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ECMO TREATMENT FOR COVID-19 RELATED ARDS: THE EXPERIENCE OF TURIN (NORTH ITALY) ECMO CENTER

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BACKGROUND

During COVID-19 pandemic, Extra Corporeal Membrane Oxygenation (ECMO) has been used as rescue therapy for treatment of severe ARDS refractory to conventional therapies. [1-2] ECMO utility is still debated in COVID-19 setting. [1] We report the experience of our ECMO center, comparing data with those provided by Extra Corporeal Life Support Organization (ELSO).

METHODS

Clinical data of all consecutive adult patients with COVID-19 related ARDS [3] treated with veno-venous ECMO in 'Città della Salute e della Scienza' Hospital (Turin, Italy), between February and December 2020, were collected retrospectively. ELSO data were recovered on the official website accessed on the 22nd April, 2021. [4]

RESULTS

We enrolled 35 patients in the study period versus 3911 reported in ELSO registry. Demographic characteristics and comorbidities are shown in Table. Median SOFA and SAPS-II scores at ICU admission were elevated in our population (9, IQR: 7-12 and 56, IQR: 53-60, respectively). Invasive mechanical ventilation (IMV) length before ECMO was longer in our cohort (median 6 vs 3.5 days). We even used more non-invasive CPAP ventilation (63% vs 12%) and prone positioning (89% vs 61%). The median PaO2/FiO2 before ECMO were 64 versus 70 in our patients and ELSO population, respectively. The overall mortality rate in our center was higher (86%) than the one reported by ELSO (50%). We had a higher rate of oxygenator failure (26% vs 12%) and circuit change (26% vs 15%). In our patients we reported a 51% of multidrug-resistant (MDR) bacteria superinfections on overall (20% in survivors versus 57% in non-survivors) and 83% of severe bleeding (40% vs 90% in survivor and dead patients respectively, p = 0.026).

	TURIN POPULATION N=35	ELSO POPULATION N= 3911
Age, years, median (IQR)	54 (50 - 61)	50 (42 - 58)
BMI, kg/m^2, median (IQR)	29 (28 - 33)	32 (28 - 38)
Gender (male), n (%)	29 (83)	2866 (73)
Patients with underlying comorbidities, n (%)	29 (83)	2988 (76)
Obesity	15 (43)	1999 (51)
Hypertension	13 (37)	1404 (36)
Lung disease	4 (11)	156 (4)
Diabetes	4 (11)	1206 (31)
Severity score at ICU admission, median (IQR)		
SOFA	9 (7 - 12)	NA
SAPS II	56 (53 - 60)	NA
Treatments before ECMO, n (%)		
HFNC	2 (6)	1917 (49)
CPAP	22 (63)	456 (12)
BIPAP	9 (26)	1244 (32)
iNO	14 (40)	1240 (32)
Prone position	31 (89)	2339 (61)
Steroid	25 (71)	2829 (72)
Hydroxychloroquine	14 (40)	689 (18)
Remdesevir	14 (40)	1887 (48)
IMV days before ECMO, median (IQR)	6.0 (3.0 – 8.3)	3.5 (1.1 - 6.4)
Ventilatory parameters before ECMO, median (IQR)		
PaO_2/FiO_2, mmHg	64 (55 - 72)	70 (58 - 90)
Lung static compliance, ml/cmH_2O	27.1 (21.6 - 39.9)	
Tracheostomy, n (%)	13 (37.1)	1614 (46)
Outcomes, n (%)		
Overall mortality	30 (86)	1961 (50)
Weaning from ECMO at 28 days	8 (23)	NA
Weaning from IMV at 28 days	2 (6)	NA
Discharge from ICU at 28 days	0	NA
ICU mortality at 28 days	17 (49)	NA
Complications, n (%)		
MDR bacteria superinfection	18 (51)	NA
Septic shock	20 (57)	NA
Severe bleeding	29 (83)	NA
Haemorrhagic stroke	2 (6)	246 (7)
ECMO related complications, n (%)		
Haemolysis	3 (9)	266 (7)
Circuit clotting	2 (6)	146 (4)
Oxygenator failure	9 (26)	468 (12)
Circuit change	9 (26)	576 (15)

CONCLUSIONS

Baseline characteristics of our patients were similar to ELSO population; nevertheless, we had higher mortality rate. ELSO did not report patients' severity scores at ICU admission, while according to our SOFA and SAPS- II our population was more severe. Differences seem to be in CPAP use before IMV and the longer IMV before ECMO. Finally, our patients reported high percentage of MDR-bacteria superinfection and bleeding complication that could explain the difference in mortality rate. Further prospective studies should be performed to understand who may benefits from ECMO and which factors can affect outcomes.

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