NATIONAL EXTRACORPOREAL MEMBRANE OXYGENATION

2nd NECMO CONFERENCE

MALAYSIAN CARDIOTHORACIC ANAESTHESIOLOGY AND PERFUSION SOCIETY

"ECMO: Breakthroughs, Best Practices and Beyond"

2nd - 4th OCTOBER 2025
Le MERIDIEN PUTRAJAYA

co-organised with

CARDIOTHORACIC ANAESTHESIOLOGY & PERFUSION
HOSPITAL SULTAN IDRIS SHAH

endorsed by

MALAYSIAN SOCIETY OF ANAESTHESIOLOGISTS
COLLEGE OF ANAESTHESIOLOGISTS, AMM

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WELCOME SPEECH

DIRECTOR GENERAL OF HEALTH

Assalamualaikum warahmatullahi wabarakatuh.

Yang Berbahagia Dato' Dr Jahizah Hassan,
President, Malaysian Cardiothoracic Anesthesiology and Perfusion Society

Yang Berbahagia Dato' Dr Norly Ismail
Organising Chairperson, 2nd National Extracorporeal Membrane Oxygenation Conference

Yang Berusaha Dr Mohd Rohisham Zainal Abidin,
Head of Anaesthesiology and Critical Care Speciality, Ministry of Health

Yang Berusaha Dr Hasmizy Muhammad,
Scientific Chairman,

Distinguished speakers, delegates, ladies and gentlemen,

I wish to congratulate the **Malaysian Cardiothoracic Anaesthesiology and Perfusion Society (MASCAP)** on the organisation of your **2nd National Extracorporeal Membrane Oxygenation Conference,** with the theme **"ECMO: Breakthroughs, Best Practices, and Beyond."**

Extracorporeal Membrane Oxygenation (ECMO), a sophisticated life support system that takes over the functions of the heart and lungs. The adoption of ECMO in Malaysia has been a gradual but steady process. While the technology has existed for decades, its application in Malaysia has seen significant growth in the last 10 to 15 years.

The Ministry of Health (MOH) has been instrumental in expanding ECMO services. Key government hospitals with ECMO capabilities include Hospital Sultan Idris Shah, Serdang, Hospital Pulau Pinang, and Sarawak Heart Centre. The other ECMO provider is the National Heart Institute.

Together, these MOH centres represent a coordinated effort that has directly impacted the lives of nearly 200 patients and their families. This remarkable progress is a direct result of the hard work and commitment of many people in this very room.

The MOH's primary role in the ECMO program is established through its **"Policy for Anaesthesiology and Intensive Care Services."** This foundational document delineates the perfusion support for extracorporeal membrane oxygenation (ECMO).

The MOH provides opportunities for its medical specialists to undergo short-term training in Extracorporeal Membrane Oxygenation (ECMO) overseas twice in 2013 and 2025 through the Hadiah Latihan Persekutuan (HLP). This strategic effort is crucial for building local expertise, enhancing the quality of critical care services in the country, and establishing centers of excellence within MOH hospitals.

While the expansion of ECMO services in Malaysia is a positive development, challenges remain. These include the high cost of equipment and consumables, the need for a sustained pool of highly trained and experienced personnel, and ensuring equitable access to this resource-intensive therapy across different regions of the country.

I am confident this conference will deliver valuable insights, networking, and inspiration to the participants. Your theme is not merely a slogan. It is a commitment to empower every healthcare team member, apply safety protocols in ECMO procedures, and extend these standards to ECMO providers in Malaysia.

Finally, my deepest gratitude goes to the scientific and organizing committee for their tireless efforts and to all of you for your participation.

Thank you, and I wish you all a stimulating and rewarding conference.

Datuk Dr Mahathar bin Abd Wahab
DIRECTOR GENERAL OF HEALTH, MALAYSIA
October 2025

President
Malaysian Cardiothoracic Anaesthesiology & Perfusion Society (MASCAP)

Dear Colleagues,

It is with great enthusiasm that we welcome you to the 2nd NECMO Biennial Conference: Breakthroughs and Beyond, to be held from October 2–4, 2025, at Le Meridien Hotel.

This year's conference is dedicated to those at the heart of ECMO care — cardiac anaesthesiologists, perfusionists, intensive care nurses, intensivists, and the entire multidisciplinary team whose expertise and dedication make life-saving interventions possible every day.

Building on the success of our inaugural event, the 2025 edition will delve deeper into the evolving landscape of ECMO through advanced clinical practices, team-based simulations, real-world case discussions, and the latest innovations in technology and patient management.

This is more than a conference — it's a platform to connect, learn, and collaborate across disciplines. Whether you're at the bedside, in the OR, or behind the circuits, your role is essential — and this program is designed with you in mind.

We look forward to seeing you in October as we push the boundaries of what's possible in ECMO, together.

Warm regards,

Dato Dr Jahizah Hassan
President MASCAP

Organizing Chairman

Assalamualaikum wbt and warm greetings. With great honour and immense pride, I welcome you to the 2nd National Extracorporeal Membrane Oxygenation (NECMO) Conference.

As we know, the successful organization of the 1st NECMO in 2023 has marked a significant milestone in the landscape of critical care in Malaysia. The conference was met with overwhelming participation, positive feedback, and strong multidisciplinary engagement, clearly reflecting the growing interest and commitment towards advancing ECMO practices in our healthcare system. That momentum has brought us here today, to the 2nd NECMO, which we believe will become a catalyst for even greater transformation.

This year, we take a bold step forward. While continuing to highlight the crucial roles of physicians and other stakeholders, the 2nd NECMO shines a spotlight on a vital yet often under appreciated pillar of ECMO team — our nurses & Perfusionists. They are the heartbeat of ECMO management & care, and their knowledge, vigilance, and clinical judgement are indispensable. This conference aims to strengthen their presence, empower their voice, and elevate their role within the ECMO team.

At its core, the NECMO series is not merely about lectures or presentations — it is about building a vision. A vision to advancing ECMO services in Malaysia, making them more accessible, efficient, and aligned with international standards. We aspire to see Malaysia's ECMO capabilities evolve into a highly coordinated, technology-driven, and evidence-based service, one that rivals leading ECMO centers globally.

On behalf of the Malaysian Society of Cardiothoracic Anesthesiology & Perfusion (MASCAP), I would like to extend my deepest appreciation to the Scientific Committee, led by Dr Hasmizy and our local Organizing committee for their best efforts and dedication in making this 2nd NECMO a total success. Tremendous gratitude also to Ministry of Health (MOH) Malaysia and medical industry for the unwavering support given to MASCAP in organizing this noble prestigious conference.

May this conference inspire you, challenge your perspectives, and ignite meaningful conversations. Let this be more than just an event — let it be a movement.

Thank you, and I wish all of you a fruitful, engaging, and memorable experience at the 2nd NECMO.

Dato' Dr Norly Binti Ismail
Organizing Chairman
2nd National Extracorporeal Membrane Oxygenation Conference

Scientific Chairman

The warmest welcome to all delegates attending the 2nd National Extracorporeal Membrane Oxygenation Conference 2025 from 2nd to 4th October 2025 at Le Meridien Putrajaya. It is a great pleasure to have the Malaysian Cardiothoracic Anaesthesiology and Perfusion Society (MASCAP) host this event for the second time.

Our theme for this year, "ECMO: Breakthroughs, Best Practices and Beyond," is more than just a title; it is our guiding principle. It reflects our commitment to not only mastering the current standards of care but also to embracing the future of this life-saving technology. We will explore the latest breakthroughs that are reshaping the field, consolidate our understanding of best practices to ensure optimal patient outcomes, and dare to look beyond the horizon at the future possibilities that lie ahead.

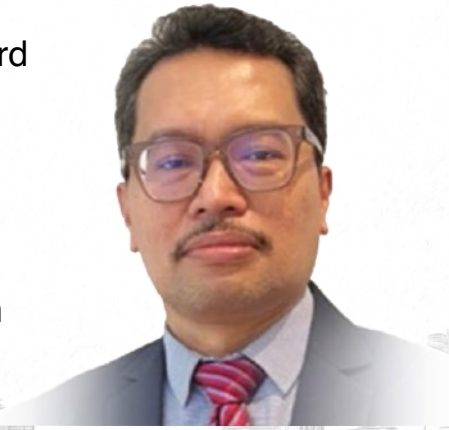
Over the next three days, you will be immersed in a comprehensive scientific program meticulously crafted for doctors, perfusionists and nurses. We are proud to feature six plenaries, 15 symposia, two dedicated lunch symposia, and workshops providing a wide array of topics and perspectives. The knowledge and expertise you will gain are invaluable, and the opportunities for networking with fellow colleagues and experts will be transformative.

Our success is driven by the calibre of our speakers. We are privileged to have eight distinguished overseas speakers joining us, bringing their global insights and experiences. They will be complemented by 26 of our own leading local experts, whose dedication and contributions have been instrumental in advancing ECMO care here in Malaysia.

I would like to extend my heartfelt thanks to the organizing committee, our generous sponsors and finally the Ministry of Health Malaysia for their unwavering support. To all the delegates, I encourage you to participate actively, engage in lively discussions, and forge new professional relationships. Let us seize this opportunity to learn from one another, challenge our assumptions, and collectively push the boundaries of what is possible in ECMO.

Thank you once again for your presence. We look forward seeing you at the event.

Thank you.



Dr Hasmizy Muhammad
Scientific Chairman
2nd National Extracorporeal Membrane Oxygenation

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LOCAL ORGANIZING COMMITTEE

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CHAIRPERSON
NORLY ISMAIL

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NURIN BADRINA BAHARUDIN
NUR AMALINA SAIDAN
NURMITHALI ZAINAL
ZARINA NATASHA SHIR BADAR KHAN

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LEE KOK TONG
NG YEW EWE
MOHD IZWAN AZMI MUDA

EXHIBITION
MOHD SHAFERO MOHD ZAHID
MOHD SHAHRULNIZAL MOHD SAAD
HERMI SAFIAN

AUDIO-VISUAL / PUBLICITY
HASLAN GHAZALI
ANWARUL ARIFIN AHMAD
AKMAL FAIZ RAZALI
MUHAMMAD NABIL AMIN NOR AZ AZLAN
MOHD FADZLI MD DAUD

LOGISTICS
MUHAMMAD HELMI LOKMAN
MOHD HAMIDY ZAINOL RASHID
ROMMY BOWIE VINCENT
MOHAMAD FARDI OTHMAN

SOCIAL
NUR ELIEYANA HANANIE MOHD SHUKRI
MUHAMMAD SAFWAN KHALILI
SYAFIQ SOFIYAN
WAN MOHAMAD FIRDAUS OMAR
NURRUL HAFIZAH YUSOF

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NOORDINI MOHAMED DANI
MOHD KHAIRUL ANWAR A. RAHIM

FACULTY

INTERNATIONAL SPEAKERS

ABDURRAHMAAN ALI ELBUZIDI (QATAR)

AHMED LABIB SHEHATTA (QATAR)

ALHADY ALFIAN YUSOF (QATAR)

FAROOK AHMAD (UK)

SIMON SIN WAI CHING (HONG KONG)

KUN ARIFI ABBAS (INDONESIA)

NBAL MOHAMMED SHPAT (QATAR)

THOMAS MULLER (GERMANY)

