

During fluid infusion therapy, plasma proteins are diluted and leak from the intravascular space, which alters the colloid osmotic pressure (COP) and potentially affects coagulation. We hypothesised that acetated Ringer's and starch solution, alone or in combination, influence these mechanisms differently" Zdolsek et al (2015).

#### Reference:

Zdolsek, J.H., Bergek, C., Lindahl, T.L. and Hahn, R.G. (2015) Colloid osmotic pressure and extravasation of plasma proteins following infusion of Ringer's acetate and hydroxyethyl starch 130/0.4. Acta Anaesthesiologica Scandinavica. June 16th. .

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#### Abstract:

**BACKGROUND:** During fluid infusion therapy, plasma proteins are diluted and leak from the intravascular space, which alters the colloid osmotic pressure (COP) and potentially affects coagulation. We hypothesised that acetated Ringer's and starch solution, alone or in combination, influence these mechanisms differently.

**MATERIALS AND METHODS:** On different occasions, 10 male volunteers were infused with 20 ml/kg acetated Ringer's and 10 ml/kg 6% hydroxyethyl starch 130/0.4 (Voluven® ) alone or in combination (first with starch solution followed by Ringer's solution). Blood samples were collected every 30-min for measurements of COP, blood haemoglobin, platelets, and plasma concentrations of albumin, immunoglobulins (IgG and IgM), coagulation factor VII (FVII), fibrinogen, cystatin C, activated partial thromboplastin time (APTT) and prothrombin international normalised ratio (PT-INR). Changes were compared with the haemoglobin-derived plasma dilution.

**RESULTS:** The COP increased by 8.4% (SD 3) with starch and decreased by 26.2% (7.9) with Ringer's. These infusions diluted the plasma by 23.4% (5.3) and 18.7% (4.9) respectively. The COP changes in the combined experiment followed the same pattern as the individual infusions. Albumin and IgG changes in excess of the plasma dilution were very subtle. The intravascular contents of the IgM and platelets decreased, whereas FVII, fibrinogen and cystatin C increased. PT-INR increased by 1/3 of the plasma dilution, whereas changes in APTT did not correlate with the plasma dilution.

CONCLUSIONS: The starch increased COP and only minor capillary leak occurred in healthy volunteers. The fluid-induced plasma dilution correlated with mild impairment of the extrinsic coagulation pathway but not of the intrinsic pathway.

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