Efficiency in critical care research: can surplus clinical blood samples be utilised for research?

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Abstract Id: 12
Submitted: July 12, 2019
Event: Dr MK Varma Memorial Prize 2019
Topic: Critical Care

Background & Aim

Large-scale prospective cohort studies undertaking cytokine analysis are required to validate the existence of subphenotypes within ARDS. Routinely, ICU patients undergo daily full blood count (FBC) testing. A typical FBC blood sample is 4ml however only 36µL is required for analysis, leaving a significant surplus which may be of use to researchers. The requirement for additional phlebotomy for research purposes is known to compound the risk of iatrogenic anaemia within the critically ill, negatively impacts study recruitment and may also introduce a selection bias within the population recruited. Therefore, this feasibility study aimed to investigate whether cytokine levels remain stable over time in surplus routinely collected blood stored under routine conditions.

Method

Unprocessed ICU patient (n=4) and healthy volunteer (n=4) whole blood samples collected in EDTA anti-coagulated tubes were stored under routine conditions for 72 hours. Routine conditions reflected storage for 24 hours at 21°C, followed by 48 hours at 4°C. Plasma concentrations of Interleukin-6, Interleukin-8 and Interferon-gamma were measured at baseline, 24, 48 and 72 hours using an ELISA.

Results

All cytokines remained stable in unprocessed whole blood stored under routine conditions for 72 hours. Storage temperature had no significant effect on the stability of Interleukin-6 (p= 0.1636), Interleukin-8 (p= 0.2101) or Interferon-γ (p= 0.1562) over time in unprocessed whole blood.

Conclusion

Surplus blood stored under routine conditions presents a stable and efficient source of

cytokines Interleukin-6, Interleukin-8 and Interferon-ɣ. Findings from this small cohort suggest surplus clinical blood samples present a low risk, stable and efficient source of blood for the analysis of cytokine levels over time in the critically ill. Using surplus routinely collected clinical blood samples for research is likely to minimise patient harm and may present an efficient methodology for future studies seeking to validate the existence of subphenotypes within ARDS.