


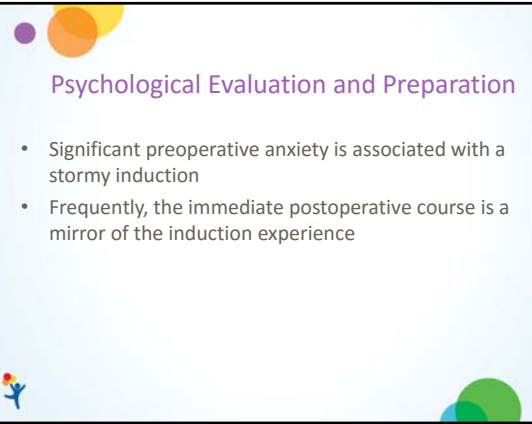
Preoperative Evaluation and Considerations of the Pediatric Patient

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Psychological Evaluation and Preparation

- Significant preoperative anxiety is associated with a stormy induction
- Frequently, the immediate postoperative course is a mirror of the induction experience



The ideal pediatric anesthetic strikes the perfect balance between psychological and clinical considerations and care.



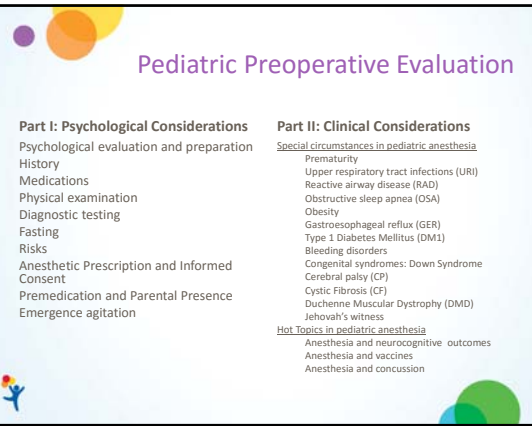
Preoperative Anxiety

- Children aged 1 to 6 years are most vulnerable
- Children who are anxious preoperatively have greater distress postoperatively
- The risk of postoperative negative behavior is 3.5 fold greater in children with preoperative anxiety
 - Nightmares
 - Waking up crying
 - Separation anxiety
 - Temper tantrums
 - New-onset enuresis



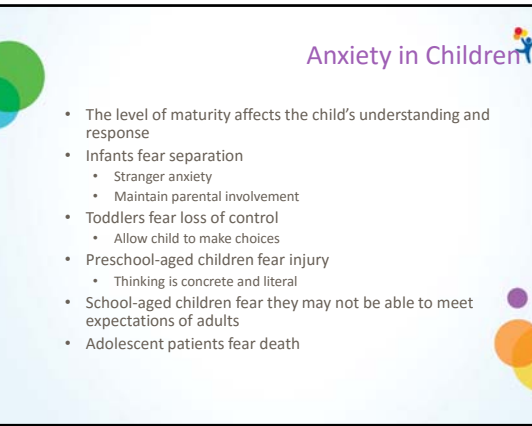

Pediatric Preoperative Evaluation


<p>Part I: Psychological Considerations</p> <ul style="list-style-type: none"> Psychological evaluation and preparation History Medications Physical examination Diagnostic testing Fasting Risks Anesthetic Prescription and Informed Consent Premedication and Parental Presence Emergence agitation 	<p>Part II: Clinical Considerations</p> <p><u>Special circumstances in pediatric anesthesia</u></p> <ul style="list-style-type: none"> Prematurity Upper respiratory tract infections (URI) Reactive airway disease (RAD) Obstructive sleep apnea (OSA) Obesity Gastroesophageal reflux (GER) Type 1 Diabetes Mellitus (DM1) Bleeding disorders Congenital syndromes: Down Syndrome Cerebral palsy (CP) Cystic Fibrosis (CF) Duchenne Muscular Dystrophy (DMD) Jehovah's witness <p><u>Hot Topics in pediatric anesthesia</u></p> <ul style="list-style-type: none"> Anesthesia and neurocognitive outcomes Anesthesia and vaccines Anesthesia and concussion
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Anxiety in Children

- The level of maturity affects the child's understanding and response
- Infants fear separation
 - Stranger anxiety
 - Maintain parental involvement
- Toddlers fear loss of control
 - Allow child to make choices
- Preschool-aged children fear injury
 - Thinking is concrete and literal
- School-aged children fear they may not be able to meet expectations of adults
- Adolescent patients fear death






- The entire family is undergoing the procedure
- Anxiety felt by the parents is transmitted to the child

Pre-anesthetic Interview

- Behavioral intervention administered to **all patients**
- Direct the focus of attention on the child
 - Desired
 - Non-procedural, distracting talk
 - Humor
 - 'Actual' control
 - Undesired
 - Reassuring/empathetic/apologetic statements
 - Description of medical equipment/procedures outside the OR

WHAT DO YOU CALL A PIG THAT DOES KARATE?



