

CRITICAL ROUNDS



MICRO LABS LIMITED

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Dear Doctor,

Greetings from Micro Labs limited. We are happy to bring **"CRITICAL ROUNDS"** containing latest information in the field of Critical care medicine.

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Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Ltd

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Diagnostic yield of routine daily blood culture in patients on veno-arterial extracorporeal membrane oxygenation

Introduction

Veno-arterial extracorporeal membrane oxygenation (V-A ECMO) is increasingly used to support various causes of refractory shock. Although it is life-saving support, it generates new issues and side effects. Emergent management, invasive procedures and devices, and intensive care unit (ICU) - acquired immunodepression increase infectious risk. Indeed, half of patients will further develop sepsis on V-A ECMO support. Infectious complications are associated with an around 50% increase of mortality. The diagnosis of sepsis in adult population supported by V-A ECMO is challenging. Body temperature cannot be interpreted because of blood exposure to heat exchanger. White blood cell count and common biomarkers lack of specificity in the setting of cardiogenic shock both on medical treatment and on V-A ECMO. To overcome diagnosis, routine blood cultures (BCs) are proposed. In a survey of the Extracorporeal Life Support Organization (ELSO), one-third of the American centers performed daily routine BCs. However, this practice is still debated and has never been evaluated on V-A ECMO.

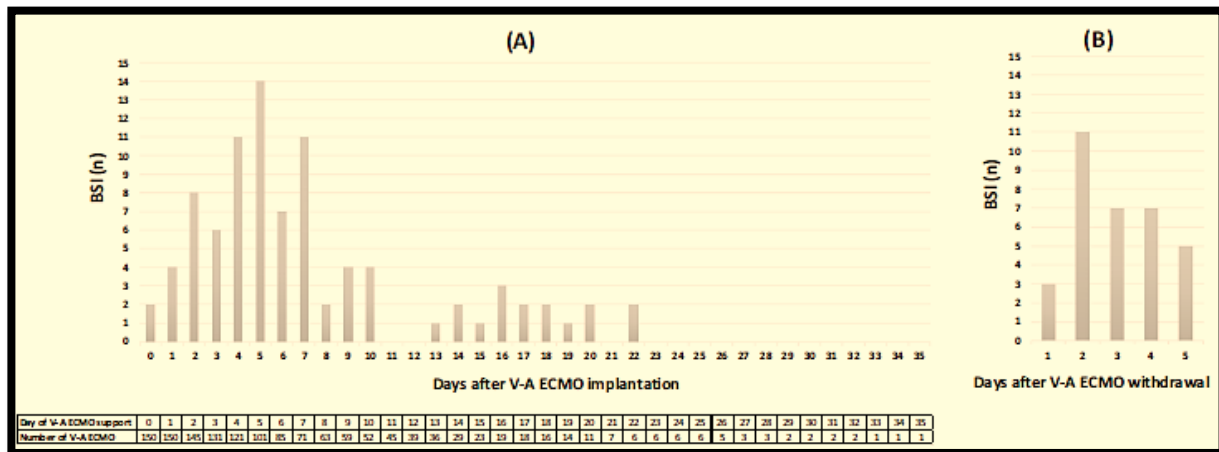
Aim: To determine the respective contribution of routine versus on-demand BCs in a population of adult patients requiring V-A ECMO for refractory cardiogenic shock.

Methods: This was a retrospective study including all adult patients requiring V-A ECMO and surviving more than 24 h. Our protocol included routine daily BCs, from V-A ECMO insertion up to 5 days after withdrawal; other BCs were performed on-demand.

Results: On the 150 V-A ECMO included, 2146 BCs were performed (1162 routine and 984 on-demand BCs); 190 (9%) were positive, including 68 contaminants. Fifty-one (4%) routine BCs revealed BSIs; meanwhile, 71 (7%) on-demand BCs revealed BSIs ($p = 0.005$).

