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Extracorporeal Cardiopulmonary Resuscitation (ECPR) candidacy in practice: a retrospective analysis on decision-making

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Objectives: Extracorporeal cardiopulmonary resuscitation (ECPR) is increasingly used to rescue patients in cardiac arrest, yet limited data guide clinical decisions, leading centers to create their own criteria and risking inconsistency. We conducted a single-center analysis of ECPR decisions to identify patterns of inconsistency, explore potential sources, and propose mitigation strategies.

Methods: We conducted a retrospective analysis at a large U.S. ECMO referral center, reviewing 79 ECPR consultations from 2021 to 2024. Of these, 73 patients with cardiac arrest upon arrival or during admission were included. Some consultations were excluded due to inconsistent tracking. The study aimed to identify factors influencing candidacy and explore cases with conflicting decisions.

Results: Seventy-three consultations resulted in 14 (19%) candidates who were cannulated to ECMO (36% survival), 53 (73%) non-candidates (0% survival), and 6 (8%) who achieved return of spontaneous circulation with no formal decision rendered (67% survival). Twenty unique contraindications were invoked across non-candidates; the five most common were duration of CPR (n=21), age (n=17), non-shockable rhythm (n=16), comorbidities (n=15), and acidemia (n=11). We identified five patterns of inconsistency:

(1) inconsistent application of contraindications between candidates and non-candidates,

(2) inconsistent invocation of contraindications between non-candidates,

(3) propensity to deem contraindications non-prohibitive in peri-operative and post-operative patients,

(4) inconsistent documentation,

(5) unclear use of terminology. We further identified that each contraindication generally informs whether the patient belongs to one of three prognostic domains:

(1) ECPR will not bridge to cardiovascular recovery or destination therapy,

(2) ECPR will not be beneficial in the setting of devastating neurologic injury, or

(3) ECPR technically/practically not feasible.

Conclusions: We demonstrate an effective process for assessing internal candidacy at centers performing ECPR, uncovering common patterns of inconsistency in decision-making. We proposed a three-domain model to categorize non-candidates prognostically, offering a structured framework to guide assessments. Additionally, our analysis suggests that targeted interventions—such as emphasizing individual relative contraindications in guidelines, standardizing documentation practices, avoiding ambiguous terminology, and implementing regular reviews of candidacy decisions—could enhance both consistency and transparency in ECPR decision-making.

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CytoSorb® hemadsorption in patients on VA-ECMO: a report from the International, Prospective COSMOS Registry

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Objectives: The International COSMOS (CytOSorb® TreatMent Of Critically Ill PatientS) Registry monitors the real-world use and clinical outcomes with CytoSorb® (CS) use in critical care, including veno-arterial extracorporeal membrane oxygenation (V-A ECMO) support.

Methods: Data were collected at various intervals, including 24 hours before CS initiation, during treatment, and 24 hours post-treatment, as well as at ICU and hospital discharge. Results are presented as mean ± standard deviation or median [IQRs].

Results: The current report includes 20 patients (mean age 57±16; 20% females) on V-A ECMO, with baseline

median APACHE II score of 30 [22, 33]. Mean number of CS adsorbers used per patient was 4.8±3.5, with 47% receiving ≥4 adsorbers; mean duration of CS use was 81 hours. CS was integrated directly on ECMO circuit (n=2, 10%), with renal replacement therapy (n=13, 65%) or stand-alone hemoperfusion (n=5, 25%). CS was initiated either concomitantly with V-A ECMO implantation (n=5) or at a later time (n=15; 8 patients ≤5 days, 7 patients >5 days). Compared with values before CS treatment, median norepinephrine dose was significantly reduced (from 0.09 [0.06, 0.14] to 0.02 [0, 0.04] µg/kg/min; p=0.02), while fluid balance not (702 [0606, 1423] vs. 394 [776, 900] ml; p=0.67).

Early initiation of CS (≤5 days from ECMO initiation) was associated with shorter ECMO duration (5 [4-29] vs. 16 [8-26] days; p=0.08) and numerically shorter ICU length of stay (18 [8-18] vs. 26 [13-26] days; p=0.21). ICU mortality was 15.8%, which was lower than expected according to baseline APACHE II score. There were no device related serious adverse events or device deficiencies reported; however, platelet counts were significantly lower at the end of CS treatment than baseline (from 105±60 to 70±36 $*10^9$/L; p=0.04).

Conclusions: In the international COSMOS Registry, we observed a significant reduction in norepinephrine requirements after addition of CytoSorb® to V-A ECMO. The overall ECMO duration was lower when CS was initiated earlier while overall mortality was lower than expected according to APACHE II score.

Conflict of interest: FST and RF have consulting contracts with CytoSorbents Corporation and CytoSorbents Medical Inc. TK and JS are full time employees of CytoSorbents Europe GmbH. END is full time employee of CytoSorbents Corporation.

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Organ utilization from donors following extracorporeal cardiopulmonary resuscitation

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Objectives: The global shortage of solid organs for transplantation is exacerbated by high demand, resulting in organ deficit and steadily growing waiting lists. Diverse strategies have been established to address this issue and enhance organ availability, including the use of organs from individuals who have undergone extracorporeal cardiopulmonary resuscitation (eCPR). The main aim of this work was to examine the outcomes for both graft and recipients of solid organ transplantations sourced from donors who underwent eCPR.

Methods: We performed a systematic literature review using the combination of the terms related to extracorporeal life support and organ donation. Using PRISMA guidelines, PubMed and Scopus databases were searched up to February 2024.

Results: From 1764 considered publications, 13 studies comprising 130 donors and 322 organ donations were finally analysed. On average, included patients were 36 years old, and the extracorporeal life support was employed for four days. Kidneys were the most often transplanted organs (68%, 220/322), followed by liver (22%, 72/322) and heart (5%, 15/322); with a very good short-term graft survival rate (95% for kidneys, 92% for lungs, 88% for liver, and 73%). Four studies with 230 grafts reported on functional outcomes at the one-year follow-up, with graft losses reported for four hearts (36%), eight livers (17%), and seven kidneys (4%).

Conclusions: Despite the continuous development of critical care, ethics, and education of the public, organ donation from patients receiving VA-ECMO remains a subject of debate. We demonstrated a successful utilisation of organs following eCPR, with very high graft and recipient short-term survival. Based on the weight of the available evidence, further studies are crucial to clarify the role of VA-ECMO support prolongation following CPR, aiming for organ preservation. Until these data are available, VA-ECMO might be an appropriate approach as far as accepted by society. This holds especially true in the sight of organ shortage, long waiting lists and good graft functionality after transplantation.

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Gender disparities in In-hospital outcomes following extracorporeal cardiopulmonary resuscitation: a propensity score-matched analysis

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Objectives: Veno-arterial extracorporeal membrane oxygenation (VA-ECMO) is crucial for managing cardiogenic shock, yet reports on gender-specific outcomes are inconsistent. This study investigates potential gender disparities in in-hospital mortality associated with extracorporeal cardiopulmonary resuscitation (ECPR).

Methods: This cohort retrospectively reviewed adult patients who received VA-ECMO at National Taiwan