

Common Perioperative Problems

EMERGENCE DELIRIUM (ED)

Emergence Delirium (ED) is a dissociated state of consciousness during emergence or early recovery from GA, when the child appears disorientated, irritable, uncompromising, uncooperative, incoherent and inconsolable. The child may have non purposeful movements and thrash about. ED causes disruption in the Post Anaesthetic Care Unit (PACU). It can be distressing for caregivers to observe and the associated restlessness can potentially lead to inadvertent self harm, or the dislodgement of intravenous lines, drains or surgical dressings. Long term effects are unknown, but some authors suggest that maladaptive behaviour may be associated with ED.

ED is a diagnosis of exclusion. It is important to exclude hypoxia, hypotension, hypoglycaemia, metabolic disturbances, pain and other causes of emergence agitation (EA) like the unmet need for food or water, before concluding that an agitated child has ED.

ED is a self limiting condition that lasts up to 30 min but may require intervention to ensure the child does not come to harm during this time.

Incidence:

The reported incidence varies from 10 to 80% depending on the diagnostic criteria, patient factors, procedure related factors and anaesthesia related factors. In KKH, ED occurs in approximately 10% of children undergoing GA for day surgery and 40% of children undergoing GA for MRI.

Risk Factors for ED:

- Use of ether volatile anaesthetic agents as oppose to propofol or halothane.
- Postoperative pain

- Surgery type (especially ENT & Eye)
- Age (2- 6 year old)
- Preoperative Anxiety
- Child temperament (more emotional, more impulsive, less social and less adaptable to environment changes)
- Presence of invasive devices at emergence from anaesthesia (e.g. urinary catheters, nasogastric tubes, chest tubes)

Assessment:

PAED scale *Sikich and Lerman 2004.*

This is a validated tool for measuring emergence delirium in children.

Behaviour	Not at all	Just a little	Quite a bit	Very much	Extremely
Makes eye contact with caregiver	4	3	2	1	0
Purposeful actions	4	3	2	1	0
Aware of surrounding	4	3	2	1	0
Restless	0	1	2	3	4
Inconsolable	0	1	2	3	4

The PAED score is the sum of all each stem. A score of 10 more is highly suggestive of ED.

It is also important to recognise the entity of hypoactive delirium although the cause and clinical significance of this is unknown.

Preventive Measures:

- Risk stratify the child for ED
- Allow the child to wake up undisturbed
- For children at high risk of ED, consider the following
 - Premedication with intranasal dexmedetomidine 1-3mcg/kg (max 200mcg) or oral midazolam 0.5mg/kg (max 20mg)
 - Intravenous Propofol: bolus 1 mg/kg given at end of procedure or used in TIVA
 - Intravenous Fentanyl: 1 mcg/kg given 10 minutes before end of procedure
 - Intravenous Dexmedetomidine 0.3-1 mcg/kg or clonidine 1-2mcg/kg given intraoperatively
- Good multi-modal analgesia
- Non-pharmacological measures can be considered including
 - Informing the patient of predictable pain or discomfort prior to anesthesia
 - Removing indwelling invasive devices as early as possible
 - Parental presence during induction of anesthesia and recovery (in pediatric patients)
 - Family-centered behavioral preparation for surgery

Management

Exclude important causes of emergence agitation like hypoxia, hypotension, hypercarbia, hypoglycemia which must be managed emergently.

Non-pharmacological

- Identify and eliminate causative factors where possible (e.g. pain, hypothermia, presence of invasive devices)
- Prevent Self-injury - secure hold of the child securely, use of cot/ trolley side paddings and restraints if necessary
- Nurse in a quiet environment
- Reunite with parents as soon as possible

Pharmacological

- IV Fentanyl 1-2mcg/kg
- IV Propofol 0.5-1 mg/kg
- IV Midazolam 0.02-0.10mg/kg
- IV Dexmedetomidine 0.3-0.5mcg/kg

References:

1. Sikich N, Lerman J. Development and psychometric evaluation of the Paediatric Anesthesia Emergence Delirium scale. *Anesthesiology* 2004; 100: 1138- 45.
2. Bong CL, Lim E,... Tan J SK. A comparison of single-dose dexmedetomidine or propofol on the incidence of emergence delirium in children undergoing general anaesthesia for magnetic resonance imaging. *Anaesthesia* 2015; 70: 393–9.
3. Bong CL, Ng AS. Evaluation of emergence delirium in Asian children using the Pediatric Anesthesia Emergence Delirium Scale. *Pediatric Anesthesia* 2009; 19: 593–600.
4. Jerrold Lerman. Emergence delirium and agitation in children. uptodate. accessed 31 July 2023
5. Lee SJ, Sung TY. Emergence agitation: current knowledge and unresolved questions. *Korean J Anesthesiol.* 2020 Dec; 73(6): 471–485.