PORK CHOP

Anxiety in Parents


- Many parents experience more anxiety around anesthesia for their child than they do for surgery
- More concerned with risks for their child than they would be for themselves
- Highest anxiety
 - Child under one year of age
 - First surgical experience

Pre-anesthetic Interview

- Behavioral intervention administered to **all parents**
- Ethical and legal obligation to disclose risk
- Providers worry that detailed risk information may increase anxiety
- Studies report conflicting results

Preoperative Preparation

- In the USA, approximately 80% of pediatric surgical procedures are outpatient or same-day admission
- Development of **coping skills** is considered the most effective preoperative preparation followed by:
 - Modeling
 - Play therapy
 - OR tour
 - Printed material



Pre-anesthetic Interview

- Early adult studies showed that patients given detailed information were more tense and uncomfortable
- Later studies have shown that patients and parents who receive extensive risk information are no more anxious than those who receive minimal information
- Parents have expressed desire to have as much information as possible

Parental Desire for Perioperative Information and Informed Consent: A Two-Phase Study

Zeev N. Kain, MD¹, Shu Ming Wang, MD², Lisa A. Caramico, MD³, Maura Hofstadter, PhD³, and Linda C. Mayes, MD¹

Departments of ¹Anesthesiology, ²Yale Child Study Center, and ³Pediatrics, Yale University School of Medicine, New Haven, Connecticut

Anesthesia providers should note the coping strategies of parents and patients and information should be tailored to the individual.

Parental Desire for Perioperative Information

	Parental desire preferences (%)		
	"Prefer not to know"	"Like to know"	"Have a right to know"
All possible complications	4	35	61
Dangerous complications	5	36	59
Common complications	2	44	54
Details of needles used	4	49	47
Length of anesthesia	1	51	46
Details of pain/pain relief	1	46	53
Alternative methods of anesthesia	1	51	45
When allowed to get up	1	55	44
When allowed to eat and drink	1	54	45
Location of operating rooms	2	55	43
Meeting the anesthesiologist	1	57	42
Details regarding an intravenous, Foley catheter	1	49	50
Time of anesthesia recovery	1	56	43
Details of premedicant drugs	1	44	55

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Anesthesia & Analgesia. 84(2):299-306, February 1997.

History

- Review of all organ systems
- Medications and allergies
- Previous surgical and hospital experiences
 - Response to premedication
 - Difficulties with I.V. access
 - Problems with airway management
- Time of last oral intake, urination, vomiting/diarrhea
- Recent illness
- Secondhand smoke exposure
- Maternal history as well as gestational and birth history

Parental Desire for Perioperative Information


The graph plots Parental Anxiety Score (STAB) on the y-axis (ranging from 20 to 70) against four time points on the x-axis: Pre Intervention (T1), Post Intervention (T2), Preoperative Holding (T3), and Separation in OR (T4). Two data series are shown: Routine Information (solid line with square markers) and Highly Detailed Information (dashed line with circle markers). Both series show a decrease in anxiety from T1 to T2, followed by a slight increase at T3 and T4. The Highly Detailed Information group consistently shows lower anxiety scores than the Routine Information group.

