

Paramedic - Evidence Based Medicine (P-EBP) Program

Paramedic CAT (Critically Appraised Topic) Worksheet

Title: To transport or not to transport; The story of prehospital ECMO vs ED ECMO

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Clinical Scenario: Called for a 52-year-old male cardiac arrest at a hockey rink. Bystander CPR is in progress, while another is activating the prehospital system and running to fetch the public access AED. An ALS/BLS crew arrive on scene and confirm the patient is in cardiac arrest. Prior to today, the patient is healthy, member to society, a husband, a Dad and a friend to many. 1 shock prior to EMS arrival and a complete and thorough ACLS code is conducted without success of ROSC. He remains in refractory VFIB to the 3 shocks applied to his body. The question is no longer *if* this patient should receive ECMO but *when and where*.

PICO (Population – Intervention – Comparison – Outcome) Question:

Would adult OOHCA patients benefit from prehospital extracorporeal membrane oxygenation in comparison to emergency department extracorporeal membrane oxygenation using 30 day neurologically intact survival rates

Search Strategy:

Adult prehospital or out of hospital or OOHCA and prehospital ECMO or prehospital extracorporeal membrane oxygenation and emergency department ECMO or emergency department extracorporeal membrane oxygenation and survival or 30- mortality or neurological or ROSC

Search Outcome:

2043



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Relevant Papers:

AUTHOR, DATE	POPULATION: SAMPLE CHARACTERISTICS	DESIGN (LOE)	OUTCOMES	RESULTS	STRENGTHS/ WEAKNESSES
Yannopoulos et al Published 2016	27 adult OOHCA who presented in refractory VFIB/VTACH between the ages of 18-75 years old, first presenting rhythm was shockable, received at least 3 direct current shocks without sustained ROSC, received amiodarone 300mg, LUCAS device able to be applied, transfer time from scene to coronary cath lab < 30mins	A prospective level 2 study	Functionally favorable survival to hospital discharge (cerebral performance categories [CPCs] 1 and 2). Secondary outcomes were 1-month survival, 1-month neurological function (CPC 1 or 2), and protocol-based complications.	50% rate of functionally favourable survival to hospital discharge	Very small cohort Very specific criteria- may be favourable to increasing outcomes Selection bias from EMS No randomization 100% sensitivity, 65% specificity
T. Sakamoto et al. Published 2014	VF/VT on initial ECG, cardiac arrest on hospital arrival with or without prehospital ROSC, within 45 min from reception of the emergency call or the onset of cardiac arrest to the hospital arrival, no ROSC at least during the 15 min after hospital arrival even though conventional CPR was performed	prospective, observational level 2 study	favorable outcomes were significantly higher in the ECPR group than in the non-ECPR group with persisting CA due to VF/VT. The same results can be shown in both the intention-to-treat and per protocol analyses even on the assumption that all patients with an	546 patients enrolled 16 patients refused 454 meeting inclusion criteria 76- excluded 260 ECPR 194 non-ECPR EPCR group; 260 analyzed at 1 month Non- ECPR group; 193 patients at 1 month	No difference in background factors-reported ABG examining superoxide was not completed on patients- neuro outcomes effected? TH was completed on ECPR group, not completed on half of the non-ECPR group-



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	<p>Exclusion criteria; under 20y/o over 75 y/o, poor ADLs prior to arrest, non-cardiac origin, core body temp <30° C, no informed consent from individuals representing patients</p>		<p>unknown outcome in the ECPR group (n = 2 at 6 months) had an unfavorable neurological outcome (CPC3-5) and that all patients with an unknown outcome in the non-ECPR group (n=1 at 1 month, n = 1 at 6 months) had a favorable outcome. The following points might have strongly contributed to favorable neurological outcomes.</p>	<p>EPCR group; 258 patients analyzed at 6 months Non-EPCR group; 192 patients analyzed at 6 months</p>	<p>effecting neuro outcome?</p>
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Comments: *During my research into answering my PICO, I determined that no official study has been completed on OOHCA patients who receive ECMO within the prehospital field. France is the only country currently completing a study, however, it is not expected to be complete until September 2019.*

Consider: *ECMO prehospital has many barriers heavily resource based, a heavy economic burden, a contention with cost associated EMS vs Hospital cost, sterility of procedure in the field, and overall more research is needed into this procedure within a hospital environment where it may be refined and streamlined.*

Clinical Bottom Line: *ECMO saves lives, more importantly it saves functional, contributing members of society.*



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References: T. Sakamoto et al; Extracorporeal cardiopulmonary resuscitation versus conventional cardiopulmonary resuscitation in adults with out-of-hospital cardiac arrest: A prospective observational study

Yannopoulos et al; Minnesota Resuscitation Consortium's Advanced Perfusion and Reperfusion Cardiac Life Support Strategy for Out-of-Hospital Refractory Ventricular Fibrillation

