Preoperative preparation, communication and premedication

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Why is perioperative distress, anxiety and fear so important?

• managing an uncooperative frightened child at induction is distressing
• associated with postoperative behavioral changes
• influence on subjective perception and associated with higher levels of postoperative pain
• poor compliance with future medical therapy
• neuroendocrine changes

Davidson, et al. Curr Opin Anaesthesiol 2011
Why is perioperative distress, anxiety and fear so important?

Frequent!

40% some distress behavior
17% significant distress
33% efforts to escape

Davidson, et al. Curr Opin Anaesthesiol 2011
Human behavior is complex
Expression of perioperative distress, anxiety and fear can be verbal or behavioral, subtle or extreme
<table>
<thead>
<tr>
<th>Code</th>
<th>Type</th>
<th>No. displaying behavior (% of sample)</th>
<th>Median proportion of observation behavior was displayed (range)</th>
<th>Median rate of behavior per minute (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cry</td>
<td>S</td>
<td>76 (26.0)</td>
<td>18.1 (1.3–57.5)</td>
<td></td>
</tr>
<tr>
<td>Scream</td>
<td>S</td>
<td>7 (2.1)</td>
<td>7.7 (1.7–20.9)</td>
<td></td>
</tr>
<tr>
<td>Nonverbal resistance</td>
<td>S</td>
<td>98 (33.6)</td>
<td>13.4 (0.6–58.3)</td>
<td></td>
</tr>
<tr>
<td>Verbal resistance</td>
<td>E</td>
<td>64 (19.6)</td>
<td></td>
<td>0.50 (0.22–5.73)</td>
</tr>
<tr>
<td>Negative verbal emotion</td>
<td>E</td>
<td>28 (8.6)</td>
<td></td>
<td>0.32 (0.17–2.82)</td>
</tr>
<tr>
<td>Request support</td>
<td>E</td>
<td>42 (12.9)</td>
<td></td>
<td>0.34 (0.16–2.32)</td>
</tr>
<tr>
<td>Information seeking</td>
<td>E</td>
<td>59 (18.1)</td>
<td></td>
<td>0.34 (0.17–2.05)</td>
</tr>
<tr>
<td>Coping statement</td>
<td>E</td>
<td>22 (7.5)</td>
<td></td>
<td>0.29 (0.13–2.69)</td>
</tr>
<tr>
<td>Positive affect</td>
<td>E</td>
<td>17 (5.2)</td>
<td></td>
<td>0.26 (0.19–0.50)</td>
</tr>
<tr>
<td>Informing status</td>
<td>E</td>
<td>85 (26.1)</td>
<td></td>
<td>0.31 (0.16–1.51)</td>
</tr>
<tr>
<td>Medical play</td>
<td>E</td>
<td>151 (46.3)</td>
<td></td>
<td>0.47 (0.15–3.43)</td>
</tr>
<tr>
<td>Nonprocedural talk</td>
<td>E</td>
<td>93 (28.5)</td>
<td></td>
<td>0.55 (0.13–3.08)</td>
</tr>
<tr>
<td>Medical talk</td>
<td>E</td>
<td>76 (23.3)</td>
<td></td>
<td>0.30 (0.13–1.22)</td>
</tr>
<tr>
<td>Humor</td>
<td>E</td>
<td>66 (22.6)</td>
<td></td>
<td>0.33 (0.16–2.94)</td>
</tr>
</tbody>
</table>

S = state (duration) behavior; E = event (frequency) behavior.

*a Rate calculated as no. of seconds with observed behavior displayed/total number of seconds.
Figure 2. Profiles of child behavior across phase of induction. a, Acute Distress profile. b, Anticipatory Distress profile. c, Early Regulating profile. d, Procedure Engage profile.
Behavior profiles by child age

* = P < .001
CHILD - risk factors

- age
- attachment and separation
- trait anxiety
- temperament / personality
- emotional-behavioral functioning
- cognitive development and understanding of illness
- quality of previous medical encounters

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Parent – risk factors

- trait / state anxiety
- monitors / blunters
- SES
- gender
- cultural differences
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- monitors / blun ters
- SES
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- cultural differences
Health care provider

Adult behavior can affect children's distress.
...AND THAT IS WHY WE LIFT ON THREE...

COMMUNICATION
Essential to understand non-verbal expressions and actions of the child!

One person should talk rather than several people all talking at the same time

- reassembly
- empathy
- criticism
- apology

- distracting behavior
- humor
- nonprocedural talk

Distress promoting behavior

Coping promoting behavior

Martin, et al. Anesthesiology 2011
How to assess perioperative anxiety?

