Title: CRICOID PRESSURE PREVENTS GASEOUS DISTENTION OF THE STOMACH DURING MANUAL INFLATION OF THE LUNGS IN INFANTS.

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Mask ventilation is routinely performed in anesthetic practice but is not risk free. Gastric inflation may occur and is associated with decreased diaphragmatic excursion and increased risks of regurgitation and aspiration.
This study was designed to determine the airway pressure at which air entered the stomach in an infant population and to examine the efficacy of cricoid pressure in preventing this occurrence, a study not previously done in this population.
Methods: 10 ASA 1 infants age 44 to 86 weeks scheduled for elective surgery were enrolled. The study was approved by the institution's Human Subjects Committee and written informed consent was obtained. Patients received inhalational inductions utilizing halothane (1-3%) in 70% N2O/30% oxygen or intravenous assisted inductions utilizing sodium pentothal. No patient received relaxants or atropine prior to the completion of this study. A doppler probe (Parks 915-AL) was placed over the upper abdomen to auscultate the stomach. Ventilation was controlled and airway pressures above 15 cm H2O were avoided. The lungs were then slowly inflated by gradually closing the pop-off valve on the anesthetic machine until air entry into the stomach was detected by the Doppler device, or until an airway pressure of 40 cm H2O was reached. This procedure was then repeated utilizing cricoid pressure.
Results: The lowest inflation pressure in which air entered the stomach was 15 cm H2O. Only one patient (#3) had no air entry at 40 cm H2O without cricoid pressure. There were only two patients experiencing gastric insufflation when cricoid pressure was applied. This occurred at 37 cm H2O (patient #7) and 35 cm H2O (patient #8).
Table I:

Ptnt. No.	Age in Wks.	Weight in Kgs.	Insp. Press. - C.P.* cm.H2O	Insp. Press. + C.P.* cm.H2O
1	86	9.5	18	40 ND
2	59	6.5	26	40 ND
3	58	6.9	40 ND	40 ND
4	46	8.0	22	40 ND
5	65	6.8	20	40 ND
6	87	9.1	22	40 ND
7	70	7.2	28	37
8	76	7.6	15	35
9	50	6.0	15	40 ND
10	44	6.2	26	40 ND

* Inspiratory pressure without and with cricoid pressure produced gastric insufflation. ND = Not detected.

Conclusions: We conclude from this study that gastric insufflation is avoided during face mask ventilation if airway pressures less than 15 cm H2O are applied. If pressure greater than 15 cm H2O is needed to ventilate the patient, cricoid pressure may improve patient safety prior to securing an airway with an endotracheal tube.

TITLE: DOES ANEMIA INCREASE THE RISK OF POSTOPERATIVE APNEA IN FORMER PRETERM INFANTS?

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This study examines whether the incidence of postoperative periodic breathing (PB), apnea and bradycardia is increased in former preterm infants with preoperative Hct < 30% and factors that affect oxygen availability to tissues.

Methods: 24 preterm infants 44-60 wks postconceptual age undergoing hernia repair were studied. All had a preoperative Hct of at least 25%. Anesthesia consisted of N_2O; O_2, halothane (ET $\leq$ 1.0%) and atracurium. Hb, Hct, reticulocyte count, % fetal Hb, 2,3-DPG and ATP levels were measured. The incidence of postoperative apnea, PB, and/or bradycardia in patients with Hct < 30% and those with Hct $\geq$ 30% were compared.

Results are presented in the table.

Discussion: The preterm infant is handicapped in his ability to compensate for the reduced oxygen carrying capacity that results from anemia. Because of the increased % of fetal Hb, decreased 2,3-DPG and inability to significantly increase cardiac output, oxygen flux is impaired. Previous studies in non-surgical patients have shown that anemia can result in tachycardia, dyspnea, pallor, and even apneic attacks. Our results show that anemia in former preterm infants can be associated with an increased incidence of postoperative apnea. The threshold for requiring preoperative correction should be lower than in healthy full term infants. These infants must be observed and monitored very closely in the postoperative period.

	Hct ≥ 30% (n = 19)	Hct < 30% (n = 5)	P
Gestational age			
mean ± SD	33.5 ± 2.7	32.4 ± 3.2	>.4[b]
range	28 - 36	28 - 36	
Postconceptual age			
mean ± SD	45.5 ± 4.6	43.6 ± 5.5	>.4[b]
range	40 - 54	34 - 51	
History of apnea	4 (21%)	1 (20%)	> .99[a]
Hematologic Profile			
Hematocrit % range	32.7 - 39.1	27.6 - 29.7	
Reticulocytes % mean ± SD	2.32 ± 1.34	4.42 ± 2.49	<.02[b]
Fetal Hb % mean ± SD	36.7 ± 15.0	61.2 ± 33.8	<.03[b]
ATP µm/dl mean ± SD	50.8 ± 5.6	43.0 ± 3.3	<.008[b]
2,3 DPG µm/ml mean ± SD	1.55 ± 0.28	1.27 ± 0.21	>.07[b]
Postoperative Complications			
Brief apnea	0	0	
PB > 1%	0	1 (20%)	>.2[a]
Prolonged apnea	4(21%)	4 (80%)	<.03[a]
Bradycardia	0	1 (20%)	

a = Fisher's exact test b = two-sample t-test