Titile: ED₉₀ OF ALFENTANIL FOR INDUCTION OF ANESTHESIA IN UNPREMEDICATED YOUNG ADULTS

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Introduction: This study determined the ED₉₀ and ED₉₀ for unconsciousness and anesthesia of alfentanil, a new rapid-acting narcotic. The hemodynamic response to intubation, the incidence of chest wall rigidity, and patient recall were also measured.

Methods: This investigation was approved by the Committee on Studies Involving Human Beings, and informed consent was obtained from each patient. 28 patients, ASA Status I, were randomly assigned to receive a bolus of alfentanil: 100, 150, 200, or 250 µg/kg. They received no premedication. Patients received d-tubocurarine 3 mg, oxygen by mask for 3 min. followed by the bolus of alfentanil. Each patient was examined 30, 60, and 90s later for eyelid reflex and response to commands to breathe. At 90s a 32F nasopharyngeal airway was placed; a response to this stimulus was movement of the head, neck or arms. Patients who responded to any of the stimuli at 90s received alfentanil 50 µg/kg.

Succinylcholine 1.5 mg/kg was given at 90s, with tracheal intubation one minute later. Blood pressure (BP) by Riva-Rocci method and heart rate (HR) were recorded every 30s. Five minutes after induction, inhalation anesthesia was begun without further narcotics. Prior to extubation, naloxone in 0.05 mg increments was given if end-tidal Pco₂ exceeded 48 torr. Patients were questioned for recall one day, and one month later. Probit analysis was utilized for the dose-response data, analysis of variance with Newman-Keuls tests for BP and HR changes with dose and time, and chi-square tests for limb movement and rigidity data.

Results: The groups were similar in age and weight. Reflexes were maximally suppressed at 90s; the figure shows the dose-response curves for the three indicators. Only two patients, both in the 100 µg/kg group, were responsive to voice at 90s; ED₉₀ = 92, ED₉₀ = 111 µg/kg. No patient in the two highest dose groups moved in response to the nasal airway (ED₉₀ = 111, ED₉₀ = 169 µg/kg). Eyelid reflex was not completely abolished in any group (ED₉₀ = 115, ED₉₀ = 382 µg/kg). The overall incidence of apnea was 89%; of chest wall rigidity, 75%. Purposeless limb movement (flexion of fingers, wrist or forearm) occurred in 54%. Roving eye and eyelid movements were seen in 25%. A greater incidence of limb movements was seen after higher doses. Two patients required ephedrine and four, one in each group,

received trimethaphan for BP changes greater than 25% of control. Mean HR increased from 81.4 ± 19.2 min⁻¹ at control to 91.8 ± 25.1 min⁻¹ at 90s (p<.05). The mean peak HR following intubation, 98.3 ± 22.6 min⁻¹, was greater than control (p<.05). Systolic BP rose from control of 123.4 ± 16.8 torr to 136.3 ± 28.9 torr following intubation (p<.05). Diastolic BP increased from 74.6 ± 12.7 torr at 90s to 84.4 ± 17.1 torr after intubation (p<.05). None of these changes was related to dose. Naloxone was required in 36% of patients. Respiratory depression, assessed by capnometry, did not recur in the recovery room. 39% had post-operative nausea or vomiting. Two patients had recall for the nasal airway.

Discussion: Alfentanil without supplementation is an anesthetic. Its anesthetic ED₉₀ is 111 µg/kg, and ED₉₀ 169 µg/kg. The sympathetic response to intubation was blunted after doses that allowed for early extubation, but a small number (14%) increased BP 25%. Alfentanil shows promise as an induction agent where its rapid onset, short duration of action and cardiovascular properties can be used to advantage.


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