12. [Local oxygen supply to the cerebral cortex during thiopental and propofolanesthesia. First results].

[Article in German]

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Because the brain is highly vulnerable to damage from even a brief imbalance of oxygen delivery and demand, intraoperative disturbances of local oxygen supply must be avoided. Until now, there has been no method allowing fast and reliable intraoperative measurement of the local oxygen supply in the human brain. Intraoperative investigations were therefore performed using the Erlangen micro-lightguide spectrophotometer. METHODS. Intraoperative investigations of local intracapillary haemoglobin saturation (SO2) were performed during neurosurgical interventions using the Erlangen microlightguide spectrophotometer (EM-PHO). Measurements were performed in eight patients (age 31-67 years) during neurosurgical interventions. Three received thiopentone anaesthesia, and three received propofol. In two patients thiopentone anaesthesia was later changed to propofol. The EMPHO enables rapid, non-invasive measurement of local intracapillary SO2. White light from a Xenon-arc lamp is transmitted by a 250-microns micro-lightguide to the tissue. The remitted (reflected) light is led by 6 micro-lightguides surrounding the illuminating one to a rotating band-pass interference filter disk. Light in the range of 502 to 630 nm is detected with a photomultiplier. In this range haemoglobin shows an SO2-dependent spectrum, which is then analysed. Because the measurements are performed with micro-lightguides, high spatial resolution is attained. Representative measurements can be performed in a very short period of time (approx. 60 s); thus, the EM-PHO enables rapid monitoring of local SO2 in the brain. RESULTS. The effect of propofol and thiopentone anaesthesia on the distribution of local intracapillary haemoglobin saturation was investigated during neurosurgical interventions. The arterial PCO2 was similar in both groups (31 +/- 0.7 and 31 +/- 0.5 mmHg, respectively). There were also no differences in arterial blood pressure. The FiO2 was 0.28 +/- 0.04 in the thiopentone group and 0.30 +/- 0.1 in the propofol group. In all patients receiving propofol anaesthesia higher local SO2 values were found, even if the patients first received thiopentone (values in parenthesis). The mean local SO2 amounted to 65.4% (57.3%) in the propofol group and 38.8% (45.2%) in the thiopentone group. The number of values below 25% SO2 was 5.6% (5.8%) in the propofol group and 18.7% (19.1%) in the thiopentone group.

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