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Bloodstream infections per day, according to time elapsed after V-A ECMO implantation (panel A) or withdrawal (panel B)



Performing routine BCs was negatively associated with BSIs diagnosis ($p = 0.002$) V-A ECMO for cardiac graft failure (OR 2.43, 95% CI [1.20; 4.92], $p = 0.013$) and sampling with on-going antimicrobial therapy (OR 2.15, 95% CI [1.08; 4.27], $p = 0.029$) or renal replacement therapy (OR 2.05, 95% CI [1.10; 3.81], $p = 0.008$). Without these three conditions, only two BSIs diagnosed with routine BCs would have been missed by on-demand BCs sampling.

Conclusions: Although routine daily BCs are less effective than on-demand BCs and expose to contamination and inappropriate antimicrobial therapy, a policy restricted to on-demand BCs would omit a significant proportion of BSIs. This argues for a tailored approach to routine daily BCs on V-A ECMO, based on risk factors for positivity.

Source: de Roux et al. Diagnostic yield of routine daily blood culture in patients on veno-arterial extracorporeal membrane oxygenation. Crit Care (2021) 25:241

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Primary success of electrical cardioversion for new-onset atrial fibrillation and its association with clinical course in noncardiac critically ill patients: sub-analysis of a multicenter observational study

Background

New-onset atrial fibrillation (AF) affects a substantial proportion of critically ill patients. In individuals with sepsis, a quarter of patients have complication of new-onset AF, which is associated with longer intensive care unit (ICU) stay and higher mortality. A prospective study reported that longer duration of AF is associated with higher rate of in-hospital mortality among critically ill patients with new-onset AF. However, therapeutic strategy for new-onset AF in critically ill patients has not been established (i.e., the rhythm control strategy or rate control strategy). Electrical cardioversion (ECV) is one of the most widely used methods in the rhythm control strategy. Compared with pharmacological cardioversion, it has an advantage regarding immediate restoration of sinus rhythm, and is thus usually performed in hemodynamically unstable patients. In critically ill patients, however, ECV often requires the use of additional sedatives, and the primary success rate of ECV is relatively low (35-71%). Even after primary success, the subsequent recurrence rate of AF can be as high as 46-77%. If ECV has any clinical benefit in critically ill patients (e.g., improved mortality), it would come from restoration of sinus rhythm. Elucidation of the clinical significance of the primary success of ECV could be the first step in assessing the prognostic impact of performing ECV. In critical care literature, however, studies describing the clinical significance of the primary success of ECV are scarce.

Objective: To examine the differences between patients with and without primary success after ECV in patient characteristics, factors associated with ECV (e.g., pretreatment with preprocedural drugs, delivered energy), and clinical outcomes.

