

Evaluating pediatric mortality risk prediction among children receiving extracorporeal respiratory support

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Table of Contents:

Study Schema

- 1.0 Background**
- 2.0 Admission Data**
- 3.0 Pre-ECMO Data**
- 4.0 ECMO Cannula and Discharge Data**

1.0 Background

All data will be collected and recorded directly onto an excel spreadsheet. Generally, at admission and Pre-ECMO, the goal is to collect diagnostic, laboratory, and ventilator information. The purpose of this collection is to be able to use the data on Pre-ECMO characteristics to predict the probability of an ECMO patient's mortality.

Inclusion Criteria

- Age <18 years old at the time ECMO cannula(s) were placed
- Person received ECMO therapy for the first time on or after January 1, 2000.

Exclusion Criteria

- Second course of ECMO therapy
- Patients already on ECMO therapy upon admission

2.0 Administrative Data

- Date of Discharge: mm/dd/yyyy, (example 09/28/2011)
- Date of Birth: mm/dd/yyyy
- Date/Time of PICU Admission: mm/dd/yyyy 23:30
The date of admission is to the hospital providing ECMO support.
If no time is available, use first documented vital signs by nursing. If no time can be found, use 12:00PM
- Date/Time of Initial Presentation: mm/dd/yyyy 23:20
If the patient presented to hospital A, then transferred to hospital B where ECMO was provided, the date of initial presentation will be the date and time of presentation to hospital A. If the patient was admitted to the floor at hospital C and then transferred to PICU at hospital C, the initial presentation would be the time of admission to the floor.
If no time is available, use first documented vital signs by nursing. If no time can be found, use 12:00PM
- Admit Height: Height within 30 days of admission; if not available can extrapolate from growth chart but place asterix.
- Admit Weight: Weight on day of admission to PICU hospital providing ECMO
- Date of Intubation: mm/dd/yyyy. Date patient was intubated.
If patient trached but not vent dependent, please use date and time started bi-level positive pressure ventilation.
If no time is available, use first documented vital signs by nursing. If no time can be found, use 12:00PM
- Female: 1=Female, 0=Male
- Admission Diagnosis: Reason the patient was admitted/transferred to your hospital
 - 1= Asthma
 - 2=Bronchiolitis
 - 3=Aspiration pneumonia
 - 4=Pneumonia, except aspiration pneumonia
 - 5=Non Pulmonary Infection
 - 6=Pertussis
 - 7=Other
- Altered Neurologic Status
 - 0= No documentation in H&P of altered mental status
 - 1= Documentation prior to sedation in H&P at initial presentation or at PICU admission of altered mental status
- Immunodeficiency
 - 0= None
 - 1= documentation of an immunodeficiency prior to receipt of ECMO of an immunodeficiency other than cancer
- Cancer
 - 0=No cancer
 - 1= Documentation prior to receipt of ECMO of cancer
- Number of Transfers:
 - 0 = Patient was admitted directly to your hospital

- Otherwise, document the number of institutions the patient visited prior to receipt of ECMO
- Placed on ECMO at OSH
 - 0 = no
 - 1 = yes
- CC1-5= Comorbidity
 - Write in text any comorbid conditions known prior to receipt of ECMO
- Dx1-Dx5Secondary Diagnosis
 - Write in text any secondary diagnoses known prior to receipt of ECMO

3.0 **Physiologic and Therapeutic Data**

- Admit Creatinine
Report the first obtained value within 24 hours of admission at place where placed on ECMO
- **Pre-ECMO Laboratory Data (Except Blood Gas)**
All values must be Pre-ECMO. These should be the most abnormal values obtained within 24 hours of ECMO. Those should be recorded in Pre-ECMO.
 - Creatinine
 - Total Bilirubin
 - Alanine Aminotransferase (ALT)
 - International Normalized Ratio (INR)
 - Hemoglobin
 - Platelets
 - White Blood Cell Count
- Pre ECMO lactate1 and PreECMO lactate2
Please record the two highest Pre-ECMO lactates. These values should be recorded within 6 hours of going on ECMO but prior to start of ECMO.
- Pre ECMO Blood Gas1 and Pre ECMO Blood Gas2
Pre-ECMO Blood Gas should be recorded **within 6 hours of the start of ECMO.**
Report the pH, PCO₂, PaO₂, SaO₂, and associated FiO₂, and peripheral saturation and the time the blood gas was obtained. If possible, the blood gas should be an arterial blood gas. If it is a venous or capillary blood gas please indicate. If there are more than 2 arterial blood gases, please report the two arterial blood gases lowest **PaO₂ if arterial.** The worst blood gas is defined by the lowest **pH if** the blood gas is **venous or capillary**
 - Blood Gas Source
 - 1=Arterial
 - 2=Venous
 - 3=Capillary
- Pre-ECMO Vent settings
Please record Vent Setting 1 as close to but before blood gas 1. Similarly, please record Vent Setting 2 as close to but before blood gas 2. **Rate/Hz** represents the set rate on conventional mechanical ventilator (CMV) and the high frequency oscillatory ventilation (HFOV) frequency in Hertz on the HFOV.
PIP/Amplitude represents Peak Inspiratory Pressure on CMV and Amplitude on

