

Title: THE EFFECTS OF PROPOFOL ON ICP AND CEREBRAL PERFUSION PRESSURE IN PATIENTS WITH BRAIN TUMORS.

Authors: J. Van Hemelrijck\* M.D., H. Van Aken\* M.D., C. Plets\*\* M.D., J. Goffin\*\* M.D.

Affiliation: \*Department of Anesthesiology, \*\*Department of Neurosurgery, University Hospital, Katholieke Universiteit Leuven, Herestraat 49, B-3000 Leuven, Belgium

**Introduction** In patients without cerebral pathology propofol (diisopropylphenol) lowers cerebral blood flow and  $\text{CO}_2$  reactivity is well maintained (1). In patients with elevated ICP from isolated intracerebral injury no increase in ICP (2) could be demonstrated after propofol 1 mg/kg/BW. The purpose of this study was to evaluate the effect of an induction bolus of 2,5 mg/kg of propofol on intracranial pressure (ICP) and cerebral perfusion pressure (CPP) in patients with a brain tumor.

**Methods** The study was approved by the institutions Human Investigations Committee and patients informed consent was obtained. The patient population consisted of 7 patients 22-69 years old with a brain tumor and intracranial hypertension treated by ventriculosubcutaneous drainage. All patients were treated with dexamethasone (4 mg, q i.d.) and phenobarbital (100 mg, b i.d.). Under local anesthesia an intraventricular catheter was placed through the burr hole of the ventriculosubcutaneous drainage. A radial artery catheter was inserted for direct measurement of arterial blood pressure. Intracerebral and arterial blood pressure were continuously measured and recorded. Cerebral perfusion pressure was achieved from MAP and ICP. The transducers were placed at the level of the meatus acusticus externus. The patients were in the supine, 15° head-up position. After a stabilisation period of 15 minutes, baseline measurements were recorded. Blood gas analysis was performed to determine baseline Pa  $\text{CO}_2$ . The patients were breathing 100%  $\text{O}_2$  from a closed circuit and end-tidal  $\text{CO}_2$  was continuously measured (Datex  $\text{CO}_2$  analysis). Five minutes after baseline measurements anesthesia was induced with 1,5  $\mu\text{g}/\text{kg}$  fentanyl, 0,1 mg/kg of vecuronium and 2,5 mg/kg propofol in 60 seconds. End-tidal  $\text{CO}_2$  was kept constant by manual ventilation by a face mask. Arterial blood gas analysis was performed four minutes post induction. Five minutes after induction the patients were intubated. End-tidal  $\text{CO}_2$  and arterial  $\text{CO}_2$  were measured immediately after intubation. ICP, MAP and CPP were continuously recorded until 10 minutes post induction. The results are expressed as the mean  $\pm$  SD. Statistically analysis was done by repeated paired-sample T-test and  $p < 0,05$  considered significant.

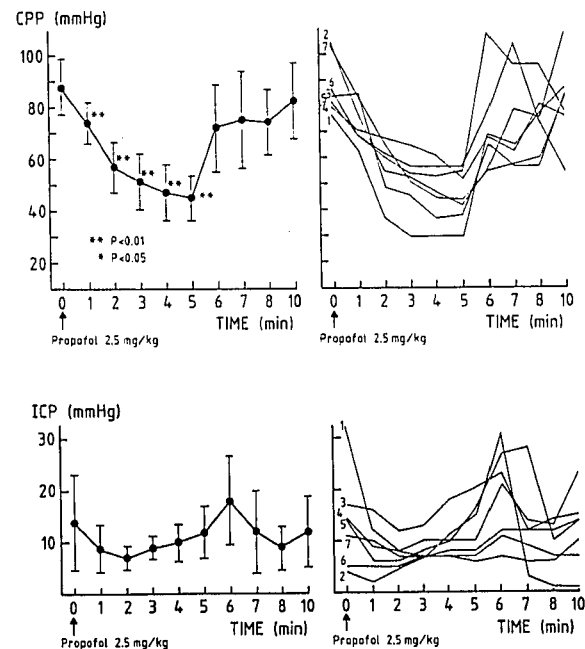
**Results** Results are shown in Fig. 1 and 2. MAP decreased from 102 ( $\pm 8,96$ ) mmHg to 57 ( $\pm 11,64$ ) mmHg ( $p < 0,01$ ). Following intubation MAP was not different from the baseline MAP. ICP did not change significantly. However, close observation of the individual data notes a rise in ICP before intubation in 2 patients. This increase in ICP could be explained by a significant rise in arterial  $\text{pCO}_2$  (35 to 45 mmHg). In 4 of the 7 patients an important increase up to 25 ( $\pm 4,6$ ) mmHg, in ICP during intubation was observed. CPP decreased from 88 ( $\pm 11,25$ ) mmHg till 45 ( $\pm 9,8$ ) mmHg ( $p < 0,01$ ) before intubation, but did not differ significantly from baseline during and after intubation. From the individual data

it can be seen that in 4 of the 7 patients cerebral perfusion pressure dropped below 50 mmHg.

**Conclusion** Propofol 2,5 mg/kg in a bolus injection over 60 seconds can produce significant decrease of the CPP due to a marked decrease in MAP in patients with brain tumors.  $\text{CO}_2$  reactivity seems to be preserved.

#### References

1. H. Stephan, H. Sonntag, M.D. Schenk, S. Kohlhausen: Einfluß von Disoprivan (Propofol) auf die Durchblutung und den Sauerstoffverbrauch des Gehirns und die  $\text{CO}_2$  Reaktivität der Hirngefäße beim Menschen. *Der Anaesthesist* (1987) 36:60-65.
2. M.S. Hartung: Beeinflussung des intrakraniellen Drucks durch Propofol (Disoprivan). *Der Anaesthesist* (1987) 36:66-68.



CPP and ICP after a bolus of propofol in patients.