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TITLE: A COMPARISON OF FENTANYL, ESMOLOL, AND THEIR COMBINATION AS ANESTHETIC ADJUNCTS DURING RAPID SEQUENCE INDUCTION

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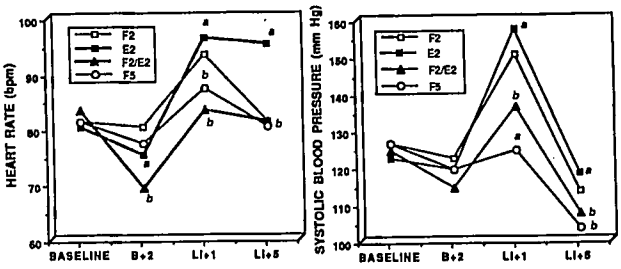
INTRODUCTION: Esmolol (*E*) or fentanyl (*F*) is often used to blunt hypertension and tachycardia following laryngoscopy and intubation. However, while *E* effectively blunts the heart rate (HR) response, it has an inconsistent effect on the blood pressure (BP).[1] In moderate to high doses, *F* may be associated with hypotension and respiratory depression.[2] This study was undertaken to determine if a combination of relatively low doses of each agent could effectively overcome the limitations encountered when either is used alone.

METHODS: Following institutional approval and informed written consent, 102 patients (ASA PS I or II) scheduled for elective surgery were randomly assigned to one of four treatment groups in a double-blinded fashion to receive either *F* 2 $mcg.kg^{-1}$ (F_2 group), *E* 2 $mg.kg^{-1}$ (E_2 group), *F* 2 $mcg.kg^{-1}$ and *E* 2 $mg.kg^{-1}$ (F_2/E_2 group), or *F* 5 $mcg.kg^{-1}$ (F_5 group). *F* was given at 4 mins and *E* 2 mins prior to a rapid sequence induction with thiopental 4 $mg.kg^{-1}$ followed by succinylcholine 1.5 $mg.kg^{-1}$. HR and BP were measured every minute from study drug administration until 5 minutes after intubation. Data were analyzed using ANOVA, repeated measures ANOVA, Fisher's exact test and Student-Newman-Keuls for multiple comparisons. $P<0.05$ was used to establish statistical significance.

RESULTS: The figures illustrate the changes in mean HR and systolic BP (SBP) at selected time points following administration of study drugs. At one minute after intubation, increases from baseline HR in the F_2/E_2 and F_5 groups (0% and 7% respectively) were significantly less than that noted in the F_2 and E_2 groups (15% and 20% respectively) ($P<0.05$). Changes from baseline SBP in the F_2/E_2 and F_5 groups (11% and -2% respectively) were significantly less than that noted in the E_2 group (29%)($P<0.05$). The F_2/E_2 group was the only one with a mean HR consistently lower than baseline HR throughout the study period. One patient in the E_2 group and three patients in the F_2/E_2 group experienced a transient decrease in HR to <50 bpm prior to induction (P=NS). The F_5 group showed the greatest reduction in SBP response to intubation, but also experienced the highest incidence (16/26 patients) of hypotension (SBP < 20% baseline).

CONCLUSION: We conclude that the combination of small doses of *F* and *E* is an effective method for blunting *both* HR and SBP responses to intubation during rapid-sequence induction. It offers an effective alternative to the use of *F* alone.

REFERENCES:
1. J Cardiothorac Anesth 4:27-30, 1990.
2. Can J Anaesth 37:S145, 1990.



B+2 = 2 mins after esmolol administration.
LI+1 and LI+5 = 1 and 5 mins respectively after intubation. Data points represent mean values.
a = $P<0.05$ vs F_2/E_2; b = $P<0.05$ vs E_2.

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TITLE: HEMODYNAMIC CHANGES DURING SEVOFLURANE OR ISOFLURANE ANESTHESIA IN ASA I AND ASA II SURGICAL PATIENTS

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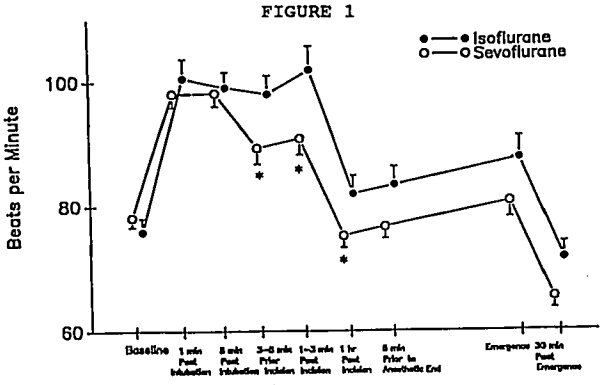
Introduction: Sevoflurane was studied in 49 patients for clinical acceptability and hemodynamic control during surgical anesthesia. A comparative group of 25 patients were randomized to receive isoflurane.

Methods: Approval by the institutional Human Subjects Committee and informed patient consent were obtained. Patients were premedicated with .01-.03 $mg \bullet kg^{-1}$ midazolam. Anesthesia was induced with thiopental and vecuronium used for muscle relaxation. Sevoflurane or isoflurane was delivered at 2-2.5 MAC for 1 min and intubation performed. Sevoflurane or isoflurane was then administered in 100% O_2 to maintain arterial pressure and heart rate within 20% of baseline values. Surgical anesthetic concentrations were maintained until wound closure. Systolic and diastolic blood pressures and heart rates were compared at clinically relevant time points. Data were compared using repeated measures analysis of variance with Students T-tests when appropriate.

Results: Systolic and diastolic blood pressures increased in both anesthetic groups 1 min after intubation. By 5 min post intubation, blood pressures were greater than baseline values only in the isoflurane group. Sevoflurane reduced blood pressures compared to baseline 5 min prior to incision. This did not occur with isoflurane. Blood pressures during maintenance anesthesia did not differ from baseline in either group but increased in both groups during emergence. At no time point was there a statistical difference in blood pressures between anesthetic groups. Heart rate increased in both groups compared to baseline following intubation. Heart rate during emergence was greater than baseline only with isoflurane. Heart rate was lower with sevoflurane than isoflurane at 3 time points: 3-5 min prior to incision, 1-3 min post incision, and 1 hour following surgical incision ($P<0.05$) (Figure 1).

Discussion: Sevoflurane and isoflurane produced comparable blood pressure changes in healthy surgical patients. Sevoflurane controlled heart rate changes prior to and following surgical incision better than isoflurane. This may be due to more rapid change in anesthetic depth after a change in delivered anesthetic concentration. Sevoflurane may offer improved hemodynamic control compared to isoflurane.

FIGURE 1



Heart rate changes during sevoflurane and isoflurane surgical anesthesia. *Differs significantly from isoflurane values. $P<0.05$. All data shown as Mean ± S.E.M.