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 Title : LIDOCAINE BEFORE ENDOTRACHEAL INTUBATION: LTA OR IV?
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Introduction. Both laryngotracheal (LTA)¹ and intravenous (IV)² lidocaine blunt the increase in heart rate and arterial pressure associated with endotracheal intubation, and IV lidocaine has been shown recently to prevent intracranial hypertension while patients with brain tumors undergo intubation.³ The purpose of this study was to determine the preferred route for administering lidocaine when used to prevent deleterious cardiovascular and intracranial pressure changes associated with endotracheal intubation.

Methods. The subjects of the study were 22 patients with brain tumors estimated to be larger than 2 cm. in diameter by CAT-scan. All were receiving steroid therapy and were scheduled for elective craniotomy. The protocol was approved by the Institution's human studies committee and informed consent was obtained from both the patients and their next of kin on the evening prior to operation. Premedication consisted of morphine 0.1 mg/kg and atropine 0.4 mg intramuscularly, and diazepam 0.1 mg/kg by mouth one hour before arrival in the operating suite. A sub-arachnoid pressure screw, arterial and central venous catheters were placed using local anesthesia, and pressures were continuously transduced and recorded. Intracranial compliance was estimated by administering a 1-2 ml volume challenge through the subarachnoid screw while the resultant change in ICP was recorded. Once a constant level of ICP, vascular pressures, and heart rate was obtained, a control arterial blood gas sample was drawn and anesthesia was induced with thiopental, 3 mg/kg IV, succinylcholine, 1.5 mg/kg IV, and 50% N₂O in oxygen. One minute after anesthetic induction, half the patients received lidocaine, 4 percent, 2 ml LTA, while the other half received lidocaine, 1.5 mg/kg IV. The type of treatment was chosen randomly by lot. Ventilation was controlled, maintaining a constant end-tidal CO₂ level (Beckman LB-2). Exactly 2 minutes after induction, laryngoscopy was begun. Endotracheal intubation was always accomplished within 20 seconds and the resulting changes in heart rate (HR), intracranial (ICP), and systolic arterial (SAP) pressures were measured over the next 5 minutes. Arterial blood gas values were repeated within 30 seconds of intubation. Observed cardiovascular changes are presented as the product of systolic blood pressure and heart rate (rate-pressure product: RPP). Statistical comparisons were performed using Student's t-tests for paired and non-paired data, with $p < .05$ regarded as significant.

Results. Both groups of patients were similar with respect to age, types of brain tumors, hemodynamic variables, arterial blood gas tensions and intracranial compliance prior to induction of anesthesia. LTA lidocaine caused increases in ICP, HR, SAP and RPP, and this was followed by additional increases in these parameters after endotracheal intubation (Fig. 1). Administration of IV lidocaine caused no changes in ICP or cardiovascular parameters, and subsequent intubation resulted only in brief changes

in SAP, HR and RPP. ICP did not increase significantly with intubation after IV lidocaine pretreatment. Mean PaCO₂ after intubation was 39.9 torr \pm 1.6 SE in the IV lidocaine group and 40.5 torr \pm 1.5 SE in the LTA group.

Discussion/Conclusions. These data indicate the superiority of IV lidocaine over the LTA technique for preventing intracranial hypertension and excessive myocardial oxygen demand in response to endotracheal intubation during light barbiturate - N₂O anesthesia. Instilling lidocaine into the trachea is deleterious in itself, and the resultant topical anesthetic does not appear to afford satisfactory blunting of noxious tracheal stimulation. IV injection of lidocaine, 1.5 mg/kg, has minimal cardiovascular effects, whereas it rapidly achieves blood levels which potentiate general anesthetics and reduce response to noxious stimulation.^{3,4} This combination of effects makes the IV route the preferred technique whenever lidocaine treatment is indicated before endotracheal intubation.

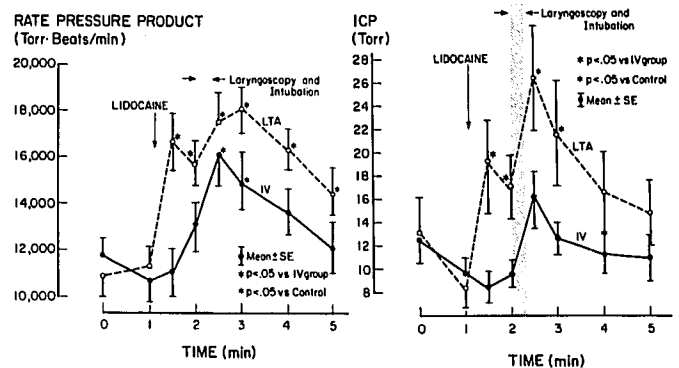


Figure 1. Response of rate pressure product and ICP to endotracheal intubation. Pretreatment with lidocaine IV was more effective than laryngotracheal lidocaine in reducing the severity and duration of intracranial hypertension and excessive myocardial oxygen demand.

References.

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