

Date : April 30, 1980

Title : CARDIAC ARRHYTHMIAS WITH ENDOTRACHEAL INTUBATION

Authors : R. A. MacKenzie, D.O., A. B. Gould, Jr., M.D. and W. T. Bardsley, M.D.

Affiliation: Department of Anesthesiology and Division of Cardiovascular Diseases, Mayo Medical School and Mayo Clinic, Rochester, Minnesota 55901

Introduction. Previous studies¹⁻³ of the incidence of cardiac arrhythmias associated with endotracheal intubation during general anesthesia have emphasized observations during oral placement of the tube. We observed that cardiac arrhythmias frequently accompanied nasotracheal intubation in young, healthy adults and designed this study to determine if their incidence during nasotracheal intubation differed from that during orotracheal intubation in a similar group of patients.

Methods. Patients studied were all ASA Physical Status I, scheduled for oral surgical procedures that could be done with either nasotracheal or orotracheal anesthesia. One group of 38 patients was intubated via the nasotracheal route and a second group of 37 received oral endotracheal tubes. No premedication was given and the route for intubation was selected by a table of random numbers. Continuous ECG was recorded during preoxygenation and induction with thiopental, and succinylcholine (1 mg/kg) was given to facilitate intubation. The times of insertion of the endotracheal tube in the nose, placement of the laryngoscope in the mouth, and passage of the endotracheal tube between the vocal cords were noted on the ECG tracing. The tracing was continued for 1 minute after intubation or if an arrhythmia occurred, until 1 minute after the restoration of normal sinus rhythm. Informed consent was obtained and all intubations were performed by the authors. The study was approved by the institution's Human Studies Committee.

Results. Arrhythmias occurred during 22 of 38 (57.9%) nasal intubations and 12 of 37 (32.4%) oral intubations. This difference is significant ($P = 0.027$). All arrhythmias resolved spontaneously. Of the 22 arrhythmias in the nasal intubation group, 15 (68.2%) were multiple PVC's (6 or more) or ventricular bi- or trigeminy and were considered potentially serious. The remaining arrhythmias in the nasal intubation group were either supraventricular or single or few PVC's (2 to 5). Of the 12 in the oral intubation group, 6 were in the above mentioned ventricular group and the remainder in the latter group. The elapsed times from initiation of intubation until ventilation was resumed (apnea duration) were computed for the various subgroups:

Group	Apnea Duration (sec.)					
	N	\bar{X}	Median	SD	Min.	Max.
Oral pos.	12	23.8	22	8.5	15	46
Oral neg.	25	19.0	19	5.2	12	31
All oral	37	20.6	19	6.8	12	46
Nasal pos.	22	35.9	31	16.2	22	84
Nasal neg.	16	30.7	28	12.2	20	68
All nasal	38	33.7	29	14.7	20	84

Mean duration of apnea in the nasal positive group was significantly longer ($P = 0.002$)* than in the oral positive group and the apnea duration in the nasal negative group was significantly longer ($P = 0.001$) than in the oral negative group. Apnea duration for the nasal intubation group was significantly longer ($P = 0.001$) than for the oral intubation group. There were no significant differences in apnea duration between nasal positive and negative, or the oral positive and oral negative groups. A significantly greater percentage of females developed arrhythmias during both types of intubation. Arrhythmias during nasal intubation were seen in 8 of 18 males (44.4%) and 14 of the 20 females (70.0%) studied. During oral intubation, 3 of 15 males (20.0%) and 9 of 22 females (40.9%) developed an arrhythmia.

Discussion. The high incidence of arrhythmias seen in this study during both nasal and oral intubation may be due in part to the omission of narcotic, sedative or anticholinergic premedication in this youthful, healthy study population. Cardiac arrhythmias occurred with significantly greater frequency during nasal endotracheal intubation than during oral intubation and potentially serious ventricular arrhythmias were seen more often during nasal intubation than during oral intubation. While it generally takes longer to intubate nasally than orally, the apnea duration in patients developing arrhythmias in either group was not significantly longer than in those patients not developing arrhythmias. This suggests that apnea duration is not the sole determinant of arrhythmia with intubation. We suspect the more frequent occurrence of arrhythmias in the nasal intubation group reflects the greater stimulation and possibly the elicitation of nasal-cardiac reflexes. Additional study is indicated to further clarify the mechanism and etiology of these arrhythmias.

*2-Tail P-Value from rank sum test.

References.

1. Stoelting RK: Anesth Analg 55:77, 1976
2. Abou-Madi MN: Can Anaesth Soc J 24:12, 1977
3. Prys-Roberts C: Br J Anaesth 43:531, 1971