

Title : COMPARISON OF SUFENTANIL-N20 VS FENTANYL-N20 IN PATIENTS UNDERGOING GENERAL SURGERY :  
A BLIND STUDY

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**INTRODUCTION.** Sufentanil (S), the N-4 thienyl derivative of fentanyl (F), which is 5-10 times more potent than F, has recently become available for clinical use. Although, some studies found that S produces less postoperative respiratory depression, allowing quicker recovery and earlier extubation than equipotent doses of F (1), these results have not been confirmed by a recent study (2). The contradictory conclusions from the literature in this respect can be explained by the fact, that none of these studies were double blind, multiple surgical procedures were included, and that narcotics were administered as successive boluses at different times throughout the operative period.

Accordingly, to determine whether S allows an earlier extubation than F, we conducted a double blind study in carotid endarterectomy patients where S or F were given at exactly the same time for induction and maintenance of anesthesia.

**METHODS.** Twenty three patients scheduled for carotid endarterectomy were included in this study. All gave informed consent after approval by our Ethics Committee. Usual antihypertensive medications were given two hours before induction. Upon arrival in the induction room, a radial artery catheter was inserted and patients received a 300 cc cristalloid infusion and were randomly assigned to receive either F (n = 11) or S (n = 12) for induction.

Anesthesia was induced with flunitrazepam (0.01 mg/Kg), F (10 mcg/Kg) or S (1 mcg/Kg) and vecuronium (0.1 mg/Kg). After tracheal intubation was performed, ventilation was controlled with 40 % O<sub>2</sub> in air. At this time, if systolic blood pressure (SBP) had decreased more than 25 % of the preinduction value, ephedrine was administered. Before incision, patients received an additional dose of flunitrazepam (0.01 mg/Kg) and F (5 mcg/Kg) or S (0.5 mcg/Kg). During surgery ventilation was controlled with 50 % N<sub>2</sub>O in O<sub>2</sub>, and isoflurane was administered if SBP > 150 mmHg. Postoperatively, patients were transferred to recovery and placed under controlled ventilation. They were then closely followed and placed under spontaneous ventilation with their endotracheal tube still in place if their respiratory rate was > 10 breaths/min and their tidal volume > 7 ml/kg. Patients were extubated according to our usual recovery room criteria. Five minutes later an arterial blood gas was obtained. S plasma levels were determined 4, 6 and 8 hours after induction (Radioimmuno assay).

Data are presented as mean  $\pm$  SD. For statistical comparison between groups, the Mann-Whitney test was used.

**RESULTS.** Both groups were identical in age (61 vs 65), cardiac treatment, preoperative BP and HR, duration of the surgical procedures (Table 1). After induction ephedrine was administered in 7 patients groups S (mean dose 10 mg) and in 9 patients groups F (11 mg). Intraoperatively it was necessary to give isoflurane (0.5-1 %) in all

patients in both groups. The average duration of the surgical procedure, length of postoperative controlled ventilation, and postoperative time until extubation and the post-extubation PaCO<sub>2</sub> values are given in table 1.

Postoperatively, patients in the S group were able to be placed on spontaneous ventilation (T-tube) at an earlier time than those in the F groups. However, time for extubation was the same in both groups. The incidence of postoperative hypertension was the same in both groups (4/11 vs 6/12). Narcotics plasma levels are given in table 2.

**DISCUSSION.** This double blind study, comparing equipotent doses of S and F (1/10) was unable to confirm the findings of Smith et al (1) who, although using a dose ratio of 1/5, noted a shorter time to extubation in patients given S. Nevertheless, this study reveals that recovery of spontaneous ventilation is significantly quicker with S, which is in agreement with the study by Clark et al. (2) demonstrating that S-N<sub>2</sub>O results in less profound respiratory depression than F in the immediate postoperative period.

In conclusion, this double blind randomized study, suggests that when used as an analgesic supplement with N<sub>2</sub>O anesthesia during general surgery, S possesses the reproducible important postoperative advantage of leading to a more rapid recovery from ventilatory depression than F.

<u>Table 1</u>	F n = 11	S n = 12
Duration of surgery (min)	98 $\pm$ 18	114 $\pm$ 14
Postoperative length of controlled ventilation (min)	126 $\pm$ 44	86 $\pm$ 38 * p < 0.05
Postoperative time until extubation (min)	185 $\pm$ 44	163 $\pm$ 33
PaCO <sub>2</sub> after extubation (mmHg)	44 $\pm$ 7	37 $\pm$ 8

<u>Table 2</u>	F	S
PLASMA LEVELS (ng/ml)		
+ 4 HOURS AFTER INDUCTION	2.08 $\pm$ 0.70	0.12 $\pm$ 0.04
+ 6 HOURS " "	1.49 $\pm$ 0.51	0.08 $\pm$ 0.02
+ 8 HOURS " "	1.29 $\pm$ 0.48	0.06 $\pm$ 0.02

**REFERENCES**

- SMITH NT. ANESTHESIOLOGY 57 : A291, 1982
- CLARK NJ. ANESTHESIOLOGY 66 : 130-135, 1987