

Title: Total intravenous anaesthesia using propofol and alfentanil infusion in neurosurgical patients.

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Introduction: There is growing evidence that a total intravenous technique could be of interest in providing safe anaesthesia for patients with reduced intracranial compliance. Nitrous oxide can no longer be regarded as a safe basic anaesthetic in neurosurgical cases because of its capacity to increase CMRO₂ and CBF (1). Recently it was reported that N₂O diminished the cerebral protective effect of barbiturates (2). The short acting drugs propofol, an hypnotic, and alfentanil, an analgesic, can be administered intravenously by a continuous infusion without accumulation. As this technique can be used without N₂O, it could be considered for use during neurosurgical procedures. The aim of the study was to evaluate the haemodynamic parameters during induction and surgery and the quality and speed of recovery in patients undergoing neurosurgical procedures during this technique.

Methods: Twenty ASA I-II patients (aged 18-67, mean 45 years) undergoing craniotomy for brain tumors were studied. Approval was given by the Institutional Ethical Committee and informed consent was obtained from all patients. Preoperatively all patients were submitted to an orientation test (place, date, day), concentration (countdown), and memory recall test (black spots in a grid). After premedication with phenobarbital 100 mg. two hours before induction of anaesthesia, intravenous and arterial lines were placed under local anaesthesia. Arterial blood pressure and heart rate (HR) were continuously measured and recorded. Anaesthesia was induced with a propofol loading infusion (21 mg/kg for 5 minutes; 12 mg/kg for the next 10 minutes). Prior to intubation (8 minutes after starting the loading infusion) pancuronium (0.1 mg/kg) and alfentanil (0.1 mg/kg) were administered and the patient ventilated with 35% oxygen in air. Maintenance was provided with a propofol infusion (6 mg/kg/h), alfentanil (0.025 mg/kg/h to 0.1 mg/kg/h) and pancuronium when needed. The infusions were stopped approximately 10 minutes before the end of the operation (mean 319 min). The time from cessation of anaesthesia to an awake, responding to command patient was recorded and the patients were extubated immediately. The prementioned orientation and concentration test were repeated every 5 minutes and the memory recall test every 15 minutes until the patients attained their preoperative values (or for a maximum of 180 min). Data are presented as mean values + S.D. Haemodynamic values were analyzed using two factor analysis of variance, with $p < 0,05$ considered significant.

Results: The loading infusions of propofol induced a significant decrease in systolic, diastolic and mean arterial pressure while heart rate was unchanged. However these decreases stayed within clinically safe limits. Pressure and heart rate during intubation were significantly different from baseline values. During maintenance of anaesthesia, 6 out of 20 patients were given labetalol IV to treat hypertensive episodes. The time from cessation of propo-

fol infusion to responding to commands was 25.3 ± 13.1 min. There was no correlation with the duration of propofol administration. After 30 ± 12.7 minutes 19 of 20 patients were able to perform the orientation test correctly. The countdown test was also performed by 19 of 20 patients after 34.7 ± 16.4 min. Five patients were not able to perform the memory recall test because of postoperative visual disturbances. The other patients reached the preoperative level after 54.2 ± 20.3 min. None of the patients had recall of the operative procedure. There was no postoperative respiratory depression and spontaneous breathing before extubation was maintained with an ETco₂ between 37 and 44 mmHg. Brain relaxation was assessed as very good by the surgeons.

Conclusion: Total intravenous anaesthesia using propofol and alfentanil infusions provided stable haemodynamic parameters, excellent operating conditions and rapid full recovery in neurosurgical patients.

References:

1. T. Sakabe, T. Kuramoto, S. Kumagai, et al. Br. J. Anaesth. 48: 957-962, 1976.
2. J. Hartung, J.E. Cottrell. Anaesth. Analg. 66: 47-52, 1987.

