Single Center Experience In Totally Percutaneus Veno-Arterial ECMO Rewarming In Treatment Of Deep Accidental Hypothermia

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BACKGROUND:

Veno-Arterial ECMO (ang.Extracorporeal Membrane Oxygenation (V-A ECMO) is one of among of methods in treatment in deep accidental hypothermia (DAH). In the past ECMO was successfully used in newborns with congenital pneumonia and diaphragmatic hernia. Which patients with DAH are best candidates for V-A ECMO has not been yet defined. Objective of the current report is to present our recent results of totally percutaneus V-A ECMO treatment in hypotermic patients.

METHODS:

Between 2016 and 2019, 20 selected patients (mean age: 40 [17-,60], ; sex male-90%) underwent totally percutaneous arterio-venous V-A ECMO procedure rewarming. Included were only cardiac arrest patients in 3rd and 4th stage of Swiss Staging of Hypothermia scale (13.7oC - 28oC). Patients in 1,2 and 5 Swiss classification were excluded. In all group of patients the cannulation V-A ECMO access was provided via right or left groin cannulation (Fig 1). In all cases Doppler ultrasonography was used.

RESULTS:

Of the 20 patients, 18 (90%) were in the 3rd Swiss Staging of Hypothermia stage. The rewarmed patients were mostly homeless patients (90% male). The mean temperature measured in eosophagus was 25.2 Celcius degree (min temp 21; max temp 28). 88% patients were diagnosed in 3 stage of swiss classification. In 14 (70%) the cause of cardiac arrest cases was ventricular fibrillation; in 5 patients was asystole and pulseless electrical activity in 1 case. Rewarming times were on average 190+/-30min (180-240). There was no case of conversion to sternotomy for and direct cannulation. Median duration of intensive care unit stay was 4.0 [1.0-5.0] days. Three patients (15%) expired during thirty-day follow-up. In the survivors, there within investigated follow-up, there wereas no early neurological complications. All results are available in Table 1.

CONCLUSIONS:

Early diagnosis and qualification institution of V-A ECMO rewarming protocols to patients in 3rd and 4th stages of Swiss Staging of Hypothermia. Swiss classification gets good early results in this group of patients is feasible and safe with promising short-term survival.

Variable	Results
Age in years, median (IQR)	40 (17;60)
Sex male, n (%)	16 (88%)
Sex female, n (%)	2 (12%)
Summary	18
Temperature in °C, median (IQR)	25.2 (21;28)
Stage 3, n(%)	16 (88%)
Stage 4, n(%)	2(12%)
First cardiac rhythm, n (%)	
Asystole	5(27%)
Sinus rhythm	0 (0%)
Ventricular fibrillation	12 (66%)
Atrial fibrillation	0 (0%)
Others- PEA	1 (5%)
Rewarming method	
ECMO	17 (94%)
Roller pump	1(5%)
Outcome , n (%)	
ICU stay, days	4 days
Discharge	15 (83%)
Death	3(16%)

Table 1. Results



Figure 1. Totally percutaneus acces.

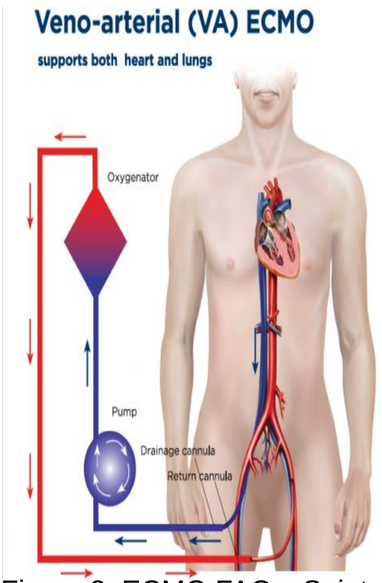


Figure 2. ECMO FAQs. Saint Luke's Health System. Scheme.





Figure 3. Pre and post ECMO implantation vital parameters