Monitoring and treatment of vitamin K deficiency in peri-operative and critically ill patients
PhD Thesis – Half time review October 15th 2020

14.00-16.00, Conference room, Intensive- and Perioperative Care, Arbetsavdelningen
Centralblocct, hisshall B, plan 6, Skåne University Hospital, Lund

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Title: Monitoring and treatment of vitamin K deficiency in peri-operative and critically ill patients

Background: Vitamin K plays a significant role in coagulation and is also believed to affect proteins involved in cardiovascular health, inflammation and cancer. Vitamin K deficiency is common among intensive care unit (ICU) patients at admission, but little is known about how it develops over time and how it should be treated. Coagulopathy contributes to increased mortality in critically ill patients but there is no consensus on how it should be treated. To correct a mild coagulopathy before invasive procedures plasma is often used albeit low evidence and risks associated with transfusion.

Aim: The first study prospectively investigates the prevalence of vitamin K deficiency at admission to intensive care and its development during the first days using hypocarboxylated prothrombin as a marker of vitamin K deficiency. The second study is a retrospective analysis of how intravenous administration of vitamin K affects the prothrombin time international normalized ratio (PT-INR) in critically ill patients with a mild coagulopathy (PT-INR 1.3-1.9).

Preliminary results: Critically ill patients were vitamin K deficient at ICU admission, which further increased during the first 6 days of ICU stay. Administration of vitamin K resulted in a larger decrease in PT-INR after 12-36 hours compared to that of controls.

Significance: The results of the first study [1] indicated that ICU patients might be under-substituted with vitamin K, putting them at risk for future bleeding events. It is also likely that the vitamin K deficiency affects the extra-hepatic vitamin K dependent proteins involved in inflammation associated with sepsis and vascular remodelling following acute myocardial infarction. The second study [2] showed that administration of vitamin K improved PT-INR
compared to its natural course. It is possible that vitamin K could be a better alternative than plasma or prothrombin complex concentrate to improve PT-INR before non-emergent invasive procedures.

**Published results:**


**Submitted results:**