- self-report (STAIC)
- measures of cooperation (ICC)
- physiological measures
- observer measures

modified Yale Preoperative Anxiety Scale m-YPAS

development of a short version of the modified Yale Preoperative Anxiety Scale m-YPAS-SF

The modified Yale Preoperative Anxiety Scale (m-YPAS)

Five behavior categories

• activity
• emotional expressivity
• state of arousal
• vocalisation

m-YPAS-SF

**Perioperative Adult Child Behavioral Interaction Scale (PACBIS)**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Assessed perioperative behaviors</th>
<th>Behaviors not assessed by scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICC</td>
<td>Child anxiety fear and negative behaviors during induction of anesthesia</td>
<td>Child’s coping behaviors, nonanxiety distress behaviors; all adult behaviors</td>
</tr>
<tr>
<td>mYPAS</td>
<td>Preoperative child anxiety (activity, emotional expressivity, state of arousal, vocalization, and use of parents)</td>
<td>Nonanxiety behaviors of child; all adult behaviors</td>
</tr>
<tr>
<td>PACBIS</td>
<td>Pre and postoperative child and parent, anxiety, coping and distraction behaviors, and adult coping and distress promoting behaviors</td>
<td></td>
</tr>
</tbody>
</table>

ICC = induction compliance checklist; mYPAS = modified Yale preoperative anxiety scale; PACBIS = perioperative adult child behavioral interaction scale.

What can be done to relieve distress, anxiety and fear?

Interventions

- educational
- behavioral
- alternative
- pharmacological
Educational interventions
Preparation appears to be a simple concept: to tell the child and parent, what is going to happen. In reality, however, preparation is not so simple!

What information, when and how it is provided and by who, are all key factors.

Coping skills > modeling > play therapy > operating tour > printed material
Educational interventions

• preparation programs / information
  (relaxation, coping, distraction, desensitization, role rehearsal, narrative information)
• age-appropriate needs (f.i. children ≥ 6 yr)
• negative behavior (f.i. children ≤ 3 yr)
• previous experience!
• should also be directed to parents
Behavioral interventions
- Anxiety reduction
- Distraction
- Video modeling
- Adding parents
- No excessive reassurance
- Coaching
- Exposure and shaping
Effective!  
High cost!
Shaping and exposure (i.e. practise with the anesthesia mask) and parental use of distraction in the surgical setting
Parental presence at induction

- experimental evidence does not support the routine use of parental presence (past versus new research)
- but it increases parental satisfaction
- respect to the child and parental rights and it should be allowed

Parental presence at induction

• conflicting data!

• dependent on parental personality

• extremely context sensitive (cultural, religious, ethnic differences) (studies US vs non-US countries)

Rosenbaum, et al. Pediatric Anesthesia 2009
Parental presence at induction

Preparing parents to be present for their child’s anesthesia induction: a randomized controlled trial

More self-efficacy about their role in the OR

Audiovisual aid viewing immediately before pediatric induction moderates the accompanying parents’ anxiety

Moderates the increase in anxiety associated with the anesthetic induction of their child

Alternative interventions
Alternative interventions

parental acupuncture
clown doctors
hypnosis
low sensory stimulation
hand-held video games

maybe helpful in reducing children’s anxiety and improving their cooperation

Alternative interventions

Streamed video clips
Cartoon distraction

Is an effective method of reducing anxiety

Alternative interventions

Tablet-based interactive distraction (TBID) vs oral midazolam to minimize perioperative anxiety in pediatric patients

Treating perioperative anxiety and pain in children: a tailored and innovative approach - Web-based

Alternative interventions

Other potential areas for future research

• environmental interventions
• equipment modification
• social interventions, including communication

Pediatric Anesthesia Teams Use Sweet Smells to Calm Preoperative Patients
Premedication
Why premedication?

- perioperative anxiety is associated with adverse outcomes
- premedication is associated with reduced anxiety (child and parents)
- reduced postoperative behavioral changes
- parents more satisfied with surgical experience
- premedication with clonidine reduces postoperative pain
- midazolam results in antegrade amnesia

## Premedication

<table>
<thead>
<tr>
<th>Drug</th>
<th>Description</th>
<th>Route/Oral</th>
<th>Nasal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
<td>Short-acting, water-soluble benzodiazepine</td>
<td>oral 0.25 – 0.5 mg/kg</td>
<td>nasal 0.2 mg/kg</td>
</tr>
<tr>
<td>Clonidine</td>
<td>$\alpha_2$ – adrenergic receptor agonist</td>
<td>oral 2 – 4 $\mu$g/kg</td>
<td>nasal 2 – 4 $\mu$g/kg</td>
</tr>
<tr>
<td>Dexmedetomidine</td>
<td>$\alpha_2$ – adrenergic receptor agonist (affinity x8)</td>
<td>oral 1 – 4 $\mu$g/kg</td>
<td>nasal 1 – 2 $\mu$g/kg</td>
</tr>
</tbody>
</table>