LOCAL SPEAKERS

HASMIZY MUHAMMAD

JUSMIDAR ABDUL JAMIL

MOHAMAD HANAFI MOHD

AZMIZA MAHARANI

FACULTY

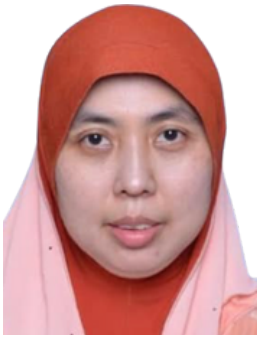
LOCAL SPEAKERS

LEE KOK TONG

NG YEW EWE

MOHD IZWAN AZMI MUDA

MOHAMAD HAFFIZ CHE MORAD



ANI SURAYA ABDUL GHANI

YONG CHOW YEN

SUNETA SULAIMAN

HASLAN GHAZALI

ISQANDAR ADNAN

MOHD KHAIRUL ANWAR A. RAHIM

KHAIRUNNADIAH KAMARUZZAMAN

NORHAYATI ANUAR

ARIFFIN MARZUKI MOKHTAR

AHMAD FAIS ABU SEMAN

MUHAMMAD HELMI LOKMAN

MUHAMMAD FIKRI ABDUL HALIM

FACULTY

LOCAL SPEAKERS

NURRUL HAFIZAH YUSOF

SYAFIQ SOFIYAN

ABDUL HALIM ABDUL HAMID

VATANA V SUNDAR

MOHD FITRY ZAINAL

ANDY SHERMAN KHUNG

THAVANI THAVARAJASINGAM

KAMILAH MUHAMMAD HAFIDZ

PROGRAMME

2nd OCTOBER 2025 (THURSDAY)

0800 - 0830	**REGISTRATION**

Millennium Ballroom 1

0830 - 0900	**PLENARY 1** | *Chairperson: Hasmizy Muhammad* ***How to Set Up and Run ECMO Mobile Team -*** *Ahmed Labib Shehatta*
0900 - 0930	**PLENARY 2** | *Chairperson: Mohamad Hanafi Mohd* ***Leadership in Perfusion and Patient Safety -*** *Yong Chow Yen*
0930 - 1030	**OPENING CEREMONY**
1030 - 1100	**TEA & TRADE EXHIBITION**

1100 - 1215	1100 - 1215	1100 - 1215
Millennium Ballroom 1	**Millennium Ballroom 2**	**Millennium 3**
SYMPOSIUM 1 : PHYSIOLOGY *Chairperson:* *Jusmidar Abdul Jamil/Lee Kok Tong*	**SYMPOSIUM 2 : EQUIPMENT** *Chairperson:* *Ng Yew Ewe/Kauthar Rashid*	**SYMPOSIUM 3 : NURSING CARE** *Chairperson:* *James Joseph/Wong Shee Ven*
• ***Oxygen Delivery and Consumption*** *Haslan Ghazali* • ***Recognition of Shock*** *Isqandar Adnan* • ***Physiology of Extracorporeal Life Support (ECLS)*** *Mohd Izwan Azmi Muda*	• ***ECMO Circuit*** *Andy Sherman Khung* • ***ECMO Cannulas And Tubing*** *Abd Halim Abd Hamid* • ***Membrane Lung, Blender and Pressure Monitoring*** *Ahmad Fais Abu Seman*	• ***Nursing Implications for Detection and Prevention of Systemic Complications Related to ECMO*** *Nurrul Hafizah Yusof* • ***Early Mobility in ECMO*** *Norhayati Anuar* • ***Sedation and Analgesia During ECMO*** *Azmiza Maharani*
Question and Answers Session		

Millennium Ballroom 1

1215 - 1245	**LUNCH SYMPOSIUM** | *Chairperson: Hasmizy Muhammad* ***Getinge's ECLS Solutions - Gokul Krishnan (Eternity)***
1245 - 1400	**LUNCH -** *Venue: Latest Recipe, G Floor*
1400 - 1430	**PLENARY 3** | *Chairperson: Jahizah Hassan* ***Qatar Experience in ECMO for Trauma Patients -*** *Alhady Alfian Yusof*

1430 - 1545	1430 - 1545	1430 - 1545
Millennium Ballroom 1	**Millennium Ballroom 2**	**Millennium 3**
SYMPOSIUM 4 **ECMO FUNDAMENTALS** *Chairperson:* *Yong Chow Yen/Nazri Mohamed*	**SYMPOSIUM 5** **CONDUCT OF ECMO** *Chairperson:* *Hanafi Sidik/Hermi Sapian*	**SYMPOSIUM 6** **CRITICAL CARE I** *Chairperson: Ariffin Marzuki Mokhtar/* *Khairunnadiah Kamaruzzaman*
• ***ECMO Transport Practicality and Guidelines*** *Ahmed Labib Shehatta* • ***ECMO Team Structure*** *Farook Ahmad* • ***Patient Selection for VV ECMO*** *Abdurrahman Ali Elbuzidi*	• ***How Do You Set Up an ECMO?*** *Muhammad Fikri Abdul Halim* • ***How to Initiate the ECMO?*** *Mohamad Hanafi Mohd* • ***Drainage Insufficiency and Return Obstruction*** *Syafiq Sofiyan*	• ***ECPR: IJN Experience*** *Kamilah Muhammad Hafidz* • ***Nutrition for ECMO Patients*** *Vatana V Sundar* • ***Antibiotics and Interaction with ECLS Circuitry*** *Suneta Sulaiman*
Question and Answers Session		

1545 - 1700	**POSTER PRESENTATION**
1700 - 1730	**TEA & TRADE EXHIBITION**

3rd OCTOBER 2025 (FRIDAY)

0800 - 0830	**REGISTRATION**

Millennium Ballroom 1

0830 - 0900	**PLENARY 4** | *Chairperson: Norly Ismail* ***Ethics in Extracorporeal Life Support -*** *Ariffin Marzuki Mokhtar*

0900 - 1015	0900 - 1015	0900 - 1015
Millennium Ballroom 1	**Millennium Ballroom 2**	**Millennium 3**
SYMPOSIUM 7 : CARDIAC *Chairperson: Mohamad Haffiz Che Morad / Kamilah Muhammad Hafidz*	**SYMPOSIUM 8 : CRITICAL CARE II** *Chairperson: Haslan Ghazali / Nazri Mohamed*	**SYMPOSIUM 9 : MONITORING** *Chairperson: Mohd Khairul Anwar A. Rahim / Syafiq Sofiyan*
• ***ECMO for Circulatory Support*** *Hasmizy Muhammad* • ***VA ECMO Maintenance and Weaning*** *Lee Kok Tong* • ***Frontline ED Experience in ECMO Resuscitation*** *Alhaldy Alfian Yusof*	• ***Daily Assessments for ECMO Patients*** *Nbal Mohammed Shpat* • ***Fluid Management in ECMO Patients*** *Norhayati Anuar* • ***Ventilation On VV ECMO: How I do it?*** *Thomas Muller*	• ***Monitoring of the ECMO Device*** *Ng Yew Ewe* • ***Neurological Monitoring and Management for ECMO Patients*** *Khairunnadiah Kamaruzaman* • ***Hemodynamic Monitoring in VA ECMO Patients*** *Jusmidar Abdul Jamil*
Question and Answers Session		

Millennium Ballroom 1

1015 - 1045	**TEA & TRADE EXHIBITION**
1045 - 1115	**PLENARY 5** | *Chairperson: Jahizah Hassan* ***ECPR in Refractory Cardiac Arrest? Pros and Cons -*** *Thomas Muller*

1115 - 1230	1115 - 1230	1115 - 1230
Millennium Ballroom 1	**Millennium Ballroom 2**	**Millennium 3**
SYMPOSIUM 10 **LUNGS** *Azmiza Maharani / Rosaidaremanja Sukri*	**SYMPOSIUM 11** **HAEMOSTASIS & COAGULATION** *James Joseph / Kauthar Rashid*	**SYMPOSIUM 12** **PAEDIATRICS** *Hanafi Sidik / Wong Shee Ven*
• ***ECMO for Respiratory Support*** *Mohd Khairul Anwar A. Rahim* • ***VV ECMO Maintenance and Weaning*** *Kun Arifi Abbas* • ***Persistent Hypoxia in VV ECMO*** *Abdurrahman Ali Elbuzidi*	• ***Anticoagulation Strategies and Monitoring on ECMO*** *Mohd Fitry Zainal Abidin* • ***Blood Transfusion During ECMO*** *Farook Ahmad* • ***Procedures During Patient On ECMO*** *Mohammad Haffiz Che Morad*	• ***Paediatrics ECMO Circuit and Cannula*** *Muhammad Helmi Lokman* • ***ECMO to Treat Infection in Paediatric Patients*** *Thavani Thavarajasingam* • ***Outcomes of Children With Extracorporeal Membrane Oxygenation*** *Ani Suraya Abdul Ghani*
Question and Answers Session		

Millennium Ballroom 1

1230 - 1300	**LUNCH SYMPOSIUM** | *Chairperson: Mohamad Hanafi Mohd* ***Extracorporeal Cardiopulmonary Resuscitation: Current Concepts and Future Directions*** *AP Mathew Chakaramakkil Jose (National Heart Centre Singapore)*
1300 - 1430	**FRIDAY PRAYERS* & LUNCH** *Venue: Latest Recipe, G Floor* *Musalla IOI City Mall, East Wing, East Court Parking, LG Floor, IOI City Mall Putrajaya
1430 - 1500	**PLENARY 6** | *Chairperson: Ng Yew Ewe* ***ECMO: Past, Present, Future -*** *Simon Sin Win Ching*

3rd OCTOBER 2025 (FRIDAY)

1500 - 1615	1500 - 1615	1500 - 1615
Millennium Ballroom 1	**Millennium Ballroom 2**	**Millennium 3**
SYMPOSIUM 13 : MISCELLANEOUS *Chairperson: Kamilah Muhammad Hafidz / Mohd Izwan Azmi Muda*	**SYMPOSIUM 14 IMAGING IN ECMO** *Chairperson: Mohd Fitry Zainal Abidin / Isqandar Adnan*	**SYMPOSIUM 15 : COMPLICATIONS IN ECMO** *Chairperson: Wong Theng Koe / Abd Halim Abd Hamid*
• ***An Experience on ECMO for COVID patients*** *Kun Arifi Abbas* • ***ECMO for Trauma and Accidental Hypothermia*** *Simon Sin Win Ching* • ***VA ECMO in Pulmonary Hypertension Patients*** *Ariffin Marzuki Mokhtar*	• ***Ultrasonography for Cannulation*** *Lee Kok Tong* • ***Echocardiography in ECMO*** *Ng Yew Ewe* • ***Other Imaging Modalities in ECMO*** *Hasmizy Muhammad*	• ***Bleeding and Thromboembolism*** *Jusmidar Abdul Jamil* • ***Infections*** *Suneta Sulaiman* • ***Mechanical Complications*** *Mohamad Hanafi Mohd*
Question and Answers Session		

1615 - 1645 | ***CLOSING CEREMONY & TEA***

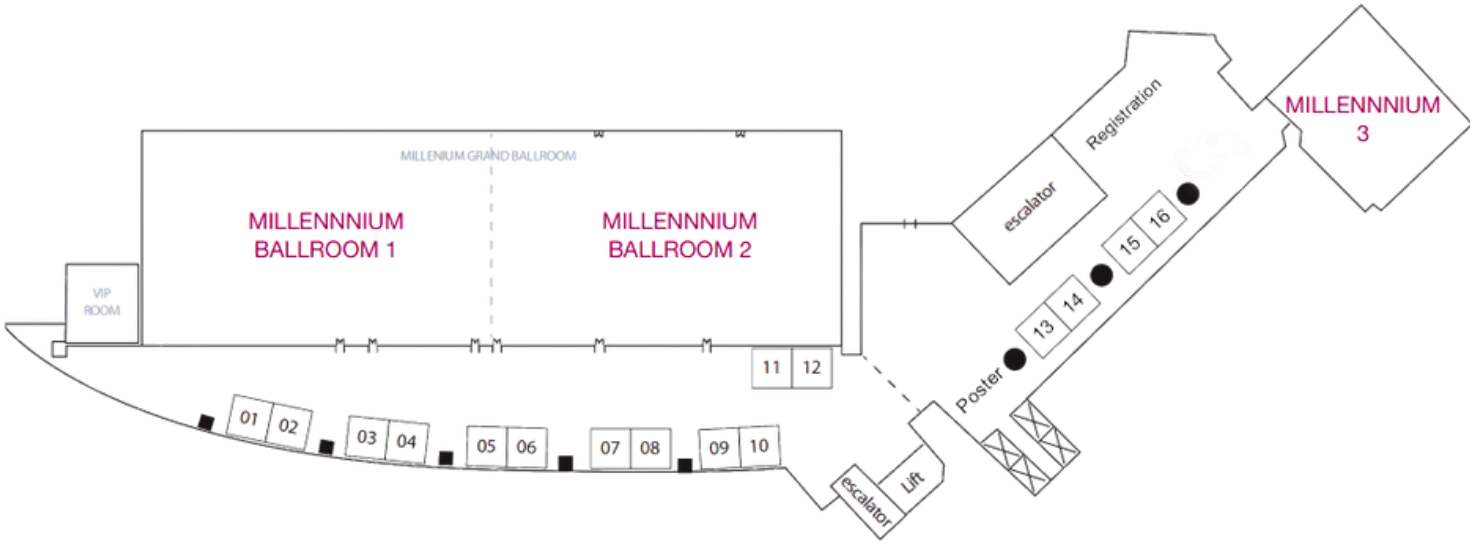
***Musalla IOI City Mall Location**
Scan QR for more details

