Q4 Can brain multimodal neuromonitoring parameters (CBF, PbtO2, TCD) be used as trigger or endpoint to guide fluid therapy in the management of cerebral ischemia?

Studies were too heterogeneous to be combined in an overall body of evidence. Their individual grading (reported in the quality assessment forms at the end of this document) hence corresponds to the body of evidence grading.

Two studies investigated fluid administration effect on brain tissue oxygen partial pressure. When a fluid bolus with 250 ml of albumin determined an increase of the cardiac index an improvement in tissue oxygenation was measured [1]. Although the study used a multivariable approach that accounted for multiple measurements, it was carried out on ten patients only raising both internal and external validity issues. The study evidence was, hence, rated very low. The second study was carried out on patients with vasospasm following subarachnoid haemorrhage. It concluded that hypervolemia combined with hypertension determined tissue oxygenation improvement but frequent adverse effects. We could not evaluate clearly the effect of hypervolemia alone because of the study design. Evidence was considered very low, in this case also.

Several studies used micro-dialysis to measure extracellular glucose, lactate, lactate/pyruvate ratio, glutamate, and glycerol in patients with subarachnoid hemorrhage to detect ischemia [2-7]. These studies, however, did not test the effectiveness of fluid therapy in reversing ischemia. Thus, for the purpose of our review they do not provide useful evidence.

Another study with the same limitations was focused on the comparison of transcranial Doppler and cerebral arterial-venous oxygen differences [8].
References


