

Another Unnecessary Test? The Value of Screening Blood Cultures on ECMO

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Background: Extracorporeal membrane oxygenation (ECMO) is a life-sustaining device for patients with cardiorespiratory failure. However, due to the invasive nature of the device, patients are at risk of developing serious bloodstream infections. Routine screening blood cultures are used as one of the precautions for early detection of these infections. Unfortunately, frequent screening blood cultures can be quite costly, resource intense, and sometimes inaccurate. The purpose of this study is to understand the efficiency of the current blood screening schedules and determine if any risk factors can be associated with developing a bloodstream infection.

Methods: A retrospective review of all patients supported with ECMO from 2015-2019 was performed. Multiple variables were collected from these patients including but not limited to age, clinical condition at the time of ECMO, duration, and culture results. A thorough analysis was conducted on all variables, most importantly data on all blood cultures and reported bloodstream infections. Comparative statistics were planned with T-tests, chi-squared test, and Mann-Whitney test. Identification of risk factors was accomplished using multivariate regression.

Results: 140 patients required ECMO during the study period. Mean age was 34 years, 61% were male, 15% were neonates. Mean duration of ECMO was 162 hours, and 52% had venovenous ECMO, with 60% needing support for respiratory failure. Antibiotic use was noted in 58% cases prior to, and 97% after initiation of ECMO. Over 90% had blood cultures obtained, and a majority were classified as 'routine screening' cultures. Only three percent (8/ 221) were reported as positive, with 4/8 being contaminant (staph epidermidis), and one each of s.aureus, p. aeruginosa, e. cloacae, and a gram-positive rod. Patients with a positive culture had a longer duration of ECMO (328.5 vs. 153.9 hrs.), were mostly VV ECMO, had femoral cannulation, and were mostly adult (7/8). No specific signs of infection were noted in cases with positive cultures, and the WBC, platelet count, fibrinogen levels and other lab values were not different to patients with negative cultures. The overwhelming majority of routine cultures were negative, and resulted in unnecessary blood draws.

Conclusion: These data strongly suggest that the practice of routine screening blood cultures in patients on ECMO support does not yield useful information. Positive cultures were very limited, and half were contaminants. Patients on ECMO for longer duration, have an immunocompromised state, or other risk factors may have higher yield with blood cultures. Based on this study, we are changing the ECMO order set and eliminating routine blood cultures.