Title: AWAKE VS. ANESTHETIZED INTUBATION: A COMPARISON OF HEMODYNAMIC RESPONSES

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Introduction. Anticipation of a difficult intubation is one of the indications for awake sedated tracheal intubation. We believe it is a technique that is somewhat unjustly avoided by many anesthetists, perhaps because the adverse hemodynamic responses to intubation under light general anesthesia are well known[1] and there seems to be a widespread belief that awake intubation produces even more deleterious changes. In this study we compared the cardiovascular response to awake sedated tracheal intubation with the response to a standard general anesthetic induction.

Methods. Institutional approval was granted and informed consent obtained from 18 healthy patients (ages 20-53) for elective surgery. Premedication consisted of diazepam 0.15 mg/kg PO and glycopyrrolate 0.2-0.3 mg IM. Monitors included radial arterial and Swan-Ganz catheters. Patients were randomly assigned to one of two groups. In Group I ("anesthetized intubation", n = 8) general anesthesia was induced using curare 3 mg, sodium thiopental 4 mg/kg, fentanyl 4 mcg/kg, lidocaine 1.5 mg/kg IV, succinyl choline 1.5 mg/kg, and N_2O/O_2 50:50 prior to tracheal intubation. Group II ("awake intubation", n = 10) received IV diazepam 0.3 mg/kg, fentanyl 4 mcg/kg, and lidocaine 1.5 mg/kg, over a 20 minute period. During this time, topical anesthesia of the airway was obtained with lidocaine 4% or cocaine 5% prior to awake oral (n = 3) or blind nasal (n = 7) intubation. Baseline data included mean arterial pressure (MAP), heart rate (HR), central venous pressure (CVP), pulmonary capillary wedge pressure (PCWP), cardiac index (CI), and systemic vascular resistance (SVR). Subsequently these variables were recorded at 1 minute $\bar{p}$ induction of topical or general anesthesia and at ½ and 3 min. $\bar{p}$ intubation. Data were analyzed using paired or unpaired t-tests as appropriate.

Results. The two groups were statistically similar with regard to baseline values of MAP,HR,CVP, PCWP,CI, and SVR. Induction of topical or general anesthesia did not result in significant changes in any variable studied. In both groups intubation was accompanied by highly significant increases in MAP (See Table 1), which remained significantly higher than baseline in both groups at 3 min. $\bar{p}$ intubation. HR increased significantly with intubation in both groups but receded toward baseline by 3 min. $\bar{p}$ intubation. Similarly, PCWP increased significantly with intubation but remained elevated at 3 min. $\bar{p}$ intubation. There were no statistical changes from baseline in CVP,CI, or SVR in either group. There were no significant differences between the groups in any variable at any time studied, although MAP reached higher peak levels at ½ minute $\bar{p}$ intubation in Group I ($p = 0.06$). The duration of surgery ranged from 1.3 to 3.1 hours; all patients were responsive to verbal stimuli within minutes after termination of surgery. No patient had unpleasant recall of awake intubation at 48 hours $\bar{p}$ operation. There were no episodes of uncontrolled epistaxis or other clinically evident complications of awake intubation.

Discussion. Successful awake intubation depends on appropriate topical anesthesia, adequate sedation, and a skillful anesthetist. Our results indicate that awake intubation performed under these conditions results in hemodynamic changes that are similar to and perhaps not as profound as those following a thiopental-fentanyl-succinyl choline-N_2O/O_2 induction. It is also interesting to note that none of our patients considered awake intubation an unpleasant experience. We conclude that anticipation of unpleasant patient recall or expectation of adverse circulatory changes should not be a deterrent to awake tracheal intubation, at least in the healthy patient. Whether patients with a more fragile cardiovascular status would respond similarly remains a point of conjecture.

Table 1.

	Group	Baseline	½ min $\bar{p}$ intubation	3 min $\bar{p}$ intubation
MAP	I	92 ± 8	123 ± 18 *	109 ± 21 #
	II	89 ± 11	103 ± 18 *	96 ± 10 #
HR	I	82 ± 12	95 ± 19 #	92 ± 22
	II	82 ± 17	89 ± 26 #	87 ± 28
CVP	I	6 ± 3	8 ± 2	7 ± 2
	II	6 ± 3	7 ± 4	6 ± 4
PCWP	I	9 ± 3	16 ± 5 *	14 ± 4 *
	II	9 ± 2	13 ± 2 *	13 ± 2 *
CI	I	3.7 ± 0.7	4.5 ± 2.1	3.9 ± 1.6
	II	3.8 ± 0.8	4.4 ± 1.6	4.2 ± 1.4
SVR	I	1009 ± 133	1211 ± 422	1139 ± 251
	II	948 ± 201	869 ± 469	985 ± 339

Mean ± S.D.

# $p < 0.05$ compared to baseline

* $p < 0.01$ compared to baseline

References.

1. Stoelting RK: Circulatory changes during direct laryngoscopy and tracheal intubation: influence of duration of laryngoscopy with or without prior lidocaine, Anesthesiology 47:381-383, 1977.