

Cerebral blood flow during propofol anaesthesia. Statistical analysis plan.

Date: 19 November 2017

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Outcomes were predefined in the clinical trials registration. The primary outcome is change in internal carotid artery blood flow by treatment of anaesthesia-induced hypotension. Secondary outcomes are 1) internal carotid artery blood flow following induction of anaesthesia, 2) correlation between changes in internal carotid artery blood flow, MAP, and CO by treatment of anaesthesia-induced hypotension, 3) cerebral oxygenation, 4) skin blood flow, 5) skin oxygenation, and 6) internal carotid artery blood flow by development of mesenteric traction syndrome as compared among those patients who developed a mesenteric traction syndrome and those who did not, and 7) change in internal carotid artery CO₂ reactivity from before to after induction of anaesthesia.

Values are averaged over 2 min. Analysis of skin blood flow, oxy- and deoxyhemoglobin concentration, arterial lactate, fraction of inspired O₂, and propofol and remifentanyl infusion is after logarithmic transformation. Analysis of the time points during awake normocapnia, after induction of anaesthesia, and before and after treatment of anaesthesia-induced hypotension by phenylephrine is by a repeated measure mixed model, fit by restricted maximum likelihood in a structured covariance model with time as a fixed effect (Proc mixed; SAS 9.4, SAS Institute, Cary, NC, USA). If the test is significant, changes from awake normocapnia and by phenylephrine are evaluated. Changes from normo- to hypocapnia when awake are evaluated by a paired *t*-test while changes from normo- to hypo- and hypercapnia during anaesthesia are evaluated by a repeated measure mixed model, fitted by restricted maximum likelihood in a structured covariance model with time as a fixed effect (Proc mixed). The effect of a mesenteric traction syndrome is evaluated by a repeated measure mixed model with the fixed effects time, development of a mesenteric traction syndrome, and interaction between time and group for the chosen measurement points.

Pearson correlation is used to evaluate relations between changes in internal carotid artery blood flow, MAP, and CO by treatment of anaesthesia-induced hypotension. Internal carotid artery CO₂ reactivity is calculated as: $\text{change in blood flow} * 100 / \text{change in PaCO}_2 * \text{baseline blood flow}$

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and CO₂ reactivity for the cerebral oxygenation evaluated similarly. Comparison of internal carotid artery CO₂ reactivity when awake and during anesthesia is evaluated as the reactivity to hypocapnia by a paired *t*-test after logarithmic transformation. Internal carotid artery blood flow and conductance and cerebral oxygenation during anesthesia are “corrected” for changes in PaCO₂ from the awake normocapnic measurement by the determined CO₂ reactivity to hypo- and hypercapnia during anesthesia. Values are presented as mean ± SD or median with interquartile range for not normally distributed data and statistical significance is set at $P < 0.05$.