

A Comparative Study to Evaluate Changes in Intraocular Pressure with Thiopentone Sodium and Etomidate in Patients Undergoing Surgery for Traumatic Brain Injury

Authors : Vasudha Govil, Prashant Kumar, Ishwar Singh, Kiranpreet Kaur

Abstract : Traumatic brain injury leads to elevated intracranial pressure. Intraocular pressure (IOP) may also be affected by intracranial pressure. Increased venous pressure in the cavernous sinus is transmitted to the episcleral veins, resulting in an increase in IOP. All drugs used in anesthesia induction can change IOP. Irritation of the gag reflex after usage of the endotracheal tube can also increase IOP; therefore, the administration of anesthetic drugs, which make the lowest change in IOP, is important, while cardiovascular depression must also be avoided. Thiopentone decreases IOP by 40%, whereas etomidate decreases IOP by 30-60% for up to 5 minutes. Hundred patients (age 18-55 years) who underwent emergency craniotomy for TBI are selected for the study. Patients are randomly assigned to two groups of 50 patients each according to the drugs used for induction: group T was given thiopentone sodium (5mg kg⁻¹) and group E was given etomidate (0.3mg kg⁻¹). Preanaesthesia intraocular pressure (IOP) was measured using Schiotz tonometer. Induction of anesthesia was achieved with etomidate (0.3mg kg⁻¹) or thiopentone (5mg kg⁻¹) along with fentanyl (2 mcg kg⁻¹). Intravenous rocuronium (0.9mg kg⁻¹) was given to facilitate intubation. Intraocular pressure was measured after 1 minute of induction agent administration and 5 minutes after intubation. Maintenance of anesthesia was done with isoflurane in 50% nitrous oxide with fresh gas flow of 5 litres. At the end of the surgery, the residual neuromuscular block was reversed and the patient was shifted to ward/ICU. Patients in both groups were comparable in terms of demographic profile. There was no significant difference between the groups for the hemodynamic and respiratory variables prior to thiopentone or etomidate administration. Intraocular pressure in thiopentone group in left eye and right eye before induction was 14.97±3.94 mmHg and 14.72±3.75 mmHg respectively and for etomidate group was 15.28±3.69 mmHg and 15.54±4.46 mmHg respectively. After induction IOP decreased significantly in both the eyes (p<0.001) in both the groups. After 5 min of intubation IOP was significantly less than the baseline in both the eyes but it was more than the IOP after induction with the drug. It was found that there was no statistically significant difference in IOP between the two groups at any point of time. Both the drugs caused a significant decrease in IOP after induction and after 5 minutes of endotracheal intubation. The mechanism of decrease in IOP by intravenous induction agents is debatable. Systemic hypotension after the induction of anaesthesia has been shown to cause a decrease in intra-ocular pressure. A decrease in the tone of the extra-ocular muscles can also result in a decrease in intra-ocular pressure. We observed that it is appropriate to use etomidate as an induction agent when elevation of intra-ocular pressure is undesirable owing to the cardiovascular stability it confers in the patients.

Keywords : etomidate, intraocular pressure, thiopentone, traumatic

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