4TH OCTOBER 2025 (SATURDAY)

WORKSHOPS

	Gallery 1, Level 2, LE MERIDIEN PUTRAJAYA	Seminar Room Level 5, PJS HSIS
0800 - 1000	**DOCTORS & PARAMEDICS WORKSHOP** ***ECMO: Cannula, Cannulation and Circuits*** *Hasmizy Muhammad* *Mohamad Hanafi Mohd* *Lee Kok Tong*	**NURSING WORKSHOP** ***Session 1***
1000 - 1100	**TEA BREAK**	
1100 - 1300	**DOCTORS & PARAMEDICS WORKSHOP** ***ECMO: Start, Maintain and Wean*** *Thomas Muller* *Ng Yew Ewe* *Lee Kok Tong*	**NURSING WORKSHOP** ***Session 2***
1300 - 1400	**LUNCH**	
1400 - 1600	**DOCTORS & PARAMEDICS WORKSHOP** ***ECMO: Troubleshooting*** *Thomas Muller* *Ng Yew Ewe* *Lee Kok Tong*	**NURSING WORKSHOP** ***Session 3***
1600 - 1630	**TEA BREAK**	

FLOOR LAYOUT



BOOTH NUMBER

1	**Lazcorp Holdings Sdn Bhd**	9	**Eternity Healthcare Sdn Bhd**
2	**Vitaltech Services Sdn Bhd**	10	
3	**Megsher Medic (M) Sdn Bhd**	11	**Hospimetrix Sdn Bhd**
4	**Mediwide Sdn Bhd**	12	**Fresenius Kabi**
5	**Pharmaniaga**	13	**Insan Bakti Sdn Bhd**
6	**Straits Scientific (M) Sdn. Bhd.**	14	**Ain Medicare Sdn Bhd**
7	**UG MEDICAL SERVICES**	15	**Junnimed Services Sdn Bhd**
8	**Medtronic Malaysia**	16	**AiM Medical Supplies Sdn Bhd**

2ND THE NECMO

NATIONAL EXTRACORPOREAL MEMBRANE OXYGENATION CONFERENCE

PLENARY & SPEAKER ABSTRACTS

PLENARY 1

How to Set Up and Run ECMO Mobile Team

Ahmed Labib Shehatta

The development of mobile extracorporeal membrane oxygenation (ECMO) teams has expanded access to advanced life support for critically ill patients who cannot be safely transferred to specialized centers. Establishing and sustaining such a service requires careful planning, multidisciplinary collaboration, and robust clinical governance.

Key components include team composition—typically an ECMO-trained intensivist, surgeon, perfusionist, and critical care nurse—supported by transport specialists and prehospital services. Standardized protocols are essential for patient selection, cannulation strategies, anticoagulation management, and transport safety. Logistics encompass dedicated equipment, portable ECMO circuits, and specialized transport vehicles or aircraft capable of maintaining physiological stability during transfer. Education, simulation training, and ongoing competency assessments underpin team readiness. Quality assurance, outcome tracking, and structured debriefings support continuous improvement. Ethically, considerations include equitable access, resource utilization, and risk–benefit assessment of mobile deployments.

A well-organized ECMO mobile team not only enables safe initiation of extracorporeal support in peripheral hospitals but also strengthens regional critical care networks, ultimately improving survival in patients with otherwise non-transportable refractory cardiopulmonary failure.

PLENARY 2

Leadership in Perfusion and Patient Safety

Yong Chow Yen

At the end of the lecture, attendees will be able to:

1. Differentiate between traditional hierarchical leadership and the distributed, situational leadership model required for high-stakes Perfusion and ECMO team management.
2. Differentiate between a culture of blame and a Just Culture, analysing how leadership directly influences psychological safety and a team's willingness to speak up about safety concerns.
3. Analyse common latent safety threats (LSTs) in Perfusion and ECMO programs and articulate the leader's role in proactively designing systems to mitigate them, moving away from a culture of blame.
4. Integrate specific, actionable communication techniques —such as structured briefs, debriefs, and assertive advocacy—to create systematic opportunities for speaking up, thereby mitigating latent safety threats in Perfusion and ECMO care.
5. Commit to one specific leadership action to champion a key patient safety initiative within their own Perfusion and ECMO program, applying leadership principles to drive meaningful changes.

PLENARY 3

Qatar Experience in ECMO for Trauma Patients

Alhady Alfian Yusof

The use of extracorporeal membrane oxygenation (ECMO) in trauma patients remains controversial due to concerns regarding bleeding, anticoagulation, and complex multisystem injuries. However, recent advances have demonstrated its potential role as a life-saving intervention in carefully selected cases. In Qatar, where trauma constitutes a major burden of critical illness, ECMO has been increasingly integrated into the management of severe trauma patients with refractory respiratory or cardiac failure.

The national experience highlights successful implementation in patients with severe blunt chest trauma, massive pulmonary contusions, and post-traumatic acute respiratory distress syndrome (ARDS), where conventional ventilation proved inadequate. Key considerations included patient selection, minimization or modification of anticoagulation, and the use of a multidisciplinary ECMO team for rapid deployment and ongoing care.

Outcomes demonstrated that ECMO can provide a bridge to recovery in otherwise fatal cases, although challenges remain in balancing bleeding risks, resource utilization, and long-term functional outcomes. Qatar's experience underscores the feasibility and effectiveness of ECMO in trauma settings within a structured national program, supporting its role as an adjunct to advanced trauma care when applied with strict protocols and ethical oversight.

PLENARY 4

Ethics in Extracorporeal Life Support

Ariffin Marzuki Mokhtar

Extracorporeal membrane oxygenation (ECMO) has emerged as a vital rescue therapy for patients with severe respiratory or cardiac failure refractory to conventional management. While its technological and clinical advances have expanded indications and improved survival, the use of ECMO raises complex ethical challenges.

These include patient selection, initiation criteria, resource allocation, and decisions surrounding futility and withdrawal of support. The high cost, limited availability of expertise, and significant burden on healthcare systems necessitate balancing individual patient benefit with societal responsibility. Ethical dilemmas are further heightened in scenarios such as bridge-to-nowhere cases, prolonged support without recovery, and conflicts between healthcare teams and families regarding continuation of therapy.

A framework grounded in principles of autonomy, beneficence, non-maleficence, and justice is essential to guide decision-making. Incorporating transparent communication, shared decision-making, and institutional policies can support clinicians, patients, and families in navigating these ethically complex situations. Ultimately, ethical stewardship of ECMO requires integrating medical evidence with compassion, fairness, and respect for patient values.

PLENARY 5

ECPR in Refractory Cardiac Arrest? Pros and Cons

Thomas Muller

Refractory cardiac arrest represents one of the most challenging situations in resuscitation medicine, with survival rates remaining dismal despite high-quality advanced life support. Extracorporeal cardiopulmonary resuscitation (ECPR) has emerged as a potential game-changer, offering a means to restore systemic perfusion and create a bridge to recovery or definitive therapy. Proponents highlight several advantages: ECPR provides immediate circulatory support when conventional resuscitation fails, preserves end-organ function, and creates a window for reversible causes such as acute coronary occlusion or massive pulmonary embolism to be addressed. Early registry data and selected clinical trials demonstrate improved survival with favorable neurological outcomes in highly selected patients, particularly younger individuals with witnessed arrest and shockable rhythms.

However, enthusiasm is tempered by significant challenges. ECPR is resource-intensive, requiring specialized equipment, trained teams, and seamless coordination—elements often confined to high-volume centers. Patient selection remains contentious; inappropriate use risks prolonging futile care, exposing patients to complications such as bleeding, limb ischemia, and neurological injury. Ethical concerns arise regarding equity of access, allocation of scarce resources, and the potential for survival with severe disability. Furthermore, robust evidence from randomized trials remains limited, and real-world outcomes often fall short of controlled reports.

This plenary will critically examine the promise and pitfalls of ECPR in refractory cardiac arrest, highlighting where it offers genuine hope, where caution is warranted, and what evidence gaps must be addressed before widespread implementation.

PLENARY 6

ECMO: Past, Present, Future

Simon Sin Win Ching

Extracorporeal Membrane Oxygenation (ECMO) has a rich history, evolving from experimental support in the 1970s to a critical life-saving technology today. Initially used for severe respiratory failure, early ECMO faced limitations such as high complication rates and technological constraints. Over time, advances in membrane oxygenators, pump systems, and biocompatible materials improved safety and efficacy, enabling broader clinical application. The present use of ECMO has expanded significantly, notably during the COVID-19 pandemic, where it played a pivotal role in managing refractory Acute Respiratory Distress Syndrome (ARDS). Modern ECMO management relies on multidisciplinary teams, standardized protocols, and improved patient selection criteria, leading to enhanced outcomes and reduced adverse events like bleeding and thrombosis.

Looking ahead, the future of ECMO is promising, driven by technological innovations and research. Developments such as portable and miniaturized devices aim to extend its use beyond intensive care units, including pre-hospital and outpatient settings. Integration with artificial intelligence and machine learning offers potential for predictive analytics, personalized treatment, and optimized management strategies. Further advancements focus on improving biocompatibility, reducing complications, and refining anticoagulation protocols. Despite these promising prospects, challenges remain, including high costs, resource demands, and the need for specialized training. Overall, the past progress, current innovations, and future directions of ECMO highlight its vital role in critical care and its potential to revolutionize management of severe cardiopulmonary failure in the coming years.

SYMPOSIUM 1 : PHYSIOLOGY

Oxygen Delivery and Consumption

Haslan Ghazali

Oxygen delivery (DO_2) and oxygen consumption (VO_2) are central determinants of tissue oxygenation in patients supported with extracorporeal membrane oxygenation (ECMO). During ECMO, oxygen delivery is influenced by circuit blood flow, arterial oxygen content, haemoglobin concentration, and residual native cardiac output, while consumption depends on metabolic demand, temperature, and systemic perfusion.

The balance between DO_2 and VO_2—often expressed as the oxygen extraction ratio—is a critical marker of adequacy of support and guides clinical decision-making. Inadequate delivery relative to consumption may lead to tissue hypoxia, lactate accumulation, and organ dysfunction. Optimizing DO_2 requires careful adjustment of ECMO flow, ventilator settings, haemoglobin levels, and systemic hemodynamics, whereas VO_2 can be modulated through sedation, analgesia, temperature management, and treatment of underlying sepsis or agitation.

A clear understanding of the interplay between oxygen delivery and consumption enables clinicians to individualize ECMO therapy, prevent hypoxic injury, and guide weaning strategies.

SYMPOSIUM 1 : PHYSIOLOGY

Recognition of Shock

Isqandar Adnan

SYMPOSIUM 1 : PHYSIOLOGY

Physiology of Extracorporeal Life Support (ECLS)

Mohd Izwan Azmi Muda

The physiology of extracorporeal life support (ECLS), often known as ECMO, is an understanding how it's provide adequate oxygen delivery and waste removal while the patient's underlying condition is addressed, effectively creating a parallel circulation to support metabolic needs. It's relies on a mechanical circuit that temporarily takes over the function of the failing heart and/or lungs to allow them to rest and recover. Blood is drained from the body, oxygenated, and carbon dioxide is removed by an artificial lung, and then it is returned to the body via either the venous (VV-ECMO) or arterial system (VA-ECMO).