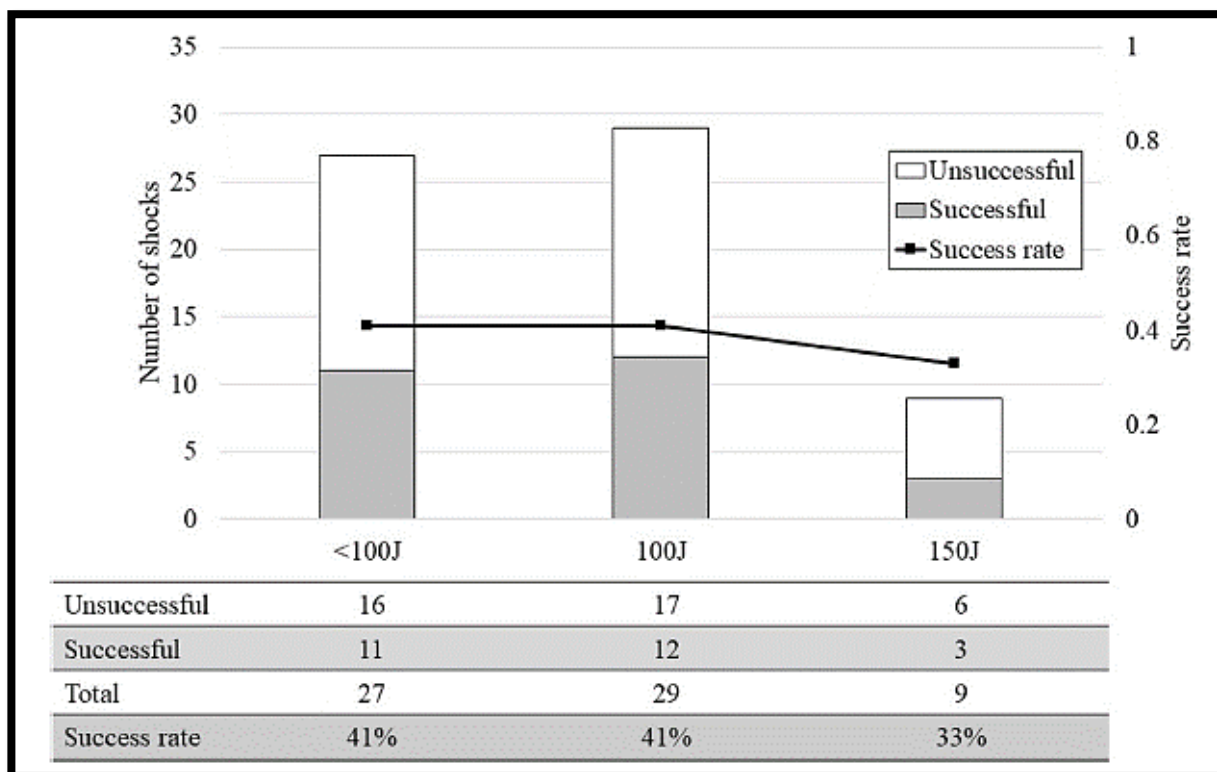
Methods: This is a sub-analysis of the AFTER-ICU study, a multi-center prospective study with a cohort of 423 adult non-cardiac patients with new-onset atrial fibrillation (AF). Patients that underwent ECV within 7 days after initial onset of AF were included in the sub-analysis. We compared intensive care unit (ICU) and overall

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hospital mortality, survival time within 30 days, cardiac rhythm at ICU discharge, and the length of ICU and overall hospital stay between patients whose sinus rhythm was restored immediately after the first ECV session (primary success group) and those in whom it was not restored (unsuccessful group). To find the factors related to the primary success of ECV, we also compared patient characteristics, the delivered energy, and pre-treatment.

Results: Sixty-five patients received ECV and were included in this study. Although 35 patients (54%) had primary success, recurrence of AF occurred in 24 of these patients (69%). At ICU discharge, three patients still had AF in the unsuccessful group, but no patients in the primary success group still had AF.

Success rate of each delivered energy in the first shock. J, joules. Gray and white bars illustrate the number of successful and unsuccessful shocks, respectively. Polygonal line shows the success rate. There was no significant association between the delivered energy and the success of electrical cardioversion ($P = 1.00$, Fisher's exact test)



ICU mortality was 34% in the primary success group and 17% in the unsuccessful group ($P = 0.10$). Survival time within 30 days did not differ between the groups. Delivered energy and pre-treatment were not associated with primary success of ECV.

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Conclusions: The primary success rate of ECV for new-onset AF in adult non-cardiac ICU population was low, and even if it succeeded, the subsequent recurrence rate was high. Primary success of ECV did not affect the rate of mortality. Pre-treatment and delivered energy were not associated with the primary success of ECV.

Source: Shima et al. Primary success of electrical cardioversion for new-onset atrial fibrillation and its association with clinical course in noncardiac critically ill patients: sub-analysis of a multicenter observational study *Journal of Intensive Care* (2021) 9:46

Immature platelets as a biomarker for disease severity and mortality in COVID-19

Introduction:

COVID-19, caused by SARS-CoV-2, is a contagious life-threatening viral disease that has killed more than three million people worldwide to date. Attempts have been made to identify biomarker(s) to stratify disease severity and improve treatment and resource allocation. Patients with SARS-CoV-2 infection manifest with a higher inflammatory response and platelet hyperreactivity; this raises the question of the role of thrombopoiesis in COVID-19 infection. Immature platelet fraction (IPF, %) and immature platelet counts (IPC, 9109/l) can be used to assess thrombopoiesis.

Aim: To investigate whether the level of thrombopoiesis correlates with COVID-19 severity.