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Medications and Allergies

- Must obtain full medication history
 - Include nonprescription and alternative therapies
- Allergies
 - All medications, food allergies, latex
- All regular medications should be taken morning of surgery (consider holding ACE-inhibitors)

Physical Examination



- Exam of opportunity
- Loose, chipped, or missing teeth, permanent oral appliances

Fasting

ASA Fasting Guidelines	
Clear liquids	2 hr
Breast milk	4 hr
Infant formula	6 hr
Non-human milk	6 hr
Light meal	6 hr
Full meal	8 hr

Diagnostic Testing

- Based on the condition of the patient and the planned procedure
- Hematocrit, blood chemistry, and urinalysis are rarely indicated in healthy children
- Pregnancy testing is controversial and guidelines vary from center to center
 - At CHCO, all females over 12 years old and those who have started menstruating require pregnancy tests before anesthesia

Fasting

Pediatric Anesthesia


Pediatric Anesthesia ISSN 1195-5645

ORIGINAL ARTICLE

Parents' understanding of and compliance with fasting instruction for pediatric day case surgery

Steve Cantellow, Jonathan Lightfoot, Helen Bould & Richard Beringer
Bristol Royal Hospital for Children, University Hospitals Bristol NHS Foundation Trust, Bristol, UK

Fasting




Modern guidelines

- Minimize aspiration risk
 - Preserve intravascular volume
 - Maintain plasma glucose levels
 - Maximize patient and parent satisfaction

Fasting


Reason to fast		Acceptable food to eat while fasting	
Aspiration	9%	Chips (french fries)	4.8%
Nausea or vomiting	51%	Toast/crackers	22.1%
Efficacy of anesthesia altered	12.5%	Cereal	17.3%
Other	17%	Sweets	14.4%
		Gum	14.4%
		Tea with milk	12.5%





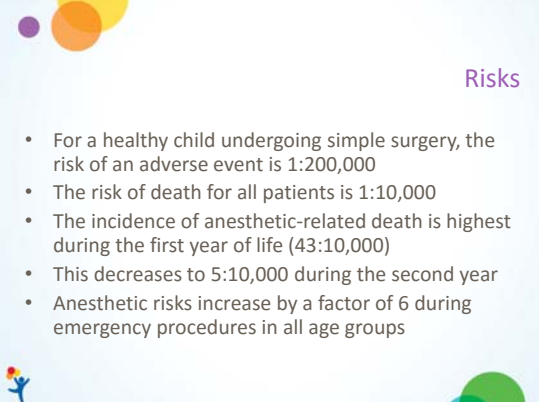
Risks

- A discussion about risk can give them perspective
- Fear among parents stems largely from a lack of information rather than a high risk



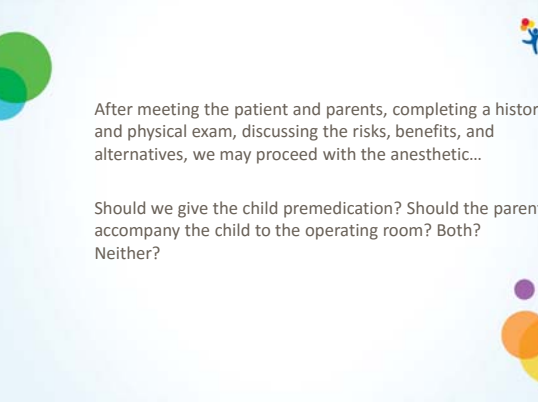
Anesthetic prescription and informed consent

- Primary rationale of informed consent is to **support and respect the autonomy of the patient**, not to decrease anxiety and not to meet legal obligations
- Should strike a balance between providing a detailed description of significant risks while considering the individual needs of the patient
- Comorbidities that increase risk should be described, measures to optimize **safety** should be explained



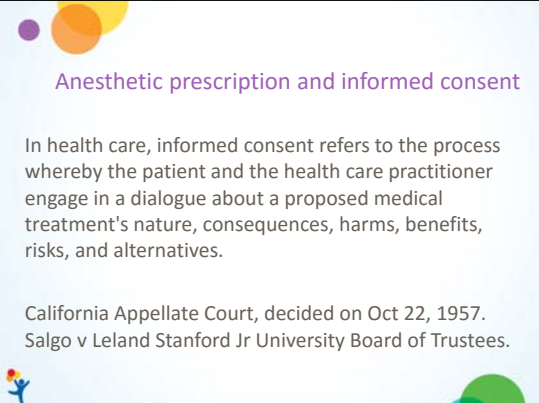
Risks

- For a healthy child undergoing simple surgery, the risk of an adverse event is 1:200,000
- The risk of death for all patients is 1:10,000
- The incidence of anesthetic-related death is highest during the first year of life (43:10,000)
- This decreases to 5:10,000 during the second year
- Anesthetic risks increase by a factor of 6 during emergency procedures in all age groups



After meeting the patient and parents, completing a history and physical exam, discussing the risks, benefits, and alternatives, we may proceed with the anesthetic...