SYMPOSIUM 2 : EQUIPMENT

ECMO Circuit

Andy Sherman Khung

Extracorporeal membrane oxygenation (ECMO) is a temporary life-support system for patients with severe heart or lung failure when other treatments are not effective. The ECMO circuit has advanced greatly to become safer, more efficient, and more compatible with the body.

A standard circuit includes a blood pump, a membrane oxygenator to exchange gases, and a heat exchanger, all connected by plastic tubing. Modern centrifugal pumps are now preferred, as they cause less blood damage and provide stable flow. New polymethylpentene (PMP) oxygenators are efficient, long-lasting, and allow treatment for longer periods.

Cannula designs have also improved, with dual-lumen devices that make both veno-venous and veno-arterial support possible in different patient situations. Biocompatible coatings on the circuit reduce clotting and inflammation, while simpler tubing layouts minimize turbulence and blood stagnation. In addition, portable ECMO systems with compact pumps and oxygenators have made patient transfers between hospitals safer.
Together, these innovations reduce complications such as bleeding and clotting, extend the safe use of ECMO, and improve patient outcomes.
“ECMO: Breakthroughs, Best Practices and Beyond”

SYMPOSIUM 2 : EQUIPMENT

ECMO Cannulas and Tubing

Abd Halim Abd Hamid

Cannulae and tubing are fundamental components of extracorporeal membrane oxygenation (ECMO) circuits, enabling safe and effective extracorporeal circulation.

Cannulae provide vascular access for blood drainage and reinfusion, with configurations varying according to ECMO mode—large-bore venous cannulae for drainage, arterial cannulae for return in venoarterial ECMO, and dual-lumen cannulae for single-site access in venovenous ECMO. Proper size selection and positioning are critical to achieving target flows and avoiding complications such as recirculation, vessel injury, or limb ischemia.

ECMO tubing connects the cannulae to the circuit and is constructed from biocompatible, heparin-coated materials to reduce thrombosis and inflammation. Designed for durability and transparency, tubing must be carefully managed to prevent kinking, clot formation, or air entrainment. Together, optimal cannula and tubing selection, placement, and surveillance are essential for safe circuit performance and favorable patient outcomes.

SYMPOSIUM 2 : EQUIPMENT

Membrane Lung,Blender and Pressure Monitoring

Ahmad Fais Abu Seman

In extracorporeal membrane oxygenation (ECMO), three circuit components are essential for safe and effective support: the membrane lung (oxygenator), the gas blender, and pressure monitoring systems.

The membrane lung functions as an artificial lung, enabling oxygen transfer and carbon dioxide removal; its efficiency depends on design and flow, while rising transmembrane pressures or impaired gas exchange may indicate clotting or failure.

The gas blender controls the sweep gas flow and oxygen concentration, allowing clinicians to adjust oxygen delivery and carbon dioxide clearance with precision.

Pressure monitoring at multiple sites—pre-membrane, post-membrane, and access lines—provides critical information on circuit resistance, cannula position, and early signs of obstruction or clot burden.

Together, these components form the backbone of ECMO safety, enabling real-time monitoring, troubleshooting, and timely interventions to maintain adequate gas exchange and systemic perfusion in critically ill patients.

SYMPOSIUM 3 : NURSING CARE
Nursing Implications for Detection and Prevention of Systemic Complications Related to ECMO

Nurrul Hafizah Yusof

Extracorporeal Membrane Oxygenation (ECMO) is a life-saving therapy for patients with severe cardiac and respiratory failure, but it carries significant risks of systemic complications. Nurses play a vital role in the early detection and prevention of these complications to improve patient outcomes.

This presentation highlights nursing implications in monitoring and managing potential complications, including neurological, cardiac, respiratory, renal, hematological, and infectious problems. Emphasis is placed on continuous assessment, strict adherence to anticoagulation and aseptic protocols, accurate documentation, and interdisciplinary collaboration. By applying vigilant nursing care, systemic complications can be minimized, ensuring safer and more effective ECMO support.

SYMPOSIUM 3 : NURSING CARE
Early Mobility in ECMO

Norhayati Anuar

SYMPOSIUM 3 : NURSING CARE

Sedation and Analgesia During ECMO

Azmiza Maharani

Sedation and analgesia in patients receiving extracorporeal membrane oxygenation (ECMO) present unique challenges due to altered pharmacokinetics, circuit drug sequestration, and the need for optimal patient–circuit interaction. Adequate sedation is essential to ensure patient comfort, facilitate mechanical ventilation, prevent accidental decannulation, and allow for safe delivery of ECMO support.

However, drug absorption onto circuit components and changes in drug distribution, metabolism, and clearance often result in unpredictable responses, necessitating individualized titration and frequent reassessment. Analgesia, primarily with opioids, is crucial to address pain from cannulation, invasive monitoring, and underlying critical illness, while balancing risks of accumulation and delayed weaning.

Sedation strategies are evolving toward lighter sedation and early mobilization in selected patients, particularly in veno-venous ECMO, supported by multimodal analgesia and careful use of short-acting agents. Protocolized approaches incorporating sedation scoring systems, daily sedation interruption, and interdisciplinary collaboration can improve safety, reduce complications, and optimize outcomes. Ongoing research is needed to refine pharmacological regimens and develop ECMO-specific sedation guidelines.

SYMPOSIUM 4 : ECMO FUNDAMENTALS
ECMO Transport Practicality and Guidelines
Ahmed Labib Shehatta

SYMPOSIUM 4 : ECMO FUNDAMENTALS
ECMO Team Structure
Farook Ahmad

SYMPOSIUM 4 : ECMO FUNDAMENTALS
Patient Selection for VV ECMO
Abdurrahman Ali Elbuzidi

Venovenous extracorporeal membrane oxygenation (VV ECMO) has become an established rescue therapy for patients with severe, reversible respiratory failure unresponsive to optimal conventional management. Achieving favorable outcomes, however, requires careful patient selection and vigilant management of complications, including persistent hypoxemia.

This presentation will focus on principles of patient selection for VV ECMO. Timely initiation is critical: too early an initiation may expose patients to unnecessary risk, while late initiation may be associated with irreversible organ injury and poor outcomes.

Key considerations include underlying diagnosis, reversibility of lung injury, severity of hypoxemia or hypercapnia despite optimized ventilation, and comorbidities that may influence recovery. Current evidence, including data from international registries and recent trials, will be discussed to highlight best practices and ongoing controversies regarding timing and candidacy.

SYMPOSIUM 5: CONDUCT OF ECMO

How an ECMO is Set Up?

Muhammad Fikri Abdul Halim

This presentation offers a comprehensive, step-by-step guide to setting up Extracorporeal Membrane Oxygenation (ECMO), an advanced form of extracorporeal life support for patients experiencing severe cardiac or respiratory failure. It begins by distinguishing between the two primary ECMO modalities: veno-venous (VV-ECMO) for respiratory support and veno-arterial (VA-ECMO) for combined cardiopulmonary support, detailing their respective cannulation strategies and indications. The core components of the ECMO circuit—including cannulas, the centrifugal pump, membrane oxygenator, heat exchanger, and monitoring systems—are thoroughly explained.

The abstract underscores that ECMO initiation is a multidisciplinary endeavour, requiring a coordinated team comprising a surgeon, perfusionist, critical care physician, and ICU nurses. The procedure is broken down into key phases: patient selection and preparation, meticulous circuit priming to eliminate air, ultrasound-guided vascular cannulation, and the careful initiation and titration of blood flow.

Finally, the summary covers the critical post-setup priorities of stabilizing the patient, implementing anticoagulation protocols, and adjusting concomitant therapies like mechanical ventilation. It concludes by acknowledging major potential complications, such as bleeding and thrombosis, reinforcing that successful ECMO management relies on rigorous technique, continuous monitoring, and effective team communication

SYMPOSIUM 5: CONDUCT OF ECMO

How to Initiate the ECMO?

Mohamad Hanafi Mohd

Initiating ECMO requires a multidisciplinary approach, precise clinical judgment, and technical expertise. This presentation will outline the key steps in ECMO initiation, including patient selection, mode choice (veno-venous vs veno-arterial), cannulation strategies, circuit priming, and anticoagulation management. Apart from Perfusionists, Anaesthesiologists are often central in coordinating hemodynamic support, airway management, and sedation during ECMO initiation.

Understanding the indications, contraindications, and potential complications is crucial to ensure safe and effective deployment. This session aims to equip perfusionists and anaesthesiologists with the Practical knowledge and confidence needed to support ECMO initiation in high-stakes, time-sensitive clinical scenarios.

SYMPOSIUM 5: CONDUCT OF ECMO

Drainage Insufficiency and Return Obstruction?

Syafiq Sofiyan

Extracorporeal Membrane Oxygenation (ECMO) supports patients with severe cardiac or respiratory failure, but its effectiveness depends on smooth blood flow through drainage and return cannulas. According to the ELSO Registry Guidelines, two key mechanical issues can disrupt this flow; drainage insufficiency and return obstruction.

Drainage insufficiency is often caused by low blood volume, high negative pressure, cannula malposition, or blockage (e.g., thrombus or kinking). Signs include circuit chattering, low flow, and high negative inlet pressure. Management focuses on optimizing volume, adjusting cannula position, or reducing flow.

Return obstruction occurs when blood from the ECMO circuit cannot re-enter the patient effectively, often due to malpositioned cannulas, vessel spasm, thrombosis, or high central venous pressure. It may present as high post-oxygenator pressure, poor perfusion, or limb complications.

Early detection, pressure monitoring, and timely intervention are essential. The ELSO guidelines stress a team-based approach, continuous monitoring, and strict adherence to protocols to ensure safe and effective ECMO support.

SYMPOSIUM 6 : CRITICAL CARE I

ECPR: IJN Experience

Kamilah Muhammad Hafidz

The National Heart Institute (IJN), Malaysia, has developed one of the country's most comprehensive ECPR programs, integrating advanced extracorporeal membrane oxygenation (ECMO) into resuscitation for patients with refractory cardiac arrest. Since its initiation, the IJN ECPR team—comprising anesthesiologists, intensivists, perfusionists, and specialized nurses—has established structured protocols for patient selection, rapid cannulation, and multidisciplinary post-resuscitation care.

Experience at IJN highlights the importance of early activation, seamless coordination between emergency, cardiac catheterization, and ICU teams, and strict adherence to time-to-ECMO benchmarks. Outcomes have demonstrated improved survival with favorable neurological recovery in selected patients, particularly those with witnessed arrests, shockable rhythms, and reversible cardiac etiologies.

IJN's experience also underscores the challenges of resource allocation, training, and the ethical considerations in patient selection. Through continuous refinement, simulation training, and regional workshops, IJN has contributed to the growing body of ECPR expertise in Southeast Asia, positioning itself as a reference center for advanced resuscitation strategies.

SYMPOSIUM 6 : CRITICAL CARE I

Nutrition For ECMO Patients

Vatana V Sundar

Extracorporeal Membrane Oxygenation (ECMO) is an advanced supportive therapy for patients with severe cardiac and/or respiratory failure, and its use poses distinct challenges for nutrition support. Patients requiring ECMO are critically ill, highly catabolic, and at significant risk of malnutrition, which can adversely impact outcomes.

Medical Nutrition Therapy (MNT) is therefore a cornerstone of care, with the goals of optimizing metabolic support, preserving lean body mass, and facilitating recovery. Current recommendations emphasize early initiation of nutrition, preferably via the enteral route within 24–48 hours in hemodynamically stable patients, to maintain gut integrity and reduce infectious risk. Energy provision should begin conservatively with hypocaloric feeding (15–20 kcal/kg/day), advancing towards 25–30 kcal/kg/day as tolerated. Protein requirements are elevated, with 1.5–2.0 g/kg/day recommended to attenuate catabolism.

