FLUORIDE LEVELS WITH LONG-TERM VOLATILE SEDATION WITHIN THE INTENSIVE CARE UNIT

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Thank you Seoul!!!!
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- No industrial involvement
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Introduction

- Proper sedation is cornerstone of ICU therapy
- Volatile anesthetics are potential alternative ICU sedative agents.
  1. Perfect control over their action
  2. Minimal metabolism
  3. Easy to measure their concentration in brain
  4. Less delirium after their use?

- Technical difficulties?
- Safety?

Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit

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Is it a new idea?

Status Asthmaticus Treated with Isoflurane and Enflurane
Samuel M. Parnass, MD, James M. Feld, MD, William H. Chamberlin, MD, and Laurence J. Segil, MD

Prolonged isoflurane anesthesia in status asthmaticus
MORRIS I. BIERMAN, MD; MARTIN BROWN, MD; ORHAN MUREN, MD; RICHARD L. KEENAN, MD; FREDERICK L. GLAUSER, MD

CHEST
Official publication of the American College of Chest Physicians

Enflurane and halothane in status asthmaticus.
M Echeverria, A W Gelb, H R Wexler, D Ahmad and P Kenefick
Expanding the use of volatile anesthetic agents beyond the operating room

Marcin Wąsowicz, MD, PhD · Angela Jerath, MD
How can we do it in the ICU?
Use Anaconda???
Anaesthetic Conserving Device
(AnaConDa, Sedana Medica, Sweden)

CJA 2013; 60: 38-43
AnaConDa-cross section

Can be used with isoflurane or sevoflurane
Background

- Technical requirements
- Use of volatiles within the ICU requires further studies on safety
- Safety needs to be addressed in context of patients safety and staff safety
- ‘Volatile Anesthetic Agents for Long-Term ICU Sedation (VALTS)’ is RCT currently being performed in Canada.
- This sub-study reports on fluorides levels in patients undergoing long term sedation with use of volatile agent-isoflurane
- Fluorides were reported to be nephrotoxic during metoxuflurane anesthesia (60 ties of XX century)
Methods

• REB approval in participating Institutions
• VALTS is a prospective, multi-centre RCT assessing the safety and feasibility of volatile agents for long-term ICU sedation.
• Recruiting 60 patients who require mechanical ventilation > 48 hours.
• Randomised 2:1 to isoflurane sedation or propofol and/or midazolam.
• Isoflurane delivered using the Anesthetic Conserving device within the ICU.
• Sedation titrated using an explicit sedation-analgesia protocol to daily target SAS score until extubation or tracheostomy.
Measurements

- Fluoride levels every second day during volatile sedation
- Renal function measured every day
  - Creatinine level
  - GFR
  - Need for dialysis
Results

- 14 patients received isoflurane sedation for mean (SD) 118 +/- 71 hours with daily infusion volumes of 38.5 +/- 21.5ml/h.

- The mean daily end-tidal isoflurane concentration was 0.33 +/- 0.18. 4 patients had a history of chronic renal failure.
### Results - Fluorides Levels (umol/l)

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| Mean         | 11.9  | 16.3  | 21.5  | 30.6  |
| St Dev       | 9.7   | 9.3   | 13.1  | 21    |
Results

• Levels rose with duration of sedation with 1 non-dialysis patient achieving a fluoride level of 56 umol/l at day 7 in one patient,

• There was no significant correlation between serum fluoride levels and GFR (R 0.14, p 0.14) or daily isoflurane infusion volume (R 0.05, p= 0.76).
Conclusion

• Serum fluoride levels rise with the duration of volatile sedation. However levels appear not to be correlated with renal function.