Team work to address current and future challenges in infections calling for critical care support

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In the 80s, severe respiratory failure associated with poliomyelitis infection required the use of ventilator support, representing a first link between infectious diseases and critical care that was associated with improved outcomes.

In 2014, many critically ill patients infected by Ebola virus (EBOV) in Africa, die due to extreme sodium and potassium abnormalities without adequate intravenous fluid resuscitation. In Western countries, mortality rates above 70% for Ebola virus disease (EVD) should be unacceptable.

We sincerely support all the caregivers that expose their lives to taking care of EVD patients over the world. Adequate simulation training and optimal protective measures should be facilitated. In this scenario, it is unethical to expose healthcare workers to potential contamination in futile patients and advanced Cardiopulmonary Resuscitation should be avoided. On the other hand, it seems unethically and medically unjustified to deny aggressive supportive therapies and techniques of organ support, such as mechanical ventilation and renal replacement therapies in a possibly reversible disease.

The NEJM reported online on October 22th, what were the real challenges on management of EVD and demonstrated that even severe EVD can be treated effectively with conventional intensive care. Consistent with other cases treated in Europe and USA, the predominant clinical syndrome of the 36 year-old male transferred from Sierra Leone to Germany, was a severe gastrointestinal choleric–like diarrhoea, with stool output of more than 8 litres within the first three days. Nausea and vomiting precluded oral rehydration, and high volume resuscitation of upon 10 l per day, with a positive net-volume balance of 30 litres during the first week was required to maintain circulatory stability. Continuous intravenous substitution around 10 mmol of potassium chloride per hour was required.

The patient presented in the NEJM report had severe hypoglycaemia and lactic acidosis, severe encephalopathy for 6 days, with transient delirium and hallucinations, typical complications in the current ICU. C-reactive protein monitoring anticipated a Gram-negative bloodstream superinfection associated with injured mucosal intestinal integrity. Enteral nutrition was not tolerated and parenteral nutrition was required. Epistaxis, gastrointestinal bleeding, vaginal bleeding and other haemorrhagic manifestations are not cardinal signs, but complicate management of patients, emphasizing the importance of team work. Respiratory failure developed late, being a combination potential volume overload and the capillary leak syndrome, which has been also documented as a challenge of management in other cases in Europe and the USA. Monitoring of rehydration had to be guided by ultrasonographic examinations of the lower vena cava. Renal replacement therapies and artificial ventilator support for
reversible complications have been used in some patients out-of-Africa. Indeed, the skills used to treat the out-of-Africa patients are critical care skills.

From the virological viewpoint, without therapies targeted to reduce the viral load, it decreased below the lower limit of RNA detection in plasma by day 17 and in saliva, sputum, conjunctival swabs and stool by day 18; urine EBOV RNA was persistently positive until day 40. However all cell cultures of clinical specimens (plasma, sweat, and urine) obtained after day 26 of illness remained negative for viable EBOV. Finally the patient survived, emphasizing the importance of routine yet-aggressive critical care and the successful coordination of a multidisciplinary treating group.

In summary, early diagnosis and optimal supportive therapy might contribute to the survival of many more patients suffering EVD. More data on care and outcomes of patients with EVD in developed countries is essential.

These experiences reinforce the need of team work between microbiologists, infectious diseases physicians, infections control practitioners, epidemiologists, virologists and specialized nurses and physicians with advanced training in critical care. Certainly we have to keep successful paradigms as a basis towards a future established preparedness to multiple challenges.

Jordi Rello, Matteo Bassetti and Garyphallia Poulakou, on behalf of the ESCMID Study Group for Critically Ill Patients (ESGCIP).