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Hjortsø, Carl Johan S.; Brøchner, Anne C.; Perner, Anders; Møller, Morten H.

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Routine vs. on-demand blood sampling in critically ill patients – protocol for a scoping review

Carl Johan S. Hjortsø, Anne C. Brøchner, Anders Perner and Morten H. Møller

1 Department of Intensive Care, Copenhagen University Hospital – Rigshospitalet, Copenhagen, Denmark
2 Department of Intensive Care, University Hospital, Kolding, Denmark
3 Department of Regional Health Research, University of Southern Denmark
4 Centre for Research in Intensive Care (CRIC), Copenhagen, Denmark

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Correspondence: Carl Johan S. Hjortsø, Department of Intensive Care 4131, Copenhagen University Hospital - Rigshospitalet, Copenhagen, Denmark. E-mail: carl.johan.steensen.hjortsoe.01@regionh.dk

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ABSTRACT

Background

In intensive care units, blood sampling is done commonly as part of daily routine. It remains unknown whether this practice is associated with harms or benefits, as not all routine blood tests may be clinically indicated, and blood sampling done without specific indications may be problematic. Accordingly, we aim to assess the body of evidence regarding the usage of routine vs. on-demand blood sampling in critically ill patients in a scoping review.

Methods

We will conduct a scoping review in accordance with the Preferred Reporting Items for Systematic and Meta-Analysis (PRISMA) statement as well as the PRISMA Extension for Scoping Reviews (PRISMA-ScR). Using a PICO-based search strategy, we will systematically search the Cochrane Library, Embase and Medline for relevant studies regardless of design. Two authors will independently screen studies for inclusion and extract data. We will provide a descriptive analysis of the data and assess the quality of evidence in accordance with the Grading of Recommended Assessment, Development and Evaluation (GRADE) approach.

Discussion

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The outlined scoping review will provide an important overview on the current body of evidence regarding the use of daily routine vs. on-demand blood sampling in critical care settings. The findings of this scoping review will guide further research.

1 Introduction

1.1 Rationale

Blood sampling is common in intensive care units (ICUs). According to Cismondi et al. blood is drawn on average 4 times per patient per day accumulating to 944 ml during ICU admission.¹ Some sampling reflects changes in the condition of the patient, whereas others are part of daily routine in ICUs.²,³ Not all daily routine blood tests may be clinically indicated; from 26% to 50% of routine blood tests have been reported to be without clinical indications.¹,²

Blood sampling without a specific indication may be problematic. Technical errors such as false negatives/positives may result in incorrect decisions and use of unnecessary interventions.⁴ Routine blood sampling and excess laboratory utilization are also likely to distort medical priorities.¹,⁵ Screening and untargeted diagnostic tests are associated with risks of over-diagnosing resulting in downstream unnecessary interventions that may harm patients and increase already rising healthcare costs.⁶–⁸ Furthermore, repeated phlebotomies may be associated with prolonged length of stays in ICU and increased need for transfusions.⁹,¹⁰

1.2 Objective

With the outlined scoping review, we aim to provide an overview of the current body of evidence regarding blood sampling practices in critical care settings.

We hypothesise that the use of routine blood tests in ICUs is frequent and not supported by high quality evidence.
1.3 Research questions

- What is the proportion of critically ill patients exposed to daily routine blood sampling?
- Are specific characteristics (patient or organizational) associated with higher proportions of daily routine blood sampling?
- What are the most frequent blood analyses done in daily routine?
- What are the reported potential patient-related benefits and harms of routine blood sampling compared with on-demand blood sampling in critically ill patients?

2 Methods

This protocol has been planned in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocol (PRISMA-P) and PRISMA Extension for Scoping Reviews (PRISMA-ScR) guidelines.\textsuperscript{11,12} Owing to the scoping review design, no registration on the International Prospective Register of Systematic Reviews (PROSPERO) was possible.