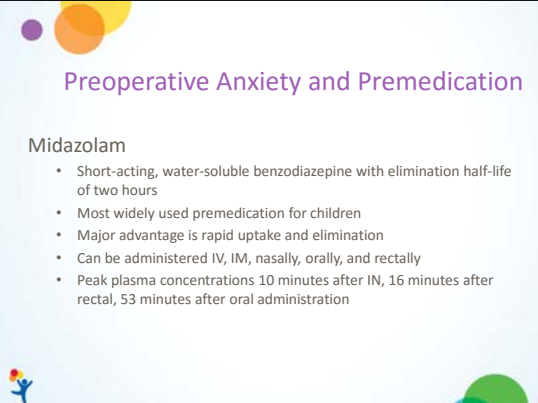
Should we give the child premedication? Should the parent accompany the child to the operating room? Both? Neither?



Anesthetic prescription and informed consent

In health care, informed consent refers to the process whereby the patient and the health care practitioner engage in a dialogue about a proposed medical treatment's nature, consequences, harms, benefits, risks, and alternatives.

California Appellate Court, decided on Oct 22, 1957.
Salgo v Leland Stanford Jr University Board of Trustees.



Preoperative Anxiety and Premedication

Midazolam

- Short-acting, water-soluble benzodiazepine with elimination half-life of two hours
- Most widely used premedication for children
- Major advantage is rapid uptake and elimination
- Can be administered IV, IM, nasally, orally, and rectally
- Peak plasma concentrations 10 minutes after IV, 16 minutes after rectal, 53 minutes after oral administration

Preoperative Anxiety and Premedication

Alpha agonists

- Cause dose-related sedation by effect in the locus ceruleus through inhibition of adenylate cyclase
- Plasma concentration of clonidine and dexmedetomidine peaks 60-90 minutes after oral administration and plasma concentration of intranasal dexmedetomidine peaks 40-45 minutes after intranasal administration

Clinical Science | November 1998

Parental Presence during Induction of Anesthesia versus Sedative Premedication : Which Intervention Is More Effective?

Zeev N. Kain, MD; Linda C. Mayes, MD; Shu-Ming Wang, MD; Lisa A. Caramico, MD; Maura B. Hofstadter, PhD

Preoperative Anxiety and Premedication


Ketamine

- Phencyclidine derivative produces dissociation of the cortex from the limbic system
- Produces reliable sedation and analgesia while preserving upper airway muscular tone and respiratory drive
- Can be administered IV, IM, nasally, orally, and rectally
- Disadvantages include increased oral secretions, nystagmus, hallucinations, nightmares, delirium (consider concomitant administration of midazolam and/or glycopyrrolate)

Parental Presence versus Sedative Premedication

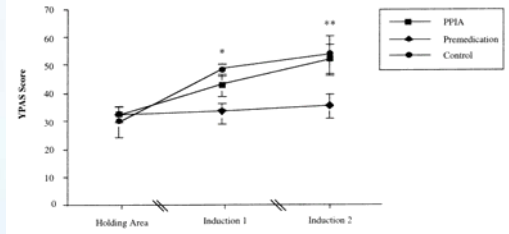
- 93 children ages 2-8 yr, ASA 1 or 2, GA, elective outpatient surgery
- Three groups:
 1. Parental presence group
 2. Midazolam group
 3. Control group
- Outcome measures:
 1. Anxiety of the child during the perioperative period
 2. Anxiety of the parent, compliance of the child, various recovery measures, parental satisfaction

Parental Presence at Induction



- Eliminates separation
- Child often does not need premedication
- Parents must understand what to expect
- Entire OR team must have a clear understanding of their roles

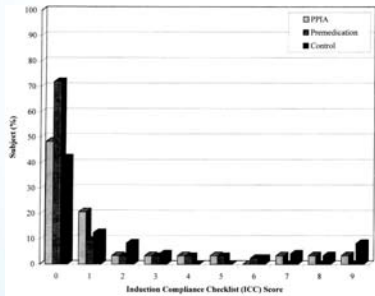
Parental Presence versus Sedative Premedication



Group	Holding Area	Induction 1	Induction 2
PPIA	~32	~48	~55
Premedication	~32	~45	~52
Control	~32	~35	~38