Fluid restriction is frequently necessary, making the use of concentrated, high-protein enteral formulas advantageous. Where enteral feeding is contraindicated, parenteral nutrition should be considered. Continuous monitoring of tolerance, biochemical markers, and metabolic status is essential to prevent complications such as refeeding syndrome, hypertriglyceridemia, and gastrointestinal ischemia.

In the short term, MNT aims to provide adequate protein calories and prevent refeeding syndrome, while longer-term objectives focus on meeting full nutritional requirements, supporting tissue repair, and enhancing functional recovery post-ECMO. Individualized, evidence-based nutrition care remains integral to optimizing outcomes in this population.

SYMPOSIUM 6 : CRITICAL CARE I

Antibiotics and Interaction with ECLS Circuitry

Suneta Sulaiman

The use of extracorporeal life support (ECLS) alters the pharmacokinetics and pharmacodynamics of many antibiotics, posing significant challenges in achieving effective antimicrobial therapy. Drug sequestration within the circuit—particularly in the oxygenator, tubing, and membrane—can reduce circulating concentrations, especially for lipophilic and highly protein-bound agents such as aminoglycosides, fluoroquinolones, and some β-lactams.

Circuit-related factors, including surface coatings, duration of support, and circuit age, further influence drug absorption and clearance. In addition, ECLS modifies the patient's physiology by expanding circulating volume, altering organ perfusion, and impairing renal or hepatic function, compounding variability in antibiotic exposure. These interactions increase the risk of subtherapeutic dosing, treatment failure, and antimicrobial resistance.

Current evidence highlights the importance of therapeutic drug monitoring (TDM), individualized dosing strategies, and consideration of circuit-specific pharmacokinetic data to optimize antimicrobial therapy in ECLS patients. Future research should focus on standardizing dosing guidelines and circuit-compatible antibiotic regimens to improve outcomes.

SYMPOSIUM 7 : CARDIAC

ECMO for Circulatory Support

Hasmizi Muhammad

Learning Objectives:

1. Understanding the Physiology of VA ECMO.
2. Describe the indications and contraindications for VA ECMO.
3. Discuss the hemodynamic changes that accompany VA ECMO.
4. Describe the process of weaning VA ECMO support.
5. Discuss the recent evidence for VA ECMO.

SYMPOSIUM 7 : CARDIAC

VA ECMO Maintenance and Weaning

Lee Kok Tong

The maintenance of veno-arterial (VA) extracorporeal membrane oxygenation (ECMO) involves careful management of hemodynamics, anticoagulation, and organ function, with the ultimate goal of weaning the patient off support . Weaning is a complex, stepwise process designed to test native heart recovery, and readiness is determined by clinical, hemodynamic, and echocardiographic assessments.

SYMPOSIUM 7 : CARDIAC

Frontline ED Experience in ECMO Resuscitation - STEMI Cardiogenic Shock and Thyroid Storm Cardiomyopathy

Alhaldy Alfian Yusof

SYMPOSIUM 8 : CRITICAL CARE II
Daily Assessments for ECMO Patients
Nbal Mohammed Shpat

SYMPOSIUM 8 : CRITICAL CARE II
Fluid Management in ECMO Patients
Norhayati Anuar

Fluid management for patients on extracorporeal membrane oxygenation (ECMO) presents a significant clinical challenge due to the complex interplay between critical illness, the inflammatory response, and the unique physiological effects of the circuit itself. Patients often present with profound shock and multi-organ dysfunction, necessitating initial fluid resuscitation. However, the initiation and maintenance of ECMO can lead to systemic inflammation, capillary leak, and a high risk of fluid overload, particularly impacting respiratory function and increasing the risk of acute kidney injury and longer-term morbidity.

The primary goals of fluid management in this population shift from initial resuscitation to aggressive de-resuscitation once haemodynamic stability is achieved. This strategy, aimed at achieving a negative fluid balance, is critical for mitigating pulmonary edema and improving lung compliance, thereby facilitating lung rest and recovery. Techniques such as continuous renal replacement therapy (CRRT) or diuretics are often essential tools to achieve this goal, while carefully balancing fluid removal against potential haemodynamic instability and electrolyte disturbances.

A goal-directed approach is paramount, utilizing a combination of clinical assessment, haemodynamic monitoring, and point-of-care ultrasound to guide decisions. Optimal fluid management is a cornerstone of ECMO therapy, directly influencing patient outcomes, weaning from the circuit, and overall survival.

SYMPOSIUM 8 : CRITICAL CARE II
Ventilation On VV ECMO: How I do it?
Thomas Muller

SYMPOSIUM 9 : MONITORING
Monitoring of ECMO Device
Ng Yew Ewe

Extracorporeal Membrane Oxygenation (ECMO) has become an indispensable modality in managing patients with severe cardiac and respiratory failure. However, its complexity demands vigilant and dynamic monitoring to ensure optimal outcomes. In this session, Dr Ng will explore ECMO monitoring giving information on what to look for in an ECMO device. Drawing on clinical experiences from Serdang Heart Centre which has the highest amount of ECMO cases per year in Malaysia, Dr. Ng will highlight practical approaches to monitoring an ECMO device once its initiated on a patient.

SYMPOSIUM 9 : MONITORING
Neurological Monitoring and Management for ECMO Patients
Khairunnadiah Kamaruzaman

Neurological monitoring and management for ECMO patients: Successful ECMO outcome is often challenged by several potential complications. Adverse neurologic events such as intracranial hemorrhages, strokes, seizures, and brain death are among the most detrimental and even catastrophic of ECMO complications. This lecture will focus on risk factors related to the therapy itself tht predispose these patients to neurologic injuries, as well as the identification and management of these complications based on existing guidelines.

SYMPOSIUM 9 : MONITORING

HEMODYNAMIC MONITORING IN VA ECMO PATIENTS

Jusmidar Abdul Jamil

Veno-arterial extracorporeal membrane oxygenation (VA-ECMO) serves as a vital, temporary life-support therapy for patients experiencing cardiogenic shock, providing hemodynamic stabilization while the underlying cardiac pathology is addressed. Effective patient management requires comprehensive monitoring to ensure adequate end-organ perfusion, guide therapy, and reduce the risk of device-related complications.

This presentation highlights the hemodynamic goals of VA-ECMO, emphasizing the importance of maintaining optimal mean arterial pressure while carefully managing left ventricular (LV) afterload to avoid distention and support myocardial recovery. Invasive arterial monitoring remains essential, as pulse pressure provides real-time feedback on native cardiac function. Echocardiography is a cornerstone of monitoring, allowing dynamic assessment of LV size, aortic valve opening, and overall contractility.

Advanced techniques also play a crucial role in detecting complications early. Near-infrared spectroscopy (NIRS) enables the identification of differential hypoxia, while continuous blood gas analysis supports precise adjustments in ECMO flow and oxygen delivery. Vigilance for complications is critical, with bleeding, thrombosis, neurological injury, and limb ischemia representing major threats to patient safety.

In conclusion, optimal VA-ECMO management relies on a multifaceted monitoring approach that combines invasive and non-invasive modalities with continuous clinical observation, ensuring both patient safety and enhanced potential for cardiac recovery.

SYMPOSIUM 10 : LUNGS

ECMO for Respiratory Support

Mohd Khairul Anwar A. Rahim

Extracorporeal Membrane Oxygenation (ECMO) provides temporary cardiopulmonary support in patients with severe, refractory respiratory failure unresponsive to conventional mechanical ventilation. Venovenous (VV) ECMO is primarily employed to oxygenate blood and remove carbon dioxide, allowing lung rest and recovery in conditions such as acute respiratory distress syndrome (ARDS), severe pneumonia, or pulmonary trauma.

Key components include cannulation strategies, circuit management, anticoagulation monitoring, and careful hemodynamic and gas exchange surveillance. Evidence from contemporary clinical series demonstrates that ECMO can improve survival in selected patients with reversible pulmonary pathology, especially when initiated early in the course of severe hypoxemia or hypercapnia. Complications such as bleeding, thrombosis, and infection require meticulous multidisciplinary management.

ECMO for respiratory support represents a bridge to recovery, transplantation, or definitive therapy, emphasizing the integration of critical care, perfusion, and respiratory management for optimized outcomes.

SYMPOSIUM 10 : LUNGS

VV ECMO Maintainance and Weaning

Kun Arifi Abbas

The primary objective of extracorporeal membrane oxygenation (ECMO) is to temporarily restore organ functions in patients with cardiovascular and/or pulmonary dysfunction, in hope that these organs may be able to resume normal organ function.

Studies have demonstrated varying outcomes associated with ECMO in acute respiratory distress syndrome (ARDS), particularly in cases involving COVID-19. ECMO procedures for ARDS patients mostly involve venous-to-venous ECMO (VV ECMO). During this procedure, carbon dioxide is extracted from the venous blood, followed by oxygenation, and the oxygenated blood is returned to the right atrium, where it is subsequently circulated to the pulmonary circulation. ECMO in ARDS improves oxygenation, ventilation, minimizes lung stress-strain, and reduces diaphragmatic myotrauma. The success of ECMO in respiratory problems depends on the correct indication and timely initiation of ECMO. Anticoagulation administration is essential to mitigate the potential complications associated with ECMO. Inappropriate anticoagulation can lead to thromboembolic events, while conversely, excessive anticoagulation may result in bleeding. A common complication of VV ECMO is recirculation, which causes desaturation in patients.

Patients receiving ECMO continue to require routine care, similar to that provided to other intensive care unit (ICU) patients. Weaning from ECMO for respiratory problems can be considered if lung function improves and the underlying disease or infection is resolved. Improvement of clinical, laboratory, and radiological parameters, as well as well as the absence of complications, are also taken into consideration of weaning from ECMO. A collaborative multidisciplinary team is crucial for achieving favorable outcomes in ECMO patients.

SYMPOSIUM 10 : LUNGS

Persistent Hypoxia in VV ECMO

Abdurrahman Ali Elbuzidi

Addressing the challenge of persistent hypoxemia in patients already supported with VV ECMO. Despite optimized circuit flows, some patients continue to demonstrate inadequate oxygenation. This talk will review mechanisms such as recirculation, high cardiac output, differential hypoxemia, and residual lung shunt.

A structured approach to troubleshooting—including cannula positioning, optimization of ventilatory strategies, manipulation of ECMO flows, and adjunctive therapies—will be presented. Special emphasis will be placed on bedside problem-solving and multidisciplinary team coordination in managing these complex scenarios.

Together, these two topics (*Patient Selection for VV ECMO& Persistent Hypoxia in VV ECMO*) underscore the importance of thoughtful patient selection and systematic management of complications in ensuring successful VV ECMO support and improving survival in severe respiratory failure.

SYMPOSIUM 11 : HAEMOSTASIS & COAGULATION

Anticoagulation Strategies & Monitoring on ECMO

Mohd Fitry Zainal Abidin

Extracorporeal membrane oxygenation (ECMO) offers vital cardiopulmonary support, but anticoagulation management remains a major challenge. Clinicians must balance the prevention of thrombus formation within the circuit against bleeding risks, both of which significantly impact outcomes. Patient comorbidities, critical illness, and contact with artificial surfaces further complicate this balance.

This lecture reviews current anticoagulation strategies, with emphasis on unfractionated heparin, direct thrombin inhibitors, and emerging alternatives. Practical approaches to tailoring therapy according to patient- and circuit-specific risks will be highlighted. Monitoring is equally complex. Conventional tests such as activated clotting time (ACT), activated partial thromboplastin time (aPTT), and anti-factor Xa assays are increasingly complemented by viscoelastic testing (TEG, ROTEM). Their roles, limitations, and integration into multimodal monitoring will be critically discussed.

Through case-based examples, attendees will gain practical insights and an updated, evidence-based framework to guide anticoagulation and monitoring during ECMO, ultimately improving safety and patient outcomes.

