TITLE: THE ADDITIVE CONTRIBUTION OF N_2O TO HALOTHANE MAC IN INFANTS AND CHILDREN

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The purpose of this study was to define the contribution of N_2O to halothane MAC in infants and children and to determine whether N_2O contributes to MAC in an additive manner as suggested by clinical studies in adults or in a non-linear fashion as determined in a study by Cole.[1,2]

Fifty-one infants and small children (14.7 ± 7.2 months) were studied to determine the MAC of halothane in O_2 (n=11) and in the presence of three different N_2O concentrations [25% (n=13), 50% (n=13) and 75% (n=14)].

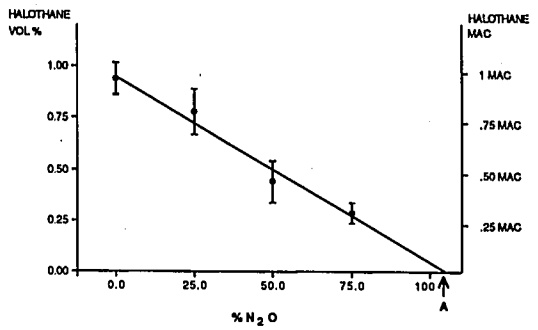
Following endotracheal intubation under deep halothane anesthesia, nitrous oxide end-expired concentrations were maintained at 0, 25, 50 or 75 vol % concentrations, and the halothane concentrations were decreased to predetermined levels to assess MAC. End-tidal gases were measured and recorded from a separate distal sampling port of an endotracheal tube during controlled ventilation (Perkin-Elmer Mass Spectrometer®). Analysis of variance was used to assess differences between groups. Results are expressed as mean ± SD.

The mean duration of constant end-tidal concentrations prior to skin incision was 10 ± 3 minutes. The MAC value for halothane in O_2 was 0.92 ± 0.08 vol %. The MAC of halothane in presence of 25%, 50% and 75% N_2O was 0.78 ± 0.12 vol %, 0.44 ± 0.10 vol % and 0.29 ± 0.06 vol %, respectively. A regression analysis through all four data points yielded a linear relationship (r^2 = 0.87). A predicted MAC for N_2O was 105 vol %.

While anesthetic requirements for halothane and isoflurane in infants and children are increased compared to adults, the predicted MAC of N_2O in infants and children (105%) is similar to predicted as well as the measured N_2O MAC in adults. Unlike the study by Cole et al., the contribution of N_2O to MAC in children is additive and linear. This linear contribution supports prior clinical studies measuring the contribution of one or two concentrations of N_2O to the MAC of volatile anesthetics.

References

1. Anesth Analg 68:551-555, 1989
2. Anesth Analg 68:556-562, 1989



Regression analysis of four data points for Halothane MAC predict MAC of N_2O at "A" is 105 vol % (r^2=0.87).

TITLE: INCIDENCE OF BLOODY TAPS (BT) DURING PEDIATRIC CAUDAL BLOCKADE.

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We prospectively collected the data of all pediatric Caudal Blocks (CB) performed in our hospital from August 1986 to September 1989 on a computerized protocol in order to evaluate the influence of Body Weight (BW) and of the Anesthesiologist's Experience (AE) on the incidence of BT.

Methods: Except for 22 high risk ex-premies, all the blocks were performed under halothane or isoflurane anesthesia after premedication with atropine. Age, BW, Number of attempts required to enter the caudal space (First attempt= 1stA, 2 to 5 = 2-5 A, taken over by the consultant= TOC), AE (quoted as the number of CB previously performed :<10, 10 to 20, >20), the eventual occurrence of Bloody Tap (BT) and of a Systemic Reaction (SR) defined as a brisk onset tachycardia (heart rate increase > 20 BPM) during or shortly after the CB were recorded. As we use local anesthetic solutions containing 1/200.000 Epinephrine a SR is the result of a total or partial IV injection. Chi Square test, with Yeates correction where appropriate, is used to assess the significance of the differences between the groups.

Results: A total of 1.100 blocks were performed :
- 203 in neonates and infants ≤ 5 kg (82 ex premies) (group 1)
- 260 in children > 5 - ≤ 10 kg (group 2)
- 300 in children > 10 - ≤ 15 kg (group 3)
- 337 in children > 15 kg (group 4)

There were 76 BT (6,9%). A total of 8 S.R. (0,72%) were observed which were all short lived and responded quickly to hyperventilation with oxygen

Two occurred despite repositioning the needle after a previous B.T. but 6 occurred without any previous evidence of blood and were thus classified as Concealed Bloody Tap (CBT): moreover all occurred in children ≤ 10 kg. CBT + BT = 82 (8.2%) is therefore the Total Bloody Tap number (TBT).As shown in table 2 the number of attempts required to enter the caudal space and the incidence of BT decreased with increasing AE.

Table 1 : Incidence of bloody taps

	Group 1	Group 2	Group3	Group4	Total
BT n	14	8*	22	32	76
%	6,8	3,1	7,3	9,4	6.9
CBT	3	3	-	-	6
TBT	17	11	22	3	82
%	8.3	4.2	7.3	9.4	8.2

Table 2: Influence of the anesthesiologist's experience (AE)

AE	<10	10-20	>20CB
n° of CB	184	210	704
1st A	94(51%)**	122(58%)**	494(70,2%)**
2-5 A	42(23%)	61(29%)	162(23%)
TOC	48(26%)**	27(13%)**	48(6,8%)**
BT	21(11,4%)*	17(8,1%)*	38(5,4%)*

* p < 0,05 ** p < 0,005

Conclusions: Our incidence of BT and SR is comparable to those of Dalens (1) when using an IM needle. The TBT incidence is not influenced by BW. But in children ≤ 10 kg 1 in 5 TBT is a CBT : this is a strong argument for the systematic use of epinephine containing LA solutions. Less attempts are needed to enter the caudal space when AE increases. CB being a blind technique, the decreasing incidence of BT when AE increases is probably due to less attempts being needed rather than to experience per se.

Reference: Anesth Analg 1989, 68: 83-89