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Title : COMPARISON OF SULFENTANYL - O_2 AND FENTANYL - O_2 ANESTHESIA FOR CORONARY ARTERY SURGERY.

Authors : S. de Lange, M.B., FFARCS, Th. H. Stanley, M.D., M.J. Boscoe, M.B., FFARCS.

Affiliation: Departments of Anesthesiology, University of Utah College of Medicine, 50 North Medical Drive, Salt Lake City, Utah 84132 and University Hospital, Leiden, Rijnsburgerweg 10, Leiden, The Netherlands, Professor and Chairman Johan Spierdijk, M.D., Ph.D.

Introduction. Fentanyl (50-100 μg/kg, IV) plus oxygen has been shown to produce profound anesthesia and remarkable cardiovascular stability in patients with coronary artery diease (CAD) and has, therefore, been advocated as a anesthetic for coronary artery bypass grafting (CABG) operations.[1] Others have reported a high incidence of chest wall rigidity and hypertension (especially during sternal spread and pericardiotomy) with this technique, at least in certain population groups.[2] Sulfentanyl, a new synethetic narcotic (5-10 x as potent as fentanyl but with the same duration of action and a much greater margin of safety in animals) has been suggested as a better anesthetic than fentanyl for patients with CAD. The objective of this study was to measure and compare the cardiovascular responses of sulfentanyl-O_2 (group I) and fentanyl-O_2 (group II) anesthesia during anesthetic induction, intubation and at certain other key intervals during operation in 40 patients with CAD undergoing CABG operation. Doses of the two drugs required for unconsciousness and the entire operation as well as the incidence and magnitude of chest wall rigidity were also compared.

Methods. Institutional approval was obtained and all patients provided informed consent at the preoperative visit. There were 40 patients in the two groups (20 in each) and all were premedicated with lorazepam (0.8 mg/10 kg, sub-ling) and atropine (0.1/15 kg, IM).Cardiovascular vaiables measured included heart rate (HR), systolic (SBP), diastolic (DBP), mean right atrial ($\overline{RAP}$), and mean pulmonary artery ($\overline{PAP}$) blood pressures and stroke volume (SV) and cardiac output (CO). The presence of chest wall rigidity during induction was evaliated as follows: 0 = no change in pulmonary compliance during manual positive pressure ventilation; + = can ventilate but compliance is reduced; ++ = impossible to ventilate. Both groups of patients were given pancuronium (1.25 mg/50 kg, IV) and allowed to breathe oxygen for three minutes. Following this, group II received fentanyl at 200 μg/min until unresponsive to verbal command and then an additional 10 μg/kg of the drug just prior to administration of succinylcholine (1.5 mg/kg, IV) and endotracheal intubation. Following intubation, fentanyl was continued in group I (at 200 μg/min) until 75 μg/ kg was given. Sulfentanil was administered to group I patients at 50 μg/15 seconds until they were unresponsive whereupon they were paralyzed and had their tracheas intubated in similar fashion as patients in group II. During anesthetic induction with both compounds respiration was at first spontaneous, then assisted and finally controlled. Following intubation, additional sulfentanil 3 μg/kg was slowly given over a period of 30 minutes. Additional fentanyl and sulfentanil were given throughout operation whenever SBP increased more than 15% of preoperative values. Cardiovascular dynamics were recorded before anesthetic induction, at the point of unconsciousness, one minute after intubation, immediately before and five minutes after chest incision, before sternotomy and 5 and 10 minutes after sternal spread.

Results. Group I patients required an average of 5.1 μg/kg of sulfentanyl for unconsciousness while group II needed 27 μg/kg of fentanyl. For the entire operation dosages of the two compounds were 10.8 and 115 μg/kg respectively. A mild decrease in compliance was noted in 3 patients in each group (15%). Severe chest wall rigidity occurred in one patient in both groups but was immediately broken with succinylcholine. HR, SV, DBP and $\overline{RAP}$ were not significantly altered in either group at any time during the study. Both compounds resulted in small but significant increases in $\overline{PAP}$ which persisted throughout the study period. Both drugs also resulted in small, but again significant, decreases in $\overline{SBP}$ with anesthetic induction which persisted until just prior to sternal split. Sernal spread resulted in an increase in SBP of 15% above preanesthesia values in 75% of group II patients but in only 15% of those in group I. Indeed, the average increases in SBP with sternal spread in the sulfentanil group was not statistically significant whereas it was highly significant in the fentanyl group. No patient remembered any aspect of the anesthetic induction or operative procedure.

Discussion and conclusion. The results of this study demonstrate that both sulfentanil and fentanyl produce complete anesthesia with little alteration in cardiovascular dynamics in patients with CAD. While chest wall rigidity can occur it is infrequent with lorazepam premedication, pancuronium pretreatment and slow administration of the compounds during anesthetic induction. The major difference between sulfentanil and fentanyl appears to lie in the dosage required after anesthetic induction (approximately twice as much sulfentanil is needed for the entire operation whereas about four times as much fentanyl is required) and the ability of these dosages of the compounds to block hypertension with the extreme stress of sternal spread (sulfentanyl = excellent - - fentanyl, at least in the dosages used in this study= not so good). Our findings suggest that sulfentanyl - O_2 anesthesia deserves further eveluation as an anesthetic for patients with CAD undergoing CABG operations.

References.

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