SYMPOSIUM 11 : HAEMOSTASIS & COAGULATION

Blood Transfusion During ECMO

Farook Ahmad

When artificial circuits meet fragile physiology, transfusion decisions in ECMO become high-stakes. Extracorporeal membrane oxygenation (ECMO) provides life-saving support in severe cardiac and respiratory failure, yet it presents a unique haemostatic challenge. Blood exposure to artificial surfaces, high shear stress,and circuit priming leads to deranged physiology and coagulopathy, making transfusion management complex.

Emerging evidence suggests that routine, liberal transfusions increase complications without improving survival. This presentation reviews the latest data on blood product transfusion strategies, including restrictive approaches and point-of-care guided therapy. It highlights how ECMO circuit factors, patient-specific variables, and bleeding risk intersect to influence transfusion needs. The session distils complex evidence into clear strategies for safer, smarter transfusion in ECMO.

SYMPOSIUM 11 : HAEMOSTASIS & COAGULATION

Procedures During Patient on ECMO

Mohammad Haffiz Che Morad

Extracorporeal Membrane Oxygenation (ECMO) is a life-sustaining procedure for patients with severe heart or lung failure. The process involves cannulating major blood vessels to circulate blood outside the body through a heart-lung machine. During this process, the machine removes carbon dioxide and adds oxygen, allowing the heart and lungs to rest and heal.

There are two main types of ECMO: veno-venous (VV) and veno-arterial (VA). VV ECMO provides lung support only, with cannulas typically placed in veins to draw deoxygenated blood and return oxygenated blood. VA ECMO supports both the heart and lungs, using cannulas in a vein and an artery to pump oxygen-rich blood throughout the body.

Patient management on ECMO requires a multidisciplinary team and continuous monitoring. Patients are often sedated to ensure comfort and minimize movement, though an "awake ECMO" approach is also possible. A critical aspect of care is the administration of blood thinners, such as heparin, to prevent dangerous clots from forming in the ECMO circuit. This also increases the risk of bleeding, a common complication. Other potential complications include infection, stroke, and limb ischemia. The duration of ECMO varies, from days to weeks, depending on the patient's condition and recovery. When the patient's heart and lungs show signs of recovery, the ECMO support is gradually tapered, and the cannulas are surgically removed.

SYMPOSIUM 12: PAEDIATRICS

Paediatrics ECMO Circuit & Canulla

Muhammad Helmi Lokman

Extracorporeal Membrane Oxygenation (ECMO) has become an essential life-support modality in the management of pediatric patients with severe cardiac and/or respiratory failure. Pediatric ECMO presents distinct challenges due to the wide variation in patient size, physiology, and underlying pathology.

Pediatric ECMO circuits must be carefully designed to minimize priming volume and reduce hemodilution, while maintaining adequate flow and gas exchange. Components typically include a centrifugal pump, pediatric oxygenator, heat exchanger, and appropriately sized biocompatible tubing. Innovations such as heparin-coated circuits and low-resistance oxygenators have contributed to improved circuit longevity and patient outcomes.

Cannula selection is a critical aspect of pediatric ECMO. The choice between central and peripheral cannulation, as well as veno-arterial (VA) versus veno-venous (VV) configuration, depends on the patient's condition, size, and therapeutic goals. Peripheral cannulation via the carotid artery and internal jugular vein remains common, while dual-lumen cannulae are increasingly used in VV ECMO. Cannula size must be tailored to ensure adequate flow while minimizing vascular trauma and complications.

Effective ECMO support requires a multidisciplinary approach, with perfusionists playing a central role in circuit management, troubleshooting, and ensuring safe operation. Continuous advances in circuit design and cannula technology, combined with standardized protocols and team training, are essential to optimize outcomes in pediatric ECMO

SYMPOSIUM 13 : MISCELLANEOUS

An Experience on ECMO for COVID patients

Kun Arifi Abbas

SYMPOSIUM 13 : MISCELLANEOUS

ECMO for Trauma and Accidental Hypothermia

Simon Sin Win Ching

Extracorporeal Membrane Oxygenation (ECMO) has increasingly been utilized as a life-saving intervention in cases of trauma and accidental hypothermia. In trauma patients, ECMO provides cardiopulmonary support when conventional therapies fail, especially in cases of severe hemorrhagic shock, traumatic cardiac arrest, or massive pulmonary or cardiac injuries. Its ability to maintain oxygenation and perfusion allows for stabilization, bleeding control, and definitive surgical interventions. ECMO's role in trauma management has expanded with improvements in technology, enabling rapid initiation and reduced complication rates, thus improving survival outcomes in select patients.

In the context of accidental hypothermia, ECMO is considered the gold standard for rewarming severely hypothermic patients, particularly those with core temperatures below 28°C or with cardiac arrest. The technique facilitates rapid, controlled rewarming while supporting vital organ functions. ECMO's circulatory and respiratory support allows for effective rewarming and oxygenation, reducing the risk of complications such as arrhythmias and multiorgan failure. Its use in hypothermic cardiac arrest has demonstrated significant survival benefits, especially when traditional rewarming methods are insufficient.

SYMPOSIUM 13 : MISCELLANEOUS

VA ECMO IN PULMONARY HYPERTENSION PATIENTS

Ariffin Marzuki Mokhtar

Pulmonary hypertension (PH) complicated by acute right ventricular (RV) failure carries high mortality despite maximal medical therapy. Veno-arterial extracorporeal membrane oxygenation (VA ECMO) provides short-term cardiopulmonary support by unloading the failing RV, maintaining systemic circulation, and ensuring adequate oxygen delivery. In this context, VA ECMO may function as a bridge to recovery, lung transplantation, or surgical intervention, particularly in patients with reversible precipitants or transplant eligibility. Outcomes, however, remain variable, with survival influenced by underlying PH etiology, baseline RV function, and timing of ECMO initiation. Complications such as LV distension, pulmonary edema, bleeding, and thromboembolism are common and necessitate meticulous monitoring and adjunctive strategies. Despite its risks, VA ECMO is increasingly recognized as a vital rescue modality in advanced PH, highlighting the importance of multidisciplinary decision-making and integration with long-term treatment pathways.

SYMPOSIUM 14 : IMAGING IN ECMO
Ultrasonography for Cannulation
Lee Kok Tong

Ultrasound is the default method for guiding peripheral extracorporeal membrane oxygenation (ECMO) cannulation, allowing for accurate, real-time visualization of vessels and cannulae .This technique helps to reduce complications and can speed up cannulation, which is critical in emergent situations.

SYMPOSIUM 14 : IMAGING IN ECMO
Echocardiography in ECMO
Ng Yew Ewe

Echocardiography has emerged as an essential tool in the management of patients on Extracorporeal Membrane Oxygenation (ECMO), offering real-time insights into cardiac function, cannula positioning, and hemodynamic interactions. This session will explore the practical applications of transthoracic and transoesophageal echocardiography (TOE) in both veno-arterial (VA) and veno-venous (VV) ECMO settings. Drawing from subspecialty experience and international fellowship training, Dr. Ng will discuss echocardiographic in ECMO patients highlighting intra-ECMO monitoring, weaning strategies in addition to detecting complications during ECMO.

SYMPOSIUM 14 : IMAGING IN ECMO

Other Imaging Modalities in ECMO

Hasmizy Muhammad

Learning Objectives:

1. Recognize the role of diagnostic imaging other than echocardiography and ultrasound throughout the ECMO process, from pre-cannulation assessment to decannulation.

2. Understand that different ECMO configurations (e.g., VV-ECMO, VA-ECMO) and the patient's condition influence the choice of imaging modality and the imaging protocols.

3. Develop a systematic approach to interpreting imaging studies in ECMO patients, including recognizing normal appearances of ECMO hardware and identifying common and life-threatening complications.

SYMPOSIUM 15 : COMPLICATIONS IN ECMO
BLEEDING AND THROMBOEMBOLISM

Jusmidar Abdul Jamil

Extracorporeal Membrane Oxygenation (ECMO) may be associated with serious complications that significantly impact outcomes. Among these, bleeding and thromboembolism remain the most frequent and clinically challenging.

Bleeding is multifactorial, often resulting from systemic anticoagulation, platelet dysfunction, surgical trauma, and acquired von Willebrand syndrome. It may present as minor oozing at cannulation or surgical sites, but can also lead to life-threatening gastrointestinal haemorrhage or intracranial bleeding, the latter carrying high morbidity and mortality. On the other hand, thromboembolic complications arise from inadequate anticoagulation, blood stasis within the circuit, or fibrin deposition on the oxygenator and cannulas. These may manifest as oxygenator clotting, systemic emboli, ischemic stroke, pulmonary embolism, or peripheral limb ischemia.

The central clinical dilemma lies in balancing anticoagulation to prevent thrombosis without provoking major bleeding. Conventional monitoring strategies include activated clotting time (ACT), activated partial thromboplastin time (aPTT), and anti-Xa levels, with viscoelastic testing providing additional insights. Management requires a tailored approach that may involve adjusting anticoagulant regimens, optimizing circuit design, prompt surgical haemostasis, and judicious use of blood products. Ultimately, maintaining a delicate hemostatic balance is key to optimizing patient survival and outcomes during ECMO therapy.

SYMPOSIUM 15 : COMPLICATIONS IN ECMO

Infections

Suneta Sulaiman

Infection remains a major complication in patients supported with extracorporeal membrane oxygenation (ECMO), with reported rates between 20–40%. The most common infections include ventilator-associated pneumonia, bloodstream infections, and cannula-related infections, often caused by bacterial pathogens, though fungal and viral organisms also contribute in high-risk groups. Multiple invasive devices, prolonged ECMO duration, and circuit-related immune dysregulation increase susceptibility. Infections are associated with higher morbidity, prolonged ICU stay, and increased mortality, while diagnosis is often complicated by nonspecific signs during ECMO.

Prevention strategies emphasize aseptic technique, antimicrobial stewardship, regular surveillance cultures, and timely removal of unnecessary lines. Future priorities include the development of standardized definitions, infection prevention bundles, and evidence-based antimicrobial protocols specific to ECMO populations.

SYMPOSIUM 15 : COMPLICATIONS IN ECMO

Mechanical Complications

Mohamad Hanafi Mohd

ECMO is a life-saving modality for patients with severe cardiac or respiratory failure, but its use is not without significant risk. Mechanical complications can compromise circuit integrity and patient outcomes, requiring vigilant monitoring and rapid intervention.

Common issues include pump oxygenator failure, tubing rupture, clot formation, air embolism, and cannula malposition. These complications can lead to hemodynamic instability, impaired oxygenation, and systemic embolization. Perfusionists and Anaesthesiologists play pivotal role in the perioperative management of ECMO patients, making a thorough understanding of these mechanical challenges essential for ensuring patient safety and optimizing clinical outcomes.

THE 2ND NECMO

NATIONAL EXTRACORPOREAL MEMBRANE OXYGENATION CONFERENCE

POSTER PRESENTATION ABSTRACTS

A SUCCESSFUL RESCUE WITH AWAKE VENOARTERIAL ECMO SUPPORT IN A PATIENT WITH FULMINANT LYMPHOCYTIC CARDIOMYOPATHY

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Background:
Venoarterial extracorporeal membrane oxygenation (VA-ECMO) is typically implemented in critically ill patients with cardiogenic shock, often requiring deep sedation and mechanical ventilation. However, the use of awake VA-ECMO may offer clinical advantages by avoiding complications associated with intubation and prolonged ventilation.

Case Presentation:
We report the case of a 24-year-old male initially admitted with acalculous cholecystitis who rapidly deteriorated and was diagnosed with fulminant lymphocytic cardiomyopathy. Due to refractory cardiogenic shock, VA-ECMO support was initiated.

Outcome and follow up:
He received awake VA-ECMO for a course of seven days. The patient remained awake and spontaneously breathing throughout the 7-day ECMO course, supported only by light sedation and high-flow nasal cannula oxygen therapy. His hemodynamic status stabilized, and he was successfully weaned off ECMO without the need for invasive ventilation. He was discharged well from the ICU, received step-down care in the wards and went home well.

