的影響，並分析其臨床效益與限制。此外，課程將說明 ECPR 的適應症與禁忌症，協助學員掌握病人選擇原則。由於 ECPR 的成功

執行高度仰賴跨專業合作，課程亦將介紹團隊導向的運作模式與流程設計。最後，將系統性說明 ECPR 各階段，包括病人辨識、啟動準備、體外循環建立、病因治療及後續照護，使學員能全面理解 ECPR 的執行架構與臨床實務重點。

Mechanical dysfunction of ECLS 賴建亨 護理師

ECMO 照護的過程，90%時間平靜無事，10%則為各種不同因素造成 ECMO 功能不良如流量降低、斷電等。ECMO 運用於嚴重心肺衰竭患者，若 ECMO 系統功能不良未能及時偵測與處理，可能對重症患者產生嚴重的合併症。故認識 ECMO 系統功能不良的成因，預防方式與處置方式就是 ECMO 照護的重要基本知識。本課針對”機器壞掉”方面向學員介紹 ECMO 功能異常之成因與處置。

Complication of ECLS 曹乃文 醫師

建立 ECMO 團隊，需要相當漫長的學習曲線，既要知識密集，也要人力密集。

團隊需要重症、心內外、感染、呼吸治療、營養等跨科際合作；患者需要全方位照顧，尤其是治療中發生多發器官衰竭患者的照護。無論西方還是東方，ECMO 發展早期因為醫療人員尚未了解 ECMO 的適應症與禁忌症，存活率都不理想，經由 ECMO 團隊、加護病房團隊持續的經驗累積與學習，才漸入佳境。

ECMO 的成敗非常倚賴加護病房護理人員的照顧能量，他們的照護守備範圍相當廣，各醫院加護病房的風格可以展現在許多細節上。此課程將介紹常見的併發症與其處理。

Air transport of ECLS 陳琬琳 醫師

Extracorporeal membrane oxygenation (ECMO) is a life-saving intervention for patients with refractory circulatory and respiratory failure. Access to ECMO care is frequently determined not by candidacy but by geography, making timely interfacility transport a critical determinant of outcomes.

International SOS has safely transported ECMO-dependent patients internationally by air, demonstrating that fixed-wing transport on extracorporeal life support is both safe and operationally feasible. ECMO transport requires a multidisciplinary team — including physicians, critical care nurses, and ECMO specialists or perfusionists — and combines the logistical challenge of transferring not only the patient but the ECMO circuit, ventilator, intravenous lines, and medication infusions. The standard circuit must be substantially modified for the aerospace environment due to space, weight, and altitude constraints. The team must be entirely self-sufficient in equipment, with blood products as the principal exception. Airframe selection is governed by distance, weather, and payload capacity. Predominant complications involve mechanical and electrical failures, oxygenator issues, and international regulatory hurdles including customs, immigration, and quarantine.

Recent advances have significantly reshaped the field. Purpose-built transport ECMO systems such as Medtronic's VitalFlow have received regulatory clearance for use in ambulances and both fixed- and rotary-wing aircraft. ELSO now mandates structured protocols, checklists, and simulation-based training for transport teams, with the 2025 ELSO Training Guideline formalizing competency standards. Prehospital

ECPR programs using mobile ECMO units have demonstrated feasibility and comparable survival outcomes to in-hospital programs when low-flow times are matched. Telemedicine and AI-assisted monitoring are emerging as real-time decision-support adjuncts.

Transport of patients on extracorporeal life support by air remains safe and effective, and the field is rapidly evolving toward networked, prehospital-integrated care models that extend ECMO access across geographic and institutional boundaries.

The TEAM: how to work as a ECMO team 李紹榕 主任

體外膜氧合器（extracorporeal membrane oxygenation，ECMO）是一種最高階的生命支援手段，能為患者提供心肺功能支持，為常規生命支持無效的急危重患者贏得寶貴搶救時間。ECMO 也在 2019 年新型冠狀病毒肺炎（新冠肺炎）危重症患者的救治中發揮了重要作用。ECMO 的準備和實施流程是否高效直接影響患者的救治效率和預後，而建立專業規範的 ECMO 快速反應團隊不僅能提高搶救效率，而且對改善護理品質和患者預後也尤其重要。