Use of Isofluorane for Sedation in a Children's Intensive Care

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PCCS LEICESTER 2022

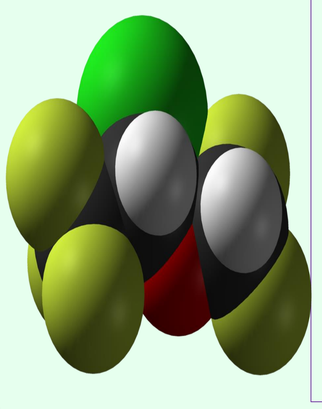
Background

Children in intensive care usually have sedation with intravenous midazolam and morphine or fentanyl. Studies suggest withdrawal occurs in 35-64% of children sedated with benzodiazepines and opioids. Current intensive care unit (ICU) sedation guidelines recommend strategies using non-benzodiazepine sedatives

Sedaconda ACD (Anaesthetic Conserving Device) is a medical device enabling delivery of inhaled anaesthetics to invasively ventilated patients.

NICE 2022 recommends Sedaconda ACD as a cost-saving option for delivering inhaled sedation in the intensive care setting when volatile anaesthetics are being considered. Evidence for use is limited in children but the same committee accepted that the results from the adult studies could be generalizable to children.

Our aim was to audit the use of this therapeutic intervention in our unit and make recommendations for improvement where applicable

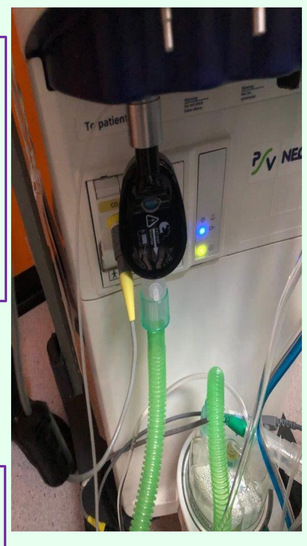


Methods

- Patients 0-16 years admitted to children's intensive care between Nov 2020-December 2021
- Received mechanical ventilation and sedation with isoflurane for at least 12 hours identified from data base
- Retrospective review of case notes and ICU charts
- Categorical parameters were expressed as frequencies and associated percentages, and continuous data as mean ± standard deviation or median [interquartile range], according to statistical distribution. Spearman Correlation used to measure relationship between 2 variables

Objectives

- Ensure indications for use are in line with recommendations as per unit policy (exclusion criteria are: Patient on HFOV, Elevated ICP, Family history of malignant hyperpyrexia)
- Ensure appropriate monitoring is taking place
- Assess efficacy of sedation
- Identify possible side effects