Conclusion:
This case highlights the potential of awake VA-ECMO as a feasible and beneficial strategy in carefully selected patients with severe cardiac failure. Avoiding intubation may reduce ventilator-associated complications and facilitate faster recovery. Further studies are warranted to define selection criteria and long-term outcomes of this approach.

Keywords:
Awake venoarterial extracorporeal membrane oxygenation (VA-ECMO), fulminant lymphocytic cardiomyopathy, multiorgan failure, outcome, critical care, sedation strategy

A UNIQUE CASE OF TAPIA'S SYNDROME POST-CABG: UNVEILING THE VAGAL MYSTERY BEHIND DYSPHAGIA & ASYSTOLE

Vimal V[1], Ivy SCG, Isqandar A[1], Sarah HM[1], Akmal FS[1], Mohd AJ[1], Nik Nadhirah NM[1]

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Abstract

Tapia's syndrome is a rare postoperative complication involving concurrent injury to the vagus (Cranial Nerve X) and hypoglossal (Cranial Nerve XII) nerves, typically presenting with dysphagia, dysphonia, and tongue deviation. It is infrequently reported following cardiac surgery. We report a unique case of a 43-year-old male who developed Tapia's syndrome following elective coronary artery bypass grafting (CABG). Post-extubation, the patient experienced dysphagia-induced coughing episodes that triggered transient asystole, due to exaggerated vagal stimulation. Clinical evaluation revealed left vocal cord palsy and tongue deviation. Conservative management, including nasogastric feeding, vitamin B supplementation, and swallowing rehabilitation, led to significant recovery within two weeks. This case underscores the importance of recognizing Tapia's syndrome as a potential postoperative complication in cardiac surgery. It also highlights the rare but serious risk of vagally mediated cardiac arrhythmias in such patients. Early diagnosis and multidisciplinary management are essential for optimal outcomes.

VA ECMO AS A BRIDGE TO TRANSCATHETER THROMBECTOMY IN MASSIVE PULMONARY EMBOLISM: A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

Introduction:
In Malaysia, adult extracorporeal membrane oxygenation (ECMO) remains limited to cardiac centres, despite broad indications outlined in the adult ECMO guidelines recently published by Malaysian Cardiothoracic Anaesthesiology and Perfusion Society (MASCAP). Limited resources and cost concerns restrict wider adoption. Massive pulmonary embolism (PE) with cardiovascular collapse carries a high mortality, and ECMO may be life-saving when conventional measures fail.

Case Description:
A young woman with adenomyosis underwent hysteroscopy under spinal anaesthesia for abnormal per vaginal bleeding. On postoperative day three, she developed acute hypoxaemia and circulatory shock. Imaging confirmed a massive PE. Before transfer to our centre, she was intubated and required high-dose inotropes. A multidisciplinary team comprising of cardiology, anaesthesiology, and vascular surgery, determined the need for urgent transcatheter thrombectomy. Veno-arterial ECMO (VA ECMO) was initiated pre-procedure to provide haemodynamic and oxygenation support, enabling safe clot extraction. She was successfully weaned from ECMO and inotropes, and discharged with good neurological and functional outcomes.

Learning Point:
In massive PE with shock, VA ECMO can stabilise haemodynamics, maintain end-organ perfusion, and bridge the patient to definitive therapy such as thrombectomy. Early recognition, decisive multidisciplinary collaboration, and readiness to deploy ECMO are critical determinants of survival.

Conclusion:
This case demonstrates the pivotal role of VA ECMO as a bridge to intervention in massive PE with cardiovascular collapse. When used in appropriately selected patients, ECMO can be a decisive life-saving adjunct. Expanding ECMO capability beyond cardiac centres, supported by clear selection protocols and rapid access to multidisciplinary expertise, could improve survival outcomes for high-risk PE cases in Malaysia.

BEYOND CLOTS: THE ROLE OF CARDIAC ANAESTHESIOLOGISTS IN A CASE OF ECMO FOR MASSIVE PULMONARY EMBOLISM

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Abstract

Extracorporeal Membrane Oxygenation (ECMO) is a life-saving intervention for patients with severe cardiac and/or pulmonary dysfunction unresponsive to conventional medical therapies. We present a case of a 35-year-old male who presented with sudden-onset severe chest pain and breathlessness. Computed Tomography Pulmonary Angiography (CTPA) revealed massive bilateral pulmonary embolism. The patient underwent mechanical thrombectomy under general anaesthesia, complicated by cardiogenic shock necessitating cardiopulmonary resuscitation (CPR). Post ROSC, veno-arterial (V-A) ECMO was initiated, and catheter-directed thrombolysis was performed. Following a successful re-attempt at thrombectomy, the patient was gradually weaned off ECMO and decannulated on day seven. He was extubated successfully and discharged home. This case underscores the cardiac anaesthesiologist`s multifaceted role in managing ECMO patients, integrating multidisciplinary teams to ensure patients receive the highest standard of care with optimal outcomes. Continuous collaboration with the multidisciplinary team enhances the effectiveness of ECMO therapy, improving patient survival and recovery.

FROM CONDUCTION BLOCK TO DIAGNOSIS: THE ROLE OF TRANSOESOPHAGEAL ECHOCARDIOGRAPHY IN ENDOCARDITIS

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Introduction:
Infective endocarditis (IE) carries high morbidity, leading to valvular destruction, embolism, conduction disturbances, and occasionally intracardiac shunts. The Gerbode defect—a left ventricle (LV) to right atrium (RA)communication—is rare and usually congenital. We present a rare case of *Mammalicoccus sciuri* IE complicated by severe aortic valve (AV) disease, an acquired Gerbode defect, and complete heart block (CHB).

Case Presentation:
A 58-year-old man with single-vessel coronary disease presented with recurrent heart failure secondary to severe AV pathology. Transthoracic echocardiography (TTE) showed AV vegetations. While awaiting elective surgical repair, the patient experienced a syncopal attack. He was managed for cardiogenic shock with CHB, necessitating transvenous pacing. A repeated echocardiogram showed no new changes. In light of the suspicious findings, computed tomography angiography (CTA) was performed and revealed aortic root pseudoaneurysm with abscess and fistulous communication to the LV outflow tract. Intraoperative transoesophageal echocardiography (TOE) showed a mycotic root aneurysm with LV–RA shunting. Surgery confirmed AV vegetations with an LV–RA fistula. Aortic valve replacement and double-patch closure of the Gerbode defect were performed. Despite initial recovery, the patient later succumbed to multiorgan failure following mediastinitis.

Discussion:
This case highlights two lessons in AV endocarditis management. First, TOE outperforms TTE for detecting vegetations, fistulae, and shunts, and though CTA is sensitive for abscesses, earlier TOE might have enabled timelier diagnosis and surgery; multimodality imaging achieves the greatest diagnostic accuracy. Second, the onset of CHB should be regarded as a sentinel marker of perivalvular extension, with strong specificity and prognostic significance, warranting immediate TOE even when TTE findings remain static. Early recognition of these red flags is crucial to timely intervention and improved outcomes.

Conclusion:
TOE is pivotal for detecting perivalvular extension and shunts, while CTA complements in defining abscesses; their integration ensures high diagnostic accuracy. Using conduction block as a trigger for early TOE within a multimodality pathway may expedite surgery and improve outcomes.

FROM RESCUE TO PREVENTION: VV-ECMO IN COMPLEX AIRWAY OBSTRUCTION – A SINGLE-CENTRE CASE SERIES

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Introduction:
Central airway obstruction is a formidable perioperative challenge, where intubation or rigid bronchoscopy may prove unsafe or ineffective. Veno-venous extracorporeal membrane oxygenation (VV-ECMO) offers a vital bridge by maintaining oxygenation and haemodynamic stability, thereby permitting definitive interventions under controlled conditions. We present a case series illustrating its transformative clinical role. Case

Presentation:
The first case involved a 26-year-old woman at 27 weeks' gestation with malignant central airway obstruction, where rescue VV-ECMO enabled urgent tracheal stenting and secured both maternal and foetal survival. The second was a 23-year-old man with a massive superior mediastinal mass causing near-total tracheobronchial compression; pre-emptive VV-ECMO provided stability for biopsy and tumour debulking. The third, a 47-year-old man with mediastinal tumour and superior vena cava syndrome, underwent safe tracheal stenting under ECMO with uneventful weaning. The fourth, a 64-year-old man with obstructive mediastinal tumour, received early ECMO support, ensuring oxygenation and permitting safe airway intervention. All patients survived to hospital discharge without major complications, underscoring ECMO's pivotal role in managing high-risk central airway obstruction.

Discussion:
Three key lessons emerge from this series. First, timely recognition of patients at imminent risk of airway collapse allows ECMO to be instituted pre-emptively, redefining its role from rescue to prevention. Second, early integration of VV-ECMO into multidisciplinary planning broadens therapeutic possibilities, facilitating safe airway stenting, tumour debulking, and other complex procedures under controlled conditions. Third, technical success depends on meticulous anticoagulation and imaging-guided cannulation using fluoroscopy and echocardiography, highlighting the value of preparation and expertise. Collectively, these lessons challenge conventional algorithms and support a paradigm shift toward earlier ECMO deployment in central airway obstruction, reframing management from reactive salvage to proactive, outcome-driven strategy.

Conclusion:
VV-ECMO, when deployed proactively, transforms the management of central airway obstruction by preventing catastrophic hypoxia, expanding therapeutic options, and redefining future standards of care. (294 words)

POST DOUBLE VALVE REPLACEMENT ECMO FOR LCOS: A CASE REPORT

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Introductiom

Low cardiac output syndrome (LCOS) is a frequently occurring complication post open heart surgery. When unresponsive to other treatments like inotropic agents, extracorporeal membrane oxygenation (ECMO) may be used as a bridging therapy to recovery.

Case Description

A 25 year old gentleman was diagnosed with chronic rheumatic heart failure with severe aortic regurgitation and severe mitral regurgitation. He was warded for a month requiring non invasive ventilation support and daily diuresis treatment. Preoperative echo showed severe aortic regurgitation and severe mitral regurgitation but preserved left ventricle function. He underwent aortic valve replacement and mitral valve replacement. Upon removal of the x-clamp, patient developed sinus bradycardia requiring right ventricle pacing. Intra-aortic balloon pump was inserted, however patient still unable to wean from cardiopulmonary bypass (CPB). In view poor heart contractility with borderline hemodynamics with high inotropic support, venoarterial extracorporeal membrane oxygenation (VA-ECMO) was initiated as bridging therapy. Central ECMO was connected (aortic and RA 3-staged) and was able to achieve full flow. Patient was then sent to intensive critical unit (ICU) for further management. In ICU, patient had developed severe metabolic acidosis requiring continuous veno-venous hemodialysis (CVVHD). Despite on VA-ECMO and CVVHD, patient's condition remained critical. On day 3 in ICU, family members were counselled for withdrawal as heart function was unstainable despite on ECMO, and they agreed. Patient went asystole 5 minutes after ECMO decannulation was done.

Learning Points

Devices that assist the heart's pumping such as IABP and ECMO may be necessary in severe cases of LCOS as bridging therapy to recovery.

Conclusion

The occurrence of LCOS after open heart surgery is inevitable and requires a systemic approach in management to reduce mortality.

RESIDUAL THROMBUS AND ECMO CLOTTING IN ANTIPHOSPOLIPID SYNDROME: A CASE REPORT.

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Antiphospholipid syndrome (APS) is an acquired prothrombotic disorder associated with recurrent venous and arterial thromboses. When combined with congenital anomalies such as cor triatriatum dexter, the risk of thrombosis increases further. Chronic thromboembolic pulmonary hypertension (CTEPH) develops from persistent organized thrombi with secondary pulmonary vascular remodelling, leading to progressive pulmonary hypertension, right ventricular (RV) failure, and premature mortality. Pulmonary endarterectomy (PEA) is the treatment of choice, but is not available in all centres.

