ECPR and Immediate Cath for Refractory OHCA?

Key Article

Belohlavek J, et al. Effect of Intra-arrest transport, extracorporeal cardiopulmonary resuscitation, and immediate invasive assessment and treatment on functional neurologic outcome in refractory out-of-hospital cardiac arrest. JAMA. 2022;327:737-47.

Background

- Refractory cardiac arrest is associated with poor survival.
- ECPR has been recognized as a potential therapy that may be beneficial for patients with refractory cardiac arrest.
- The ARREST Trial (reviewed in prior CCPEM podcasts) randomized 30 patients with refractory OHCA due to vfib and found significantly improved survival to discharge and functional status compared with standard ACLS.
- Notwithstanding this small, randomized trial, the benefit of ECPR remains uncertain.
- Both AHA and European Resuscitation Council provide a weak recommendation for ECPR as a rescue method for patients with refractory cardiac arrest.

Objective

- Compare a bundle of intra-arrest transport to the hospital with mechanical CPR, ECPR, and immediate coronary angiography vs. standard treatment in refractory OHCA on 180-day good neurologic outcome.

Methods

- Randomized clinical trial
- Single center in Prague, Czech Republic
- Patients
    - Included
        - Adults aged 18 to 65 years of age
        - Witnessed OHCA of presumed cardiac etiology
        - Received a minimum of 5 min of ACLS without ROSC
        - Presented when the ECPR team was available
    - Excluded
        - Unwitnessed arrest
        - Presumed noncardiac cause
        - Attained ROSC within 5 min of arrest
        - Regained consciousness
        - Life-threatening comorbidities
        - Pre-arrest CPC of 3 or greater
        - Suspected or confirmed pregnancy
- Intervention
    - Standard Strategy Group

        - Received continued ACLS on site – use of a mechanical CPR device was left to the discretion of the emergency physician
        - Use of medications, further defibrillation, or other interventions were provided according to recommended guidelines.
        - If ROSC was achieved, patients were transported to the hospital and early coronary angiography was encouraged.
    - Invasive Strategy Group
        - Intra-arrest intranasal evaporative cooling was initiated if feasible
        - Patient immediately transported to the cardiac center while receiving mechanical CPR
        - Use of medications, further defibrillation, and other interventions delivered according to ERC guidelines
        - On arrival, overall status, ROSC or no ROSC, and ECLS inclusion/exclusion criteria were assessed.
        - If no ROSC and no exclusion criteria, ECLS cannulation was performed in the cath lab during mechanical CPR using a femoral-femoral approach.
        - Placed on ECMO and then underwent angiography
    - Post-arrest care standardized in both study groups
        - Urgent bedside echo
        - Pan CT if feasible
        - TTM to 33C (following TTM1 – a temp of 36C was allowed if cases of early awakening or hypothermia complications)
- Primary Outcome
    - 180-day survival with favorable neurologic status (CPC 1 or 2)
- Secondary Outcomes
    - 30-day survival with cardiac recovery and neurologic recovery (CPC 1 or 2)
- Exploratory Analysis
    - Survival to 180 days
    - Subgroups
        - > 65 years of age
        - 65 years of age and younger
        - Place of arrest
        - Initial rhythm

Results

- In total, 256 patients were analyzed
    - Standard Strategy Group: 132 patients
    - Invasive Strategy Group: 124 patients
    - (7.6% of patients had crossover: 11 in standard group to invasive group and 9 from invasive group to standard group)
- Patient characteristics
    - Median age
        - Standard Strategy Group: 57 years
        - Invasive Strategy Group: 59 years
    - Most frequent cause of arrest: acute coronary syndrome
        - Standard Strategy Group: 48%
        - Invasive Strategy Group: 52%
    - Most common location of arrest: public place

        - Standard Strategy Group: 41%
        - Invasive Strategy Group: 36%
    - Most common initial rhythm: ventricular fibrillation
        - Standard Strategy Group: 64%
        - Invasive Strategy Group: 58%
    - Bystander CPR
        - Standard Strategy Group: 98%
        - Invasive Strategy Group: 99%
- Primary Outcome
    - Standard Strategy Group: 22%
    - Invasive Strategy Group: 31.5%
    - Not statistically significant
- Secondary Outcomes
    - Neurologic recovery at 30 days
        - Standard Strategy Group: 18.2%
        - Invasive Strategy Group: 30.6%
        - Statistically significant
    - Cardiac recovery at 30 days
        - Standard Strategy Group: 34.1%
        - Invasive Strategy Group: 43.5%
        - Not statistically significant
- Subgroup Analysis
    - No difference based on age > or < 65 years, initial shockable rhythm, cardiac arrest cause
- Complications – Major Bleeding Events
    - Standard Strategy Group: 15%
    - Invasive Strategy Group: 31%

Limitations

- Single center
    - Prague – operates with 1 dispatch center – EMS system with an emergency physician
- Limited enrollment/randomization
- High percentage of bystander CPR in Prague – 90%
- Study allowed crossover

Take Home Points

- A bundle of early intra-arrest transport, ECPR, and angiography did not significantly improve 180-day survival with favorable neurologic outcome in patients with refractory OHCA.