

ORCID ID: 0000-0002-3051-6441 (S.K.).

*Corresponding author (e-mail: skher@tuftsmedicalcenter.org).

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Antimicrobial Prophylaxis in Extracorporeal Membrane Oxygenation: Is the Debate Still Open?

To the Editor:

Extracorporeal membrane oxygenation (ECMO) is increasingly used in intensive care units, even in the context of the pandemic we are experiencing (1). There is evidence that nosocomial

infections in ECMO-treated patients are associated with significantly increased morbidity and mortality (2), and most centers use antimicrobial prophylaxis, although there is no evidence supporting this practice.

Prevalence of nosocomial infections in ECMO-treated adult patients has been reported to be one in five patients, with the highest incidence of infections in the cardiac ECMO population; bloodstream and surgical site infections are the most common (3). No evidence of reduced risk of infections in patients given an antimicrobial prophylaxis regimen has been observed in any of the papers analyzed (2). Another retrospective study (3) found that antimicrobial prophylaxis did not reduce the risk of new sterile site infection, as by

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500 hours on ECMO, all patients had a 60% probability of developing an infection.

Accordingly, the Extracorporeal Life Support Organization Task Force for Infectious Diseases stated that antimicrobial prophylaxis is not routinely recommended either for pediatric or adult patients except for groups at risk, such as those with prolonged open chest or abdomen or the immunocompromised (4).

Surprisingly, Kondo and colleagues (5), in the context of a Japanese cohort covering the period 2010–2017, comparing patients treated ($n = 5,552$) and untreated ($n = 4,063$) with antibiotic prophylaxis during ECMO, concluded that it may reduce in-hospital mortality (56.4% vs. 59.8%) and effectively prevent nosocomial pneumonia (12.9% vs. 15.3%).

Despite the undoubted strengths of this study, we believe that some methodological criticalities need to be discussed.

First, prophylaxis is classically defined as a process of preventing the development of a disease by means of a treatment or action that affects the pathogenesis of the disease itself. Antibiotic prophylaxis is usually defined as the administration of antimicrobials taking place before the invasive procedure begins. Notwithstanding, the authors define the prophylaxis group as “those who received cephalosporin or glycopeptides within the 2 days after starting ECMO treatment.” This definition is arbitrary: How can a treatment started up to 48 hours after the procedure be always considered prophylactic? Furthermore, how can the authors assimilate patients who received treatment at the same time as the procedure and those who instead received it up to 48 hours later?

In addition, all patients who received antibiotics other than cephalosporin/glycopeptides within the 2 days were excluded from analysis. However, it is difficult to discriminate between the so-called “prophylaxis” and an empirical therapy only on the basis of the medications chosen. Furthermore, among the enrollment criteria, ECMO indication and type, concomitant infections (excluding sepsis) and previous antimicrobial therapies are not foreseen.

Another point still to be considered is the unclear correlation between the use of the selected antimicrobials and the prevention of nosocomial pneumonia, rather than bloodstream infection, which was not specifically investigated.

In light of all of the above, we believe that the study by Kondo and colleagues (4) does not completely dispel previous unsolved questions, leaving open the debate on the real need for prophylaxis.

Future studies, ideally prospective and specifically designed, should investigate the role of antibiotic prophylaxis in ECMO as well as other approaches to infection prevention (e.g., chlorhexidine bathing and preferential elective cannulation) to define a bundle of care, like the one used for vascular access or ventilator-associated pneumonia.

In the era of multidrug resistance, antimicrobial stewardship is of paramount importance in any setting and requires great caution. Prophylactic antibiotic therapy—not to be confused with preemptive or empiric therapy—is widely used in many clinical settings, some with good evidence base and others with less convincing proof. Its efficacy in ECMO-treated patients is still far from being defined. ■

Author disclosures are available with the text of this letter at www.atsjournals.org.

Giorgia Montrucchio, M.D.*
University of Turin
Turin, Italy
and
Città della Salute e della Scienza Hospital
Turin, Italy

Marcello Zagagnoni, M.D.
University of Turin
Turin, Italy

Luca Brazzi, Ph.D.
University of Turin
Turin, Italy
and
Città della Salute e della Scienza Hospital
Turin, Italy

*Corresponding author (e-mail: g.montrucchio@gmail.com).

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