Onset of action delayed
Disadvantages - midazolam

<table>
<thead>
<tr>
<th>Limitations associated with the use of midazolam for premedication in children</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oral and intranasal administration</strong></td>
</tr>
<tr>
<td>Poor patient acceptance</td>
</tr>
<tr>
<td>Bitter taste that is difficult to mask</td>
</tr>
<tr>
<td>High incidence of burning and stinging is administered intranasally</td>
</tr>
<tr>
<td><strong>Bioavailability</strong></td>
</tr>
<tr>
<td>Low and unpredictable absorption when administered orally or rectally</td>
</tr>
<tr>
<td><strong>Pharmacokinetics</strong></td>
</tr>
<tr>
<td>Not short-acting in infants and adolescents caused by intermediate terminal half-life in these age groups</td>
</tr>
<tr>
<td>Active metabolite (1-OH midazolam)</td>
</tr>
<tr>
<td><strong>Pharmacodynamics</strong></td>
</tr>
<tr>
<td>Negative effects on cognitive function, especially memory (loss of explicit memory, preservation of implicit memory)</td>
</tr>
<tr>
<td>May produce postoperative behavioral disturbances</td>
</tr>
<tr>
<td>Risk of producing paradoxical reactions, especially after intravenous administration</td>
</tr>
<tr>
<td>Increase the risk for hiccups</td>
</tr>
<tr>
<td>Negative effects on respiratory drive, which is markedly enhanced by co-administration of opioids</td>
</tr>
<tr>
<td>Increased risk for sevoflurane-associated postoperative confusion/agitation/delirium</td>
</tr>
</tbody>
</table>

28/01/2016
BAPA RC
50
Disadvantages - midazolam

- high levels of impulsivity may be a contra-indication
- 14.1% of children do not respond to midazolam and still exhibit extreme distress in a subgroup of younger children who are more emotional and more anxious at baseline
- preoperative sedation was associated with increased incidence of adverse postoperative behavior changes
- paradoxically midazolam does not diminish EA/ED

Kain, et al. Anesthesiology
Advantages – clonidine

| Preoperatively | No taste and no stinging or burning after intranasal administration |
|               | High and predictable bioavailability after oral and rectal administration (only clonidine) |
|               | Anxiolysis |
|               | Sedation – similar to normal tiredness/sleep |
|               | No effect on cognitive function or memory |
|               | Reduced salivation |
|               | No or minimal effects on respiratory drive. Does not enhance the respiratory depression of opioids |

| Induction of anesthesia | Reduced need for induction agent |
|                        | Attenuates stress response associated with endotracheal intubation |

| Intraoperatively | Anesthetic requirements reduced by approximately 50% (both volatile agents and opioids) |
|                 | Hemodynamic stability |

| Postoperatively | Reduced postoperative pain |
|                | Reduced risk for sevoflurane-associated postoperative confusion/agitation/delirium |
premedication with oral clonidine appeared to be superior
quality of mask acceptance comparable between both groups
clonidine better accepted by the child
more effective preoperative sedation
trend towards better recovery from anesthesia and had a higher degree of parental satisfaction

clonidine is superior in producing sedation
decreasing post-operative pain and ED/EA
superiority of clonidine for PONV prevention remains unclear while other factors such as nausea prevention might interfere with this result
Two recent meta-analyses comparing dexmedetomidine and midazolam premedication

• better satisfactory sedation upon parent separation and mask acceptance
• reduced rescue analgesia
• reduced agitation or delirium and shivering postoperative period
• prolonged sedation and risks of heart rate and blood pressure decrease

Dexmedetomidine

‘The significance and the optimal dose of nasal dexmedetomidine still need to be defined. It may be that, in the future, a small dose of midazolam combined with dexmedetomidine will be the optimal choice.’

Why we should not use premedication

• premedication to a child who does not want it and may struggle may not be recorded
• implementation of multimodal information packages is a valid alternative
• parental presence will also reduce its need
• midazolam has a number of undesirable characteristics

blocking behavioral change with sedation may interfere with adaptive responses
Restraint

• positive application of force, with the intention of overpowering the child, applied without the child’s consent
• controversial – ethical dilemma
• could be regarded as physical assault and consent should be asked from the parents - the parents may feel that temporary restraint is justified

Homer, J. R. and S. Bass. Paediatr Anaesth 2010
Risk inhalation vs IV induction

Ortiz, et al. The Cochrane Library 2014
Conclusions (1)

- minimize psychological trauma related to anesthesia and surgery
- could be predicted to some extent
- hospital-related stress cannot be focused completely on just the induction
- pyramid of increasing preparation programs

- not all children need full application of all methods (only a few children require a psychologist)
- for most of the children distress, anxiety and fear associated with anesthesia is transient
Conclusions (2)

- shaping and exposure (i.e. practise with the anesthesia mask)
- parental use of distraction – enhancement of parental self-efficacy
- avoid distress promoting behavior

- maybe consider premedication in 6 months to 4 years old (these children are less likely to cope unless the anesthesiologist knows how to handle them)

- streamed video clips in the OR, tablets
- web-based development
- environment and equipment modification
FAMILY-CENTERED
PEDIATRIC
PERIOPERATIVE
CARE

Thank you for your attention!