Title: HIGH DOSE SUFENTANIL VS. FENTANYL ANESTHESIA IN NEUROSURGERY

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Introduction: In a previous study we found that fentanyl (F) oxygen anesthesia followed by immediate postoperative naloxone reversal provided stress free anesthesia, satisfactory brain relaxation, and a stable postoperative course including early awakening and extubation.[1] Because sufentanil (S) is more potent than fentanyl the effective therapeutic ratio might be greater for sufentanil and the potential for central nervous system toxicity might be lower. In addition, the shorter half life of S might fascilitate postoperative narcotic reversal. Therefore, a comparison of high dose narcotic techniques was undertaken in order to determine the clinical applicability of high dose S in neurosurgery.

Methods: Twenty patients requiring elective craniotomies were randomly and equally divided into two groups. Premedication consisted of valium 0.05 mg/kg and atropine 0.4 mg. A radial arterial catheter (MAP) was inserted. In addition, ECG, HR, EEG, end expired CO_2, temperature, blood gases, and degree of neuromuscular blockade were monitored intraoperatively. All patients were induced with oxygen and an intravenous infusion of S or F at a rate of 30 or 150 µg/min, respectively. After 3 minutes the rate of the infusion was increased to 50 µg/min for S and 250 µg/min for F until the total dose infused was 20 and 100 µg/kg, respectively. In addition, curare 0.2. mg/kg plus pancuronium 0.03 mg/kg were given. Intubation was performed after 4 µg/kg of S or 20 µg/kg of F was infused. Intraoperatively, 50 µg of S or 250 µg of F was given at 30 minute intervals after the termination of the infusion. MAP and HR were measured at selected times intraoperatively and postoperatively. Blood levels of S or F were sampled intraoperatively and at 24 and 48 hours postoperatively. Following the completion of surgery, muscle relaxation was reversed. Postoperatively, all patients received a loading dose of naloxone 0.5 µg/kg followed by a continuous maintenance infusion at an initial rate of 6 µg/kg/hr which was gradually tapered during the subsequent 12 hour period. Respiratory rate (RR) and Glasgow coma scores (GCS) were measured at frequent intervals. In addition, nausea, vomiting, headache, and time to extubation were recorded.

Results: Variables measured intraoperatively (MAP, HR) and postoperatively (MAP, HR, GCS, RR) are presented in the table. Analysis of variance reveals no between group differences for MAP. However, in the postoperative period, MAP was higher in both groups. Mean control HR was lower in the S group accounting for the significantly lower HR in this group. However, paired T tests comparing controls with measurements taken intraoperatively and postoperatively reveal no difference within groups for HR. All except one patient in each group were extubated within 28 minutes after arrival in intensive care. Glasgow coma scores were not different between the two groups. The incidence of N, V, and headache was similar (25%) in both groups. No memory of the intraoperative experience was reported by any patient. F and S blood levels follow comparable patterns of peak effect, redistribution, and elimination as displayed in the figure.

Discussion: High dose S neuroanesthesia appears to provide a stress free intraoperative course, satisfactory operating conditions, and a hemodynamically stable postoperative course including early awakening and extubation when compared to the high dose technique. In the postoperative period, both groups of patients experienced similar incidences of nausea, vomiting, and headache. In addition, MAP was higher than control values in both groups. Review of the postoperative RR and GCS indicates that naloxone administration may be reduced or discontinued after 4 hrs if the course is uncomplicated. No patients who received high dose S or F exhibited sharp waves or spikes on their EEG's..

References:

1. Shupak RC, Harp JR: Reversible narcotic coma for neuroanesthesia. Anesthesiology 55:A230, 1951 (Abstract).

FIGURE: MEAN BLOOD LEVELS ± SD.

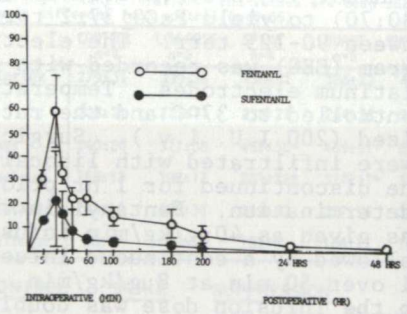

TABLE. MEASURED VARIABLES (MEANS)

TIMES	MAP	HR	GCS	RR	MAP	HR	GCS	RR
CONTROL	94	74	-	-	92	88	-	-
INTUBATION	93	74	-	-	90	93	-	-
INCISION	88	64	-	-	87	77	-	-
3 HR	99	70	-	-	90	73	-	-
END SURGERY	92	67	-	-	92	77	-	-
*1/2 HR	109	75	12	12	112	97	11	15
*2 HR	114	76	14	14	105	86	13	18
*4 HR	101	75	13	17	103	89	13	18

*POSTOPERATIVE PERIOD