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Infection control on ECMO

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Background: Mortality of patients on extracorporeal membrane oxygenation (ECMO) remains high. Diagnosis of infection during extracorporeal life support (ECLS) is still challenging, and prevention strategies vary widely from center to center.[1–3] These facts led us to analyze the occurrence rate, site, and organism in our ECLS patients in order to implement infection control measures to reduce the incidence of infections during ECLS.[4]

Our objective was to analyze our Extracorporeal Life Support Organization (ELSO) registry center data specifically focused on incidence of infection, typical microorganisms, time of manifestation, and site of cultures in the settings of tertiary pediatric cardiac intensive care unit mainly utilizing transthoracic cannulation and VA-ECMO, and compare with the ELSO database.[1]

Methods: We conducted a retrospective study analyzing 25 neonatal and pediatric ECMO cases in relation to infection from January 2014 to December 2015, in comparison to the ELSO database age and modality specific data. We obtained ethical approval from our institution. We examined the prevalence of infection, the time of the first positive cultures, the site of the positive cultures, and the underlying microorganisms and compared with ELSO data whenever feasible.

Results: There is no specific data on the incidence of infection in the ELSO database with open chest/transthoracic cannulation; our incidence was 0.44. The *Candida* species was the highest offending organism (24% vs. ELSO 12% concerning the entire ECMO population), followed by *Klebsiella* 20%, *E. coli* 16%, and *Pseudomonas* 12%. The first positive culture was taken on the 8th day of ECMO (median). By site, the highest prevalence of infection is as follows: ventilator-associated pneumonia (VAP), 41%, followed by bloodstream infection (BSI), 22%, and

then catheter-associated urinary tract infection (CAUTI), 12%.

Conclusions: The highest prevalence of *Candida* infections is most probably due to the combined antibiotic and steroid therapy for patients with capillary leak syndrome. This may prompt that routine antifungal prophylaxis can be added after 1 week of ECMO for this patient group. Alternatively, the early detection with fungal polymerase chain reaction (PCR) assay should be evaluated.[5] The high occurrence of VAP may indicate the need of reinforcing enteral feeding, oral decontamination protocol along with VAP bundle, and investigation of alternative source of contamination. As Gram-negative Enterobacteriaceae and *Pseudomonas* were in second line as typical multidrug-resistant (MDR) organisms, those should be covered whenever a need for empiric antibiotic therapy arises.

Keywords: ECMO, ECLS, infection, infection control, microorganism, fungal infection, pediatrics

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