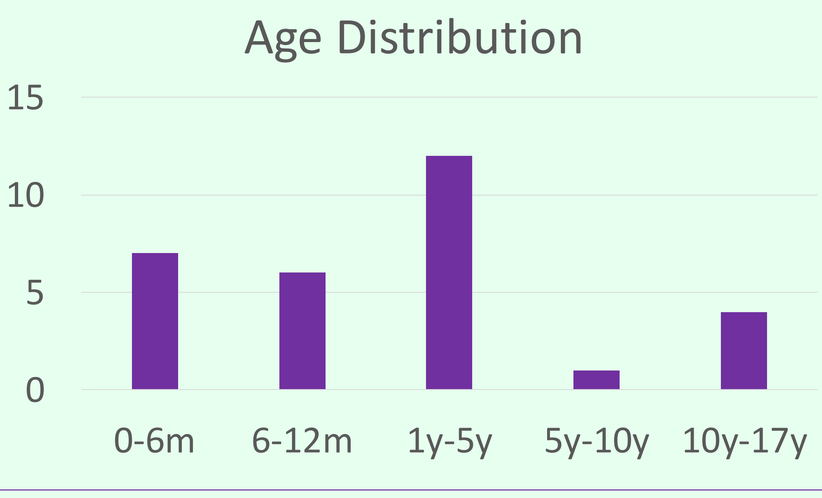


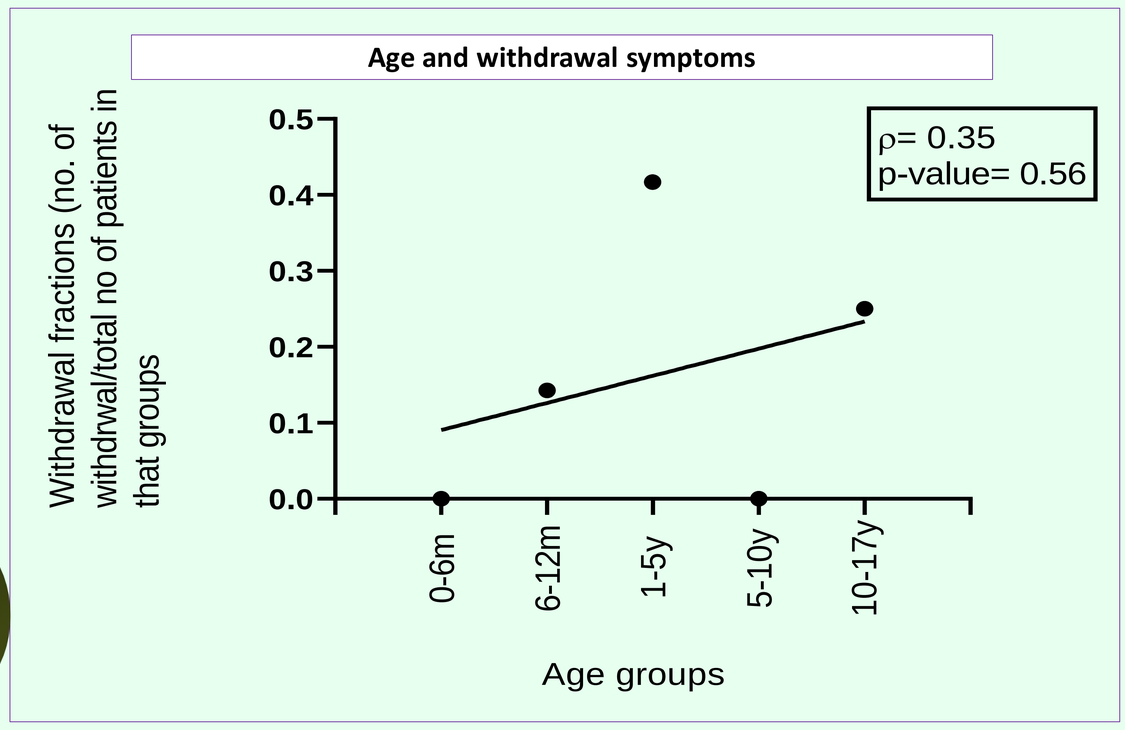
Standards

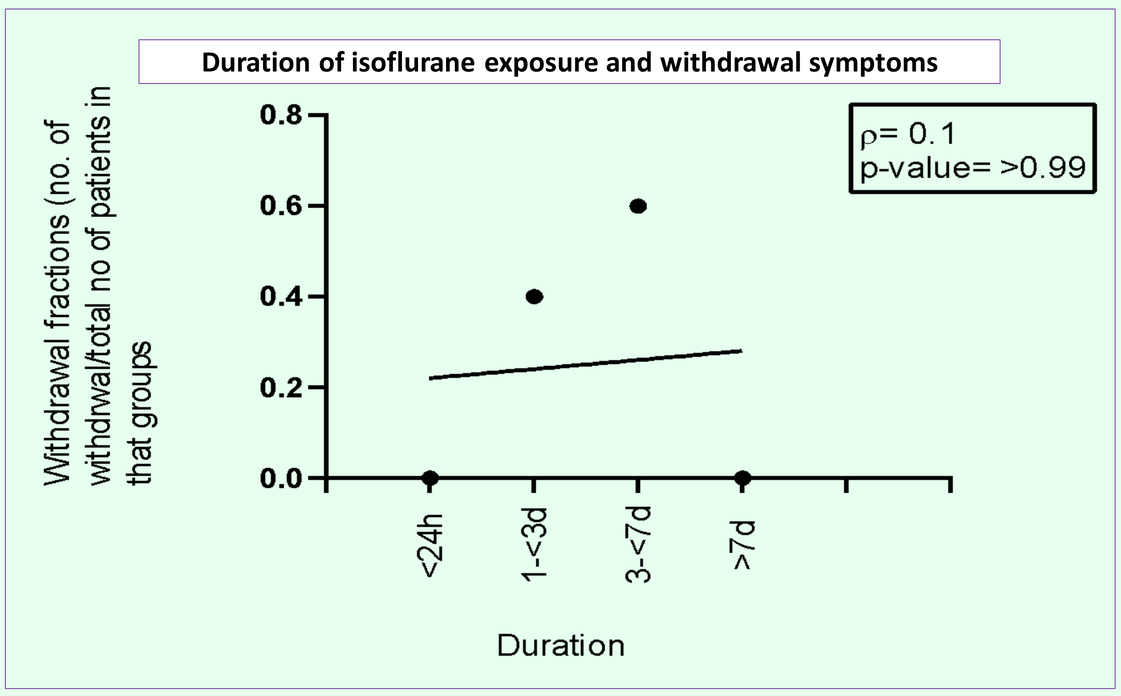
- Record end tidal isofluorane concentration hourly (Target FET 0.2-0.7)
- Record Comfort scores at least 4 hourly (Target 17-26)
- Monitor for withdrawal on discontinuation of isofluorane (using WAT-1 scores and Nottingham withdrawal score)