2.1 Eligibility criteria

2.1.1 Study design

All study designs will be eligible, but we will give priority to systematic reviews, randomised clinical trials and prospective observational studies.

2.1.2 Population

We will include studies examining blood sampling in adults and children in critical care settings, including ICUs, high dependency units, emergency rooms, and recovery rooms. Studies assessing non-critically ill patients will be excluded as well as studies assessing a specific test for a specific diagnosis (e.g. blood glucose test for diabetic patients).

2.1.3 Intervention

Routine and on-demand blood sampling in critically ill patients.

2.1.4 Comparator

None
2.1.5 Outcomes

Clinical outcomes:
- Mortality at longest follow up
- Length of hospital/ICU stay (LOS)
- The incidence of anaemia as defined by the individual studies
- Serious adverse events as defined by the individual studies

Process-related outcomes:
- Rates of routine an on-demand blood sampling as defined by the individual studies
- Types and number of tests requested routinely as defined by the individual studies
- Types and number of tests requested on-demand as defined by the individual studies
- Reported co-interventions as defined by the individual studies
- Reported reduction in test utilisation as defined by the individual studies

2.2 Information sources

We will search Cochrane Library, Medical Literature Analysis and Retrieval System Online (MEDLINE) and Excerpta Medica Database (EMBASE).

To ensure literature saturation we will manually scan the reference lists of relevant review articles identified in the search as well as studies included in our review.

2.3 Search

The tentative search strategy is available in the supplementary material.

2.4 Data collection and analysis

2.4.1 Selection of studies

Two review authors (CSH, ACB) will independently screen titles and abstracts identified by the search and assess their eligibility according to the inclusion criteria. We will assess full-text of the studies that appear to match our inclusion criteria or in case of any uncertainty. Any disagreements will be discussed and resolved by consensus or by discussion with a third author.

The study selection process will be summarised in a PRISMA flow diagram.
2.4.2 Data extraction

Two review authors (CSH, ACB) will independently extract the data from all included studies. We will collect all data on a predefined data extraction form including characteristics of the given study (type, year, country, study duration), characteristics of the population (adults/children, age, gender, type of critical care setting), characteristics of the intervention (feedback, education, ordering procedure alterations, guidelines), and the outcomes of interest.

2.4.3 Quality of evidence assessment

We will assess the quality of evidence for all clinical outcomes according to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. In brief, we will downgrade the quality of evidence for risk of bias, inconsistency, indirectness (population or intervention differs from those of interest, use of surrogate outcomes), imprecision (optimal information size not met), and publication bias. The quality of the body of evidence may be upgraded for identified large effects, dose response or plausible residual confounding accounted for. Accordingly, the overall quality of evidence will be rated as high, moderate, low, or very low.

2.4.4 Synthesis of results

We will provide a descriptive analysis of the relevant data.

3 Discussion

In the outlined scoping review, we aim to assess the current body of evidence on the use of daily routine vs. on-demand blood sampling in critical care settings. The findings of the proposed scoping review will provide an overview of existing knowledge, and unanswered research questions and topics will be highlighted. This will inform further research within this topic.

The strengths of the outlined review include the PICO-based systematic search and inclusion criteria, as well as adherence to the PRISMA and GRADE guidelines.

Our scoping review has some limitations. We will exclusively provide a descriptive analysis, and we will not assess risk of bias of the individual studies included, but rather assess the overall quality of
evidence according to GRADE. Furthermore, the search strategy may be considered somewhat broad.

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Ethical considerations

As the outlined scoping review will be based on already published journal articles, consent and ethical approvals will not be necessary.

Conflicts of interest

The authors have no conflicts of interest to declare.

Authors contribution

The protocol was drafted by C.J.S.H., A.C.B., A.P. and M.H.M. and carefully revised by all authors. All authors have approved the final draft prior to submission.

4 References


2. Dhanani JA, Barnett AG, Lipman J, Reade MC. Strategies to reduce inappropriate laboratory