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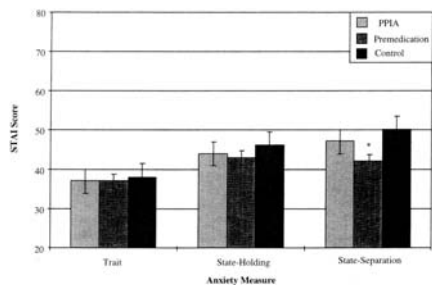
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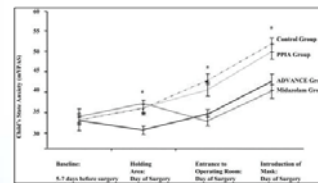
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Preoperative Anxiety and Preparation

- **ADVANCE** family-centered behavioral preparation program
 - Anxiety reduction
 - Distraction
 - Video modeling and education
 - Adding parents
 - No excessive reassurance
 - Coaching
 - Exposure/shaping



Parental Presence during Induction of Anesthesia versus Sedative Premedication: Which Intervention is More Effective?
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Family-centered Preparation for Surgery Improves Perioperative Outcomes in Children: A Randomized Controlled Trial.
Kain, Zeev, Caldwell-Andrews, Alison, Mayes, Linda, Weinberg, Megan, Wang, Shu-Ming, MacLaren, Jill, Bourne, Ronald
Anesthesiology, 106(1):65-74, January 2007.

Parental Presence versus Sedative Premedication

- Parents and children prefer to stay together
- Literature suggests this may not be effective treatment for anxiety of the child
- Allowing a parent into an operating room without significant preparation may be counterproductive

Preoperative Anxiety and Preparation

- Family-centered behavioral preparation program
 - Reduced children's anxiety before surgery
 - Reduced incidence of postoperative delirium
 - Shortened discharge time after surgery
 - Reduced analgesic consumption after surgery

Emergence Agitation

- Characterized by nonpurposeful restlessness and inconsolability
 - Thrashing, screaming, prolonged crying, inconsolability
- Reported incidence 10-50% in children less than 10 years of age
- Usually short lived but can last 45 minutes or longer
- Can lead to injury and prolong PACU stay

Treatment of emergence agitation

- First must rule out cardiorespiratory problems and pain
- Nonpharmacologic treatment
 - Swaddling, reassurance, parental presence
- Pharmacologic treatment
 - Agents useful for prevention are often useful for treatment
 - Propofol, opioids, midazolam, flumazenil, recently dexmedetomidine

Factors that increase the risk of postoperative emergence delirium

Patient factors	Anesthesia technique	Surgery type
Age 2-9	Volatile anesthetics	ENT surgery
Male gender	Time to awakening	Ophthalmologic procedures
Preoperative anxiety	Pain	
Maladaptive behaviors		
History of emergence agitation		

In Summary

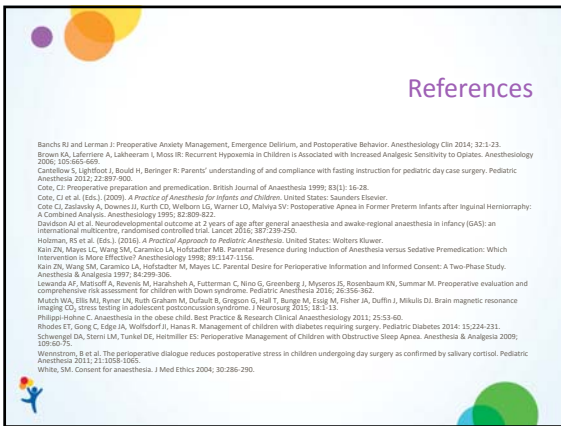
- Preoperative anxiety is associated with postoperative behavioral complications
- The anxiety of the parents influences the anxiety of the child
- Parental presence and/or premedication may help alleviate anxiety in both patients and parents
- Explain what to expect to both patients and parents
- Preoperative intervention can influence postoperative outcomes

Prophylaxis of emergence agitation

Midazolam	Equivocal
Propofol	Effective
Opioids	Effective
NSAIDs	Effective, but less so than opioids
Acetaminophen	Not effective
Ketamine	Effective
Alpha agonists	Effective
Volatile anesthetics	Increase the risk of EA
Nonpharmacologic treatments	Parental presence not effective, strategies to decrease pre-op anxiety effective

Before anything else,
preparation
is the key to success.

Alexander Graham Bell



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