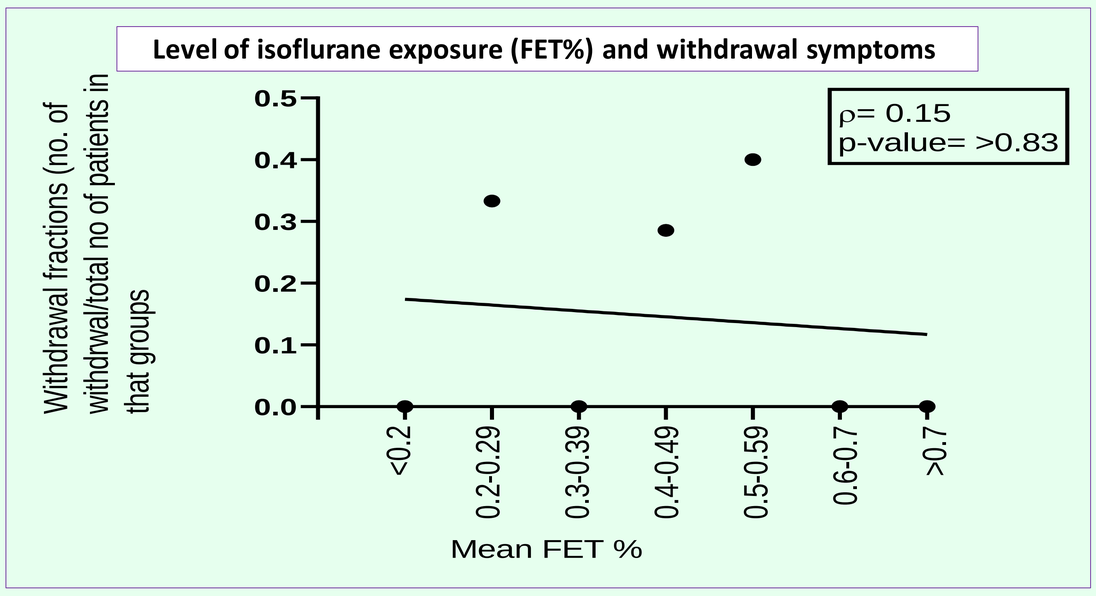
Results

- 32 patients were sedated using isofluorane over the study period
- Complete data set is available for 30 patients
- Indications: **status asthmaticus (23%), difficult sedation (23%) and short-term ventilation (27%)**
- 30% of patients did not have 4 hourly Comfort scoring on at least one occasion.
- <10% of recorded Comfort scores demonstrated under sedation.
- Only adverse event recorded in our study population was withdrawal – reported in 23% of patients









Conclusions

1. 23% of the study population demonstrated withdrawal symptoms with use of inhaled isoflurane.
2. There is a positive trend between age and withdrawal, with older children demonstrating more signs of withdrawal, however the trend is nonsignificant primarily because of the small sample size
3. No correlation found between withdrawal symptoms and duration of exposure, or the amount of exposure (FET % of isofluorane) in our study
4. At the time of this study, a well validated delirium screening tool was not in use in our unit. There is consequently a lack of delirium data during the sedation period. It should be considered that there is a potential overlap between delirium and withdrawal. Emergent delirium is a well recognised side effect of volatile inhalational agents, and subsequent maladaptive behaviours are known to continue for up to 2 weeks
5. We also couldn't perform an exact cost analysis comparing isofluorane vs standard sedation regime
6. Further research with adequate sample size is required to investigate potential clinical benefits and optimal role of volatile agents for ICU sedation in children. Analysis of cost, and impact on neurocognitive function is also needed. Evaluation of the potential impact of a robust weaning protocol in reducing withdrawal or delirium symptoms is needed

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