HFOV. On CMV and HFOV, please report measured MAP. On CMV, please report set inspiratory time (iTime) and positive end expiratory pressure (PEEP). If no blood gas enter vent highest vent settings within 6 hours of ECMO and enter associated SpO2.

- Vent Type
 - 1=Conventional Mechanical Ventilator
 - 2= HFOV
 - 3= Hand bagging
 - 4=Other
- iNO
Please record the maximum inhaled nitric oxide the patient was on prior to ECMO.
- Pre-ECMO Pupillary Exam
This exam should have occurred prior to receipt of ECMO support and be within 12 hours of receiving ECMO.
 - 0= Pupils briskly reactive bilaterally
 - 1= Pupils reactive bilaterally but sluggish
 - 2= Pupils not reactive
- Pre-ECMO Cardiovascular Data
Pre-ECMO cardiovascular support should be recorded within 6 hours of receipt of ECMO. Record the two lowest arterial line pre-ECMO systolic blood pressures and associated mean arterial pressures. The blood pressures should be separated by 30 minutes and must be pre-ECMO. If no arterial line blood pressure exists or less than 30 minutes of arterial line blood pressure exists, then a non-invasive blood pressure is acceptable.
- Vasoactive Infusions
Please report the dose of Dopamine1, Dobutamine1, Epinephrine1, Vasopressin1, and Milrinone1 the child is on at the time SBP1 was recorded. Similarly, please record the dose of those vasoactive at the time SBP2 was recorded.
The Vasoactive Infusion Score (VIS) is then calculated using this data
 - $VIS = \text{Dopamine dose } (\mu\text{g/kg/min}) + \text{Dobutamine dose } (\mu\text{g/kg/min}) + 100 * \text{Epinephrine dose } (\mu\text{g/kg/min}) + 100 * \text{Norepinephrine dose } (\mu\text{g/kg/min}) + 10,000 * \text{Vasopressin dose } (\text{U/kg/min}) + 10 * \text{Milrinone } (\mu\text{g/kg/min})$
- Pre-ECMO Cardiac Arrest:
Record if the patient suffered a cardiac arrest during the hospitalization prior to receipt of ECMO. This should not include cardiopulmonary resuscitation (CPR) delivered at the time of ECMO cannulation, which is considered ECMO during cardiopulmonary resuscitation (ECPR).
 - 0= No cardiac Arrest
 - 1= Pre-ECMO cardiac arrest
- Reason for Respiratory ECMO: Reason the patient went on ECMO at your hospital
 - 1= Oxygenation.
Inability to achieve clinically adequate oxygenation (or inability to achieve adequate oxygenation and ventilation)
 - 2= Ventilation.

Inability to achieve clinically adequate ventilation in isolation

- 3= Other such as lost critical airway
- 4= Respiratory and Cardiac

Either 1, 2 or 3 and also placed on ECMO for cardiac support

- PRISM, PELOD, and PIM

Please record values at admission to PICU

4.0 ECMO Cannulae and Discharge Data

- ECMO Cannulae
 - 1=Dual lumen veno-venous (VV) ECMO
 - 2=Single lumen veno-venous (VV) ECMO
 - 3=Veno-arterial (VA) ECMO
 - 4= Other
- Discharge Status
 - 0=Alive
 - 1=Died
- Date and time off ECMO
- Date of Discharge: mm/dd/yyyy
Date of discharge from center providing ECMO care

5.0 Calculated Data

- From the above source data the following variables will be calculated:
Vasoactive Infusion Score, calculated Mean Airway Pressure, Length of Stay,
Age at ECMO Cannulation, Time from initial presentation to ECMO cannulation,
time from PICU admission to ECMO cannulation, time from intubation to ECMO
cannulation, hours on ECMO.

Once this Data is collected, please convert the calculated times into text fields and then delete the date of discharge, date of birth, date of admission, date of ECMO cannulation, and date of intubation. These are fields only used to calculate the above data.