

LETTER TO THE EDITOR

2012 Pandemic Flu

Dear Editor, a new H1N1 pandemic flu is approaching Europe.

In Italy, the results obtained from the “EC-MONet” network, for the centralization of patients with adult respiratory distress syndrome (ARDS) in structures with extracorporeal membrane oxygenation (ECMO) support, are encouraging (1,2) but far from being exhaustive, mainly because of the small number of patients treated. The ECMO technique seems to be successful (3), and probably represents the turning point for patients affected by a respiratory failure considered, until recently, irrecoverable. Moreover, the key role of extracorporeal life support in severe hemodynamic failure, not responding to conventional therapy, is already established, and a more extensive use of ECMO is recommended. Despite the attention that the technique has received during the previous Italian pandemic, many physicians do not know the criteria for patients centralization and therapy establishment. This could lead to an higher

than expected failure rate due to late or missed patients centralization.

More efforts are therefore needed to establish the enrollment criteria and to spread their knowledge among clinicians involved in patients’ recruitment. We would be very grateful if you could publish the enrollment criteria, shared by your trustworthy board, to publicize this data among the Italian ICUs. This could help to improve survival of patients with adult respiratory distress syndrome (ARDS) not only during the pandemic, but also during the rest of the year.

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RESPONSE

The criteria of eligibility to the extracorporeal treatment

Dear colleagues,

We agree with your analysis and believe that a higher circulation of the criteria of eligibility to the extracorporeal treatment, both for the treatment of severe cases of ARDS and for refractory shock, could lead to a greater number of patients treated and therefore saved.

However we cannot forget the serious economic crisis that part of Europe is suffering, and the remarkable cut of the financial resources that seriously limits the possibility to carry out programs of widespread awareness campaign. Despite these hard limitations, other initiatives continue. A web-based interface for information (www.ecmonet.org) is continuously updated. A 24/24 hours and 7/7 days telephone Help-

line (800 – 82 12 29) is always active in Italy for any kind of information and assistance. In engaging ourselves to keep alive the interest of the scientific community and looking forward to a “consensus conference” that will establish guidelines, we propose, as follows, the criteria of inclusion to the extracorporeal therapy.

Pathological Processes Suitable for venous-venous (V-V) ECMO

- Severe pneumonia
- ARDS
- Acute lung (graft) failure following transplant
- Pulmonary contusion
- Others:
 - Alveolar proteinosis
 - Smoke inhalation
 - Status asthmaticus
 - Airway obstruction
 - Aspiration syndromes

Respiratory Indications to V-V ECMO (after considering recruitment maneuvers, conventional or HFO protective lung ventilation, prone positioning, diuresis or renal replacement therapy for correction of volume overload, optimization of perfusion including restoration of oncotic pressure, intravascular volume, and inotropes). Identify acute reversible pulmonary injury and select patients early in the course.

- Murray score > 3
- PaO₂/FIO₂ < 100 (mm Hg) despite high PEEP (10 -20 cmH₂O) on FiO₂ > 80 %
- Others:
 - intrapulmonary right-to-left shunt (Q_s/Q_T) > 30 %
 - total thoracopulmonary compliance (CT_{stat}) < 30 ml/cmH₂O
 - Severe hypercapnia with PaCO₂ > 80 on FiO₂ > 90 % or pH < 7.20
 - Maximal medical therapy > 48 h

Contraindication to V-V ECMO

Absolute

- Irreversible cardiac or pulmonary disease
- Metastatic malignancy
- Significant brain injury
- Current intracranial hemorrhage
- Major pharmacologic immunosuppression (absolute neutrophil count < 400)

Relative

- Age > 65-70 years, considering increasing risk with increasing age
- Mechanical ventilation at high settings (FiO₂ > 90 %, Plateau Pressure > 30) > 7-10 days
- Multitrauma with high risk of bleeding

Pathological Processes Suitable for venous-arterial (V-A) ECMO

- Cardiogenic shock: Acute Myocardial Infarction and complications (including: wall rupture, papillary muscle rupture, refractory ventricular tachycardia or fibrillation) refractory to conventional therapy including intraaortic balloon pump
- Post cardiac surgery: unable to wean safely from cardiopulmonary bypass using conventional supports
- Drug overdose with severe cardiac depression
- Myocarditis
- Early graft failure: post heart/heart-lung transplant

- Others:
 - Pulmonary embolism
 - Cardiac or major vessel trauma
 - Massive hemoptysis/pulmonary hemorrhage
 - Pulmonary trauma
 - Acute anaphylaxis
 - Peri-partum cardiomyopathy
 - Sepsis with severe cardiac depression
 - Bridge to transplant

Cardiac Indications to V-A ECMO (shock persist despite volume administration, maximal inotropic and vasoconstrictors support, mechanical ventilation and intra-aortic balloon counterpulsation - if appropriate -)

- Cardiac index < 2 L/min/m²
- Lactate level > 50 mg/dl or 5 mmol/L or Central Venous Oxygen Saturation - ScVO₂ < 65 % with maximum medical management
- Others:
 - Systolic blood pressure less than 90 mmHg
 - Low cardiac output

Contraindication to V-A ECMO

Absolute

- Unrecoverable heart and not a candidate for transplant or Ventricular Assist Device (VAD)
- Age > 75 years
- Chronic organ dysfunction (Emphysema, cirrhosis, renal failure)
- Prolonged Cardiopulmonary Resuscitation without adequate tissue perfusion
- Aortic dissection
- Severe aortic valve regurgitation
- Current intracranial hemorrhage

Extracorporeal Cardiac Life Support (ECLS) – Extracorporeal Cardiopulmonary Resuscitation (ECPR)

Indications to V-A ECMO include persistent cardiopulmonary arrest despite traditional resuscitative efforts

ECLS-ECPR Contraindications to V-A ECMO

- Initial rhythm asystole
- Age > 80 years
- Chest compressions not initiated within 10 min of arrest (either bystanders or emergency medical team)
- Cardiopulmonary Resuscitation > 60 min before implanting ECMO
- Pre-existing severe neurological disease (in-

cluding traumatic brain injury, stroke, or severe dementia)

- Current intracranial hemorrhage
- Malignancy in the terminal stage
- Cardiac arrest of traumatic origin with uncontrolled bleeding
- Irreversible organ failure leading to cardiac arrest when no physiological benefit could be expected despite maximal therapy

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REFERENCES

1. Pappalardo F, Pieri M, Greco T, et al. Predicting mortality risk in patients undergoing venovenous ECMO for ARDS due to Influenza A (H1N1) pneumonia: the ECMOnet score. *Intensive Care Med* 2012; In press.
2. Patroniti N, Zangrillo A, Pappalardo F, et al. The Italian ECMO network experience during the 2009 influenza A(H1N1) pandemic: preparation for severe respiratory emergency outbreaks. *Intensive Care Med.* 2011; 37: 1447-57.
3. Peek GJ, Mugford M, Tiruvoipati R, et al. Efficacy and economic assessment of conventional ventilatory support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR): a multicentre randomised controlled trial. *Lancet.* 2009; 374: 1351-63.

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