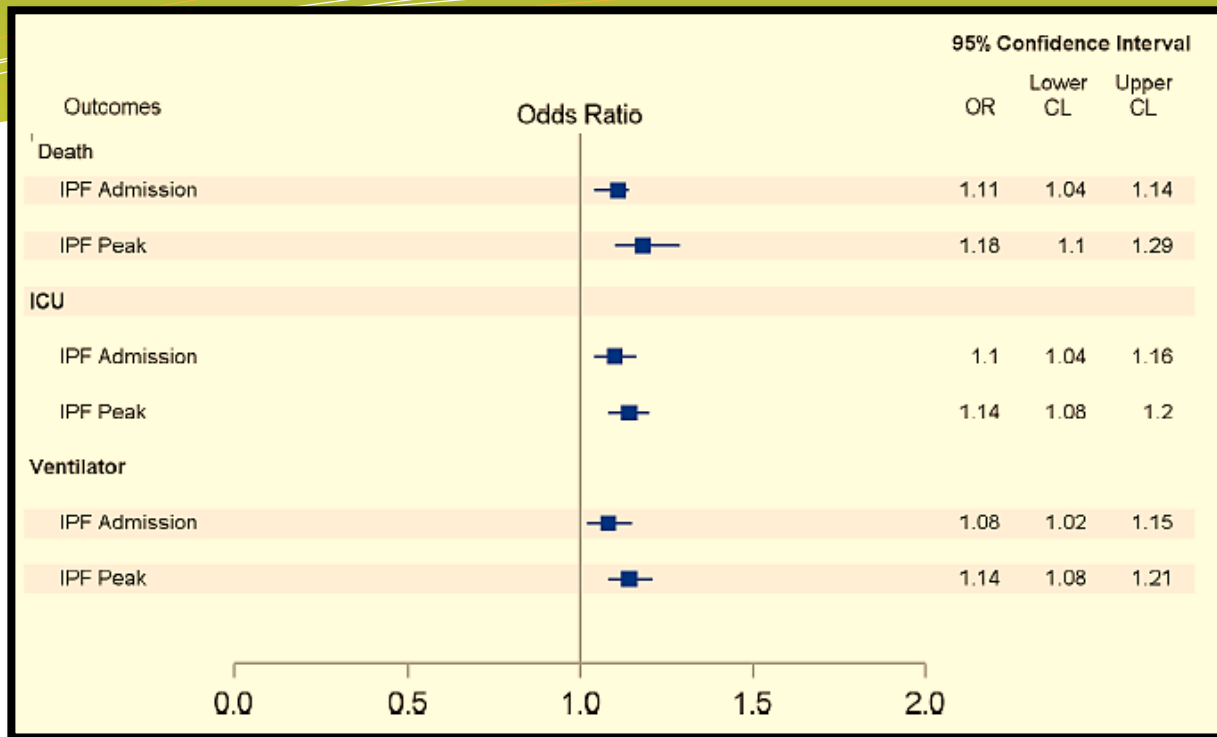
Method: A large cohort of 678 well-characterized COVID-19 patients was analyzed, including 658 (97%) hospitalized and 139 (21%) admitted to the intensive care unit (ICU).

Result:

Elevated percentage IPF at presentation was predictive of length of hospitalization ($P < 0.01$) and ICU admission ($P < 0.05$).

Logistic regression results of immature platelet fraction (IPF, %) on death, intensive care unit (ICU) and mechanical ventilation requirement. The 95% confidence interval [lower confidence limit (CL)–upper CL] of odds ratios (OR) does not include '1' and is statistically significant under $\alpha = 0.05$.

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Additionally, percentage IPF at the peak was significantly higher among ICU patients than non-ICU patients ($P < 0.01$) and among deceased patients than recovered patients ($P < 0.01$). Furthermore, IPC at the peak was significantly higher among ICU patients than non-ICU patients ($P < 0.05$) and among patients on a ventilator than those not ($P < 0.05$).

Conclusion: This study demonstrated that elevated initial and peak values of percentage IPF and IPC might serve as prognostic biomarkers for COVID-19 progression to severe conditions.

Source: D. Welder et al. Immature platelets as a biomarker for disease severity and mortality in COVID-19 patients. British Journal of Haematology. 0007-1048

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