We report a 21-year-old man with primary APS, cor triatriatum dexter, and recurrent pulmonary embolism who presented with acute-on-chronic pulmonary embolism and severe RV dysfunction. He underwent surgical embolectomy with incomplete clot clearance, complicated by persistent pulmonary hypertension and RV failure requiring central veno-arterial extracorporeal membrane oxygenation (VA-ECMO). Despite therapeutic heparin anticoagulation guided by ACT and APTT, ECMO circuit thrombosis occurred on day 7, precipitating a pulmonary hypertensive crisis. The patient was stabilized after ECMO decannulation, optimized with inotropes and inhaled nitric oxide, and later transitioned from heparin to long-term warfarin.

This case highlights the challenges of anticoagulation in APS during ECMO support. Conventional monitoring with ACT and APTT may be unreliable due to lupus anticoagulant interference, leading to inaccurate estimation of anticoagulant effect. Anti-Xa assays are considered more accurate but are not always available. In APS patients on ECMO, standard heparin anticoagulation may fail, and alternative agents such as direct thrombin inhibitors (bivalirudin, argatroban) should be considered.

APS poses unique anticoagulation challenges in ECMO, with high risk of circuit thrombosis despite standard therapeutic targets. Early recognition, alternative monitoring strategies, and individualized anticoagulation are essential to optimize outcomes in this high-risk subgroup.

SUCCESSFUL USE OF ECMO POST-TOF REPAIR DUE TO BIVENTRICULAR FAILURE, COMPLICATED WITH MULTI-ORGAN FAILURE

Nuraeiniza I[1], Amar Ghassani G[2], Nurul Asyikin R[2], Mohamad Hanafi M[2], Jusmidar AJ[2], Maseeda MY[2], Mohammad Tamim J[2], Nurul Amani AJ[2], Kah Min P[2]

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Introduction

Extracorporeal Membrane Oxygenation (ECMO) can serve as a bridge following myocardial surgical repair, especially when full myocardial recovery is delayed or resistant to conventional methods such as inotropes, pacemakers, or other supportive cardiac devices.

Case Description

A 1-year-old girl (7.4 kg) with Tetralogy of Fallot (TOF) and ASD secundum underwent TOF correction and ASD patch closure. She was well-developed and showed no signs of heart failure preoperatively. The procedure was uneventful, with no prolonged bypass time, and only low-dose inotropic support was needed postoperatively (Milrinone 0.3 mcg/kg/min and Adrenaline 0.02 mcg/kg/min). Unfortunately, 11 hours post-operation, she suffered a cardiac arrest, requiring chest re-opening and approximately 1 hour of resuscitation. She developed hemodynamic instability despite maximum inotropic support, severe metabolic acidosis, acute renal injury, and seizures.

A multidisciplinary discussion involving four teams (CTC surgeon, cardiac anaesthesia, paediatric cardiology, and PICU) led to the decision to initiate V A-ECMO due to biventricular failure.

While on ECMO, she required CVVHDF for acute renal injury and continued to suffer from severe metabolic acidosis. Complications included coagulopathy, frequent seizures due to HIE (secondary to cardiac arrest), and severe sepsis, managed with Meropenem and multiple inotropes.

After 7 days of V A-ECMO, ECMO was successfully weaned off with support from Levosimendan and inhaled nitric oxide (iNO). Within 3 weeks, her condition improved significantly, she was extubated, able to maintain oxygenation, and eventually discharged with good neurological outcomes.

Learning points

V A-ECMO can be lifesaving in post-op cardiac failure with multi-organ involvement.

Pre-morbid status, surgical correction quality, and rapid multidisciplinary decision-making are critical.

Full team cooperation and continuous support are essential

Conclusions

Multidisciplinary discussion and coordinated management are crucial for the success of ECMO interventions, especially in complex cases.

This collaborative approach helps optimise outcomes and reduce morbidity.

VV ECMO FOR HIGH RISK AIRWAY RECONSTRUCTION IN A PATIENT WITH MYASTHENIA GRAVIS: A CASE REPORT

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Introduction

Airway reconstruction in the presence of tracheoesophageal fistula (TEF) and tracheal stenosis (TS) carries significant anesthetic and surgical risks. Patients with Myasthenia Gravis (MG) are further predisposed to perioperative respiratory complications due to impaired neuromuscular function. Traditional ventilation strategies may fail, with risks of gastric insufflation, aspiration, and inadequate oxygenation. We describe the use of venovenous extracorporeal membrane oxygenation (VV-ECMO) to enable successful surgical repair in a patient with MG and combined TEF–TS.

Case Description:

A 43-year-old woman with anti-MuSK antibody-positive MG, presented with progressive respiratory distress. She had a history of multiple intubations and prior tracheostomy, later decannulated. At admission, she was diagnosed with ESBL Klebsiella pneumoniae pneumonia. Bronchoscopy and CT imaging revealed a 10mm TEF located 2.8cm below the vocal cords, with a severe TS (3-4mm) just inferior to the fistula. Preoperative optimization included nutritional support and MG stabilization. A multidisciplinary team discussion agreed the best approach is by VV-ECMO to mitigate airway risks. Under monitored sedation, bilateral femoral venous cannulation was performed, ensuring stable oxygenation and carbon dioxide clearance. With ECMO support, anaesthesia was safely induced, avoiding the hazards of positive-pressure ventilation through the fistula. The surgery comprised partial sternotomy, thymectomy, resection of the stenotic tracheal ring, primary esophageal repair, and tracheal reconstruction. Postoperatively, the patient was decannulated from ECMO within 7 hours and extubated at 20 hours, without any immediate complication.

Learning Points:

VV-ECMO is a valuable adjunct for complex airway reconstruction when conventional ventilation poses high risk. It ensures stable oxygenation, reduces aspiration and lung injury risks, and improves surgical access. In MG patients, VV-ECMO reduces the risks of postoperative ventilatory failure. Multidisciplinary planning is essential for achieving the best results.

Conclusions:

VV-ECMO is a transformative tool for complex airway and esophageal surgery, particularly in MG, ensuring perioperative safety and stability.

"WHEN THE AIRWAY CLOSES AND THE HEART FAILS; ECMO ASSISTED AIRWAY STENTING IN MEDIASTINAL MASS"

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Anaesthesia for mediastinal masses with airway and great vessels involvement possess a high risk of catastrophic complications, including cardiovascular collapse and complete airway obstruction. Airway stenting can be lifesaving, but maintaining adequate ventilation and circulation during such procedures is challenging. Extracorporeal membrane oxygenation (ECMO) provides an important safety net in these high-risk scenarios.

A 37-year-old gentleman presented with progressive dyspnoea, hoarseness, orthopnoea, and minimal haemoptysis. Examination revealed, distended chest wall veins, and mild tachypnoea. CT thorax demonstrated a large infiltrative superior mediastinal mass (5.6 × 5.7 × 7 cm) causing venous thrombosis, tracheal compression, and endobronchial extension. Bronchoscopy showed severe distal tracheal narrowing, distorted carina, and right main bronchus obstruction. He was scheduled for tracheal stenting under veno-venous(VV) ECMO. Shortly after initiation of VV ECMO (3.4 L/min), he developed ventricular fibrillation requiring two minutes of CPR, defibrillation, and intravenous amiodarone. Transoesophageal echocardiography (TOE) revealed new global left ventricular dysfunction (EF 20–30%) with preserved right ventricular function, prompting urgent conversion to peripheral veno-arterial(VA) ECMO.Rigid bronchoscopy with side-port ventilation enabled successful tracheal stent deployment. The endotracheal tube was positioned within the stent under bronchoscopic guidance. He was transferred to ICU, weaned from VA ECMO after six days, and extubated five days later.

Mediastinal masses with airway and vascular compression require meticulous multidisciplinary planning. While VV ECMO offers a safety net for airway protection, acute cardiovascular collapse may necessitate rapid conversion to VA ECMO. Maxwell & Forrest (2023) recommend VA ECMO in cases involving great vessel obstruction due to the high risk of hemodynamic instability. Real-time echocardiography is invaluable for both cannula positioning and dynamic cardiac assessment.

ECMO is a vital adjunct in managing mediastinal masses with combined airway and cardiovascular compromise. Flexibility in support strategy and close team coordination are essential for procedural safety and survival.

CASE REPORT: SUCCESSFUL MULTIDISCIPLINARY MANAGEMENT BY PULMONARY EMBOLISM RESPONSE TEAM (PERT) UTILIZING VA ECMO SUPPORT IN A PATIENT WITH LIFE-THREATENING MASSIVE PULMONARY EMBOLISM.

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Introduction:
We present a case of a successful veno-arterial extracorporeal membrane oxygenation (VA ECMO) support combined with thrombectomy in the management of a 34-year-old woman with massive pulmonary embolism (PE). She presented to a district hospital just outskirts of Klang Valley electively to undergo hysteroscopy for abnormal uterine bleeding. She deteriorated post procedure and computed tomography pulmonary angiography (CTPA) confirmed massive PE. She was electively intubated and urgently referred to the Institut Jantung Negara (IJN) PERT team. Upon arrival at 10:00 pm, she was in profound shock requiring high-doses of vasoactives. Inhaled nitric oxide was initiated immediately in the emergency department and she was transferred directly to the operating theatre for emergent VA ECMO initiation and thrombectomy. Full-flow VA ECMO was established at 11:00 pm via peripheral femoral cannulation, followed by bilateral lower limb thrombectomy (vascular team) and pulmonary thrombectomy (cardiology team) using the Penumbra system. A good length of DVT was removed from bilateral lower limbs (Figure 2) however the team was unable to fully extract the pulmonary thrombus. She was stabilised on ECMO and serial echocardiogram showed improving biventricular result (see table 1) and after successful ECMO weaning protocol, she was weaned off ECMO support on POD 4 to moderate doses of vasoactives and extubated on POD 6.

Discussion:
This case underscores the critical importance of rapid, multidisciplinary intervention spearheaded by early involvement of a Pulmonary Embolism Response Team (PERT) and precise use of VA ECMO for patients with life-threatening massive pulmonary embolism (PE). Post-procedure course which marked recovery of biventricular function, and successful ECMO decannulation highlights how this integrated, time-sensitive approach yields optimal outcomes in massive PE.

Conclusion:
In conclusion, this re-affirms the importance of establishing streamlined pathways to facilitate such time-critical transfers including ECMO-supported retrieval to centers with multidisciplinary expertise and advanced interventional capabilities which can improve both survival and functional recovery.

Challenges for Perfusionist in Managing Awake Veno-venous Extracorporeal Membrane Oxygenation in Patient with Tracheal Stenosis: A Case Report

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Introduction: Tracheal airway stenosis is typically associated with severe breathing impairment. Perioperative veno-venous extracorporeal membrane oxygenation (VV-ECMO) provides an important bridge alternative to sustain adequate gas exchange during tracheal stenting in potential total airway obstruction where common difficult airway management procedures may fail.

Case Description: A 47 years old male with no known medical illness (NKMI) have presented with 2/12 hx of intermittent cough and dyspnea presented with mediastenal widening. He developed worsening breathlessness with inspiratory stridor. CT NTAP shows mediastenal mass (10x6x12cm) with compression onto distal trachea (narrowest distal trachea measuring 0.3cm) and right main bronchus with evidence of bilateral branchiocephalic vein and superior vena cava (SVC) are being compresses by large mediastenal mass.

Learning Points:
1. Clinical Protocal: validates awake ECMO as a rescue strategy for inoperable airway stenosis when conventional intubation fails.
2. Perfusionist Role: emphasizes cannulation precision, flow titration (¾ flow) and real-time SVO2/ blood gas monitoring to manage hypercarbia.
3. Demonstrates ECMO's efficiacy in cO2 clearance (PaCO2 110.7 to normal range)
4. Multidisciplinary Coordination: highlights collaboration betrween perfusionists, anesthesiologist and pulmonologist for succesful intubation-free airway securing.
5.Outcome evidence: supports ECMO;s viability in complex airway management, avoiding catastrophic airway loss.

Conclusion:
Airway management of tracheal stenosis with complete obstruction si challenging and may require prior intervention. Perioperative VV-ECMO has been shown to be an effective and safe adjunctive technique for gas exchange.

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