

Post Operative Delirium in Paediatric Anaesthesia Development of a protocol for recovery

Dr Sian Hughes, Dr Anisa Bhattay

Fellow in Paediatric Anaesthesia, Red Cross War Memorial Children's Hospital, Cape Town
Consultant in Paediatric Anaesthesia, Red Cross War Memorial Children's Hospital, Cape Town

Introduction:

Red Cross War Memorial Children's Hospital anaesthetises between 9000-10,000 children per year. A large proportion are of pre-school age and there is a high percentage of gaseous inductions with Sevoflurane, typical of many Children's hospitals worldwide.

Post-operative delirium has been strongly associated with the above risk factors and can be distressing not only to patients but also staff and carers.

It was first described by Eckenhoff and colleagues in the 1960s- in 14,436 prospectively studied children emerging from ether, cyclopropane or ketamine. Incidence decreased due to 2 factors:- the introduction of Halothane and recognising the importance of post-operative pain management.

Incidentally-a 2008 meta-analysis of 23RCTs 2300 pts compared halothane with sevoflurane and found increased post-operative delirium with Sevoflurane (pooled odds ratios 2.21, 95% confidence interval, p<0.0001) [1]

Post-operative delirium typically begins soon after emergence from anaesthesia (mean 14 ± 11 min), but longer delays of onset have been reported (up to 45 min). Duration lasts typically 15-30mins but has been reported as lasting up to 2 days.

Whilst the aetiology of this phenomenon is not well understood, pre-school age and Sevoflurane are well established risk factors. Further hypothesised associations include immature central nervous systems and different neuronal networks, low blood gas solubility coefficients, and rapid washout and emergence from anaesthesia.

Contact:

Dr Sian Hughes, department of anaesthesia and critical care, Southmead hospital, Bristol, UK.

S.hughes16@nhs.net

References and Acknowledgements:

Department of Anaesthesia at Red Cross War Memorial Children's Hospital, Cape Town, South Africa

1. Paediatric emergence delirium: a comprehensive review and interpretation of the literature K. P. Mason BJA: British Journal of Anaesthesia, Volume 118, Issue 3, March 2017, Pages 335-343

2. Severe emergence agitation after myringotomy in a 3 year old child, Dahmani S, Veyckemans F, Anaesthesiology-June 2012, pp399-406

Methods:

After surveying the literature and observing a relatively high incidence of delirium in our recovery unit, we established a protocol based on that described by Dahmani and colleagues [2] which was displayed in each key recovery area.

Being a diagnosis of exclusion, we emphasized the importance of a differential diagnosis (for example pain/hypoglycemia/hypoxia) prior to progressing further down the protocol. Our protocol also included the validated post-operative delirium PAED scale, to aid recovery staff and attending physicians in diagnosis.

In addition to this, we gave a morning teaching session to the department surrounding the diagnosis, aetiology and management of post-operative delirium and also presented our work to the recovery and theatre nursing staff to aid learning and feedback.

Summary and future work:

The distressing consequences of post-operative delirium in children may not be entirely avoided whilst risk factors remain. However, prompt recognition and exclusion of mimics/life threatening issues, combined with an understanding of its diagnosis and management can aid patient safety, as well as patient, carer and staff well-being and satisfaction.

Options for future work could include:

- Auditing incidence of post-operative delirium with volatile anaesthesia versus total intravenous anaesthesia
- Surveying confidence/comfort levels in anaesthesia and recovery staff in management of post-operative delirium following institution of this protocol
- Cyclical training sessions to coincide with new starters in medical and nursing divisions

Our work has shown that whilst the aetiology of post-operative delirium in children may be poorly understood, one can create an easy to follow protocol for diagnosis and acute management. Whilst this protocol predominantly focuses on pharmacological treatment, we are aware that non-pharmacological treatments have also been studied.

Agitation in Recovery

Rule out:

- Hypoxia
- Hypotension
- Hypoglycemia/metabolic disturbance
- Upper airway obstruction
- Pain (surgical or nonsurgical, e.g. Corneal abrasion)
- Prolonged neuromuscular blockade
- Urinary retention
- Drugs

Confirm diagnosis of Emergence Delirium

- Non-purposeful agitation, kicking, absence of eye contact with caregivers (or parents), eyes staring, inconsolable, unaware of surroundings
- Measure with PAED score
- High risk includes- pre-school age, Sevoflurane

Pain

- Fentanyl 1-2mcg/kg

Other treatment options

- Propofol 1mg/kg iv
- Clonidine 0.5-1mcg/kg iv
- Dexmedetomidine 1mcg/kg iv (3-4mcg/kg intranasal)

The PAED (Paediatric Anaesthesia Emergence Delirium) scale. Add each behavior score to get final score. >10-12 = ED. Applicability to neuroatypical and neurodevelopmentally delayed children may be limited-

| Behavior | Not at all | Just a little | Quite a bit | Very much | Extremely |
|--|------------|---------------|-------------|-----------|-----------|
| The child makes eye contact with caregiver | 4 | 3 | 2 | 1 | 0 |
| The child's actions are purposeful | 4 | 3 | 2 | 1 | 0 |
| The child is aware of his/her surroundings | 4 | 3 | 2 | 1 | 0 |
| The child is restless | 0 | 1 | 2 | 3 | 4 |
| The child is inconsolable | 0 | 1 | 2 | 3 | 4 |

Emergence delirium protocol modified from Dahmani et al, Anesthesiology 8 2012, Vol.117, 399-406