Variability in anesthesiologists approach to the preoperative management of asthmatic children

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Background

Anesthesia, surgery and endotracheal intubation in asthmatic children:

• Higher risk for: laryngospasm, bronchospasm, perioperative cough, desaturation and airway obstruction especially in Exercise induced asthma and at least 3 episodes of wheezing in the last 12 months prior surgery.

• Asthmatic children treated with corticosteroids may encounter deficient adrenal response to stress.

No guidelines exist for preoperative respiratory treatment of asthmatic children who are referred to elective anesthesia and surgery.
Background

It was widely accepted by pediatric pulmonologists that preoperative assessment was required. However, a large variability in preoperative management of asthmatic children exists. The pediatric anesthesiologists (PA) are the professionals who are responsible for the preoperative decisions, and actually encounter and assess those patients prior surgery, we investigated this problem among this discipline.
Objective

The aim of this study was to evaluate the attitude of PA regarding preoperative management of asthmatic children and to compare the findings to the PP attitude using a national survey.
Methods

• A survey was conducted to all anesthesiologists who perform pediatric anesthesia in all 24 public hospitals.
• They were asked to complete a questionnaire:
  – 6 case scenarios
  – 13 pre-structured questions
• Questions and scenarios covered:
  – Clinical situations of asthmatic children at different ages and on different asthma treatment regimens.
  – Risk factors to augment treatment prior to surgery.
• The results were also compared to the findings of the PP discipline.
Results

• Forty-four PA from all 24 public hospitals in Israel responded.

• At least 1 from each hospital.

• 910 out of a total of 968 questions were answered (94%).
Characteristics of the 44 pediatric anesthesiologists

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Responders (n=44)</th>
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<tr>
<td>Male</td>
<td>39 (83%)</td>
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<tr>
<td>Experience in practicing PA</td>
<td></td>
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<tr>
<td>&lt; 5 years</td>
<td>6%</td>
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<tr>
<td>5-15 years</td>
<td>37%</td>
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<td>&gt;15 years</td>
<td>57%</td>
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Who should be consulted – in addition to the PA?

- PP - all cases: 25%
- PP only in individual cases: 45%
- General pediatrician: 25%
- No one but the anesthesiologist: 5%
Results

IV CS morning of surgery

- Never: 16%
- Consider: 86%

   - Always: 5%
   - Susp. adrenal insufficiency: 50%
   - High dose ICS prophylaxis: 50%
   - Exacerbation in the past 2 months: 21%
   - Low dose ICS prophylaxis: 27%
School aged-well controlled

8 years old boy, no prophylactic Tx, asthma exacerbation once in 6 months

Systemic CS-0% vs 18%

No Tx: 3% vs 21%
SABA: 21% vs 21%
SABA+ICS-1: 32.50% vs 42%
SABA+ICS-2: 11% vs 5%
po CS: 0% vs 9%
SABA+po CS: 0% vs 9%
IV CS-only: 0% vs 0%
IV total: 24% vs 9%

p < 0.001
School aged-poorly controlled

13 years old boy, high dose prophylactic ICS+LABA, asthma exacerbation
1-2 per month

Systemic CS 53% vs 26%

p = 0.068

School aged-

- poorly controlled

13 years old boy, high dose prophylactic ICS+LABA, asthma exacerbation
1-2 per month

p = 0.068

Systemic CS 53% vs 26%
Preschool-well controlled

2 years old girl, low dose ICS prophylaxis, no recent exacerbation

Systemic CS 31% vs 20%

p = NS
Preschool-poorly controlled

2 years old boy, low dose ICS prophylaxis, 2 courses of systemic GCS during the last 6 months

Systemic CS 63% vs 34%

p = NS
The majority of PA augment treatment prior to surgery for the following scenarios:

- Exacerbation during the last month: 73%
- PICU hospitalization in the past: 68%
- High dose ICS: 78%
- > 2 weeks systemic GCS during the last 6 months: 83%
- Night cough 2-3 days/week: 71%
- Type of surgery: 68%
Conclusion

• A considerable variability in the preoperative treatment strategies of asthmatic children by PA in common clinical scenarios.

• The PA showed a much better homogenous and lenient approach compared to the PP for the case of well-controlled school age asthmatic children.

• While wide variability existed for poorly controlled school age children and for all preschool children.
תודה ל:
פרופ' יעקוב סינו
דר' רותי סופרמן
דר' גיא גוט
בת אל יקיר
ותודה لكم!!
Most PA do not augment treatment prior to surgery for the following scenarios:

- Exacerbation during the Last 6 months: 15%
- BMI > 95 percentile: 29%
- Smoking passive/active: 40%
- Family history of atopy: 10%
“The incidence of RAD has increased markedly in the general pediatric population and is now approximately 25% of the pediatric surgical population”.

“Asthma medical therapy must be escalated preoperatively even in asymptomatic patients”.

“Short courses of GCS are extremely effective in preventing perioperative wheezing, even in patients who have severe asthma.”

Discussion

Children on no prophylaxis – “should begin use SABA or oral medications 3 to 5 days preoperatively”.

Children on prophylaxis – “should have steroids added”

“The difficult asthmatic child requires intensification in the frequency of nebulizer treatments, added bronchodilators, increased steroids, or, on occasion, all of these measures.”

Discussion

• Randomized, prospective, placebo-controlled study.

• 31 patients with partially reversible airway obstruction
• Lung function and wheezing after intubation.

• Prophylaxis with:
  1. combined salbutamol–methylprednisolone
  2. salbutamol alone
  3. salbutamol single dose

Silvanus M-T et al. Corticosteroids and inhaled salbutamol in patients with reversible airway obstruction markedly decrease the incidence of bronchospasm after tracheal intubation. *Anesthesiology.* 2004
Does it make any difference?

Review 6.2013

• The effects of GCS on wound healing - animal and human from 1949 to 2011.
• Animal studies - 30% reduction in wound tensile strength with perioperative corticosteroids.
• **Acute, high-dose** systemic GCS use likely has no clinically significant effect on wound healing, whereas **chronic systemic steroids** may impair wound healing.

Does it make any difference?

• Observational prospective study.
• 212 pregnant woman
• Corticosteroid administration were found to be correlated with wound complications.
• To avoid wound complications obstetricians should be careful in the administration of steroids before surgery.

Conclusions

• A major variability exists among pediatric pulmonologists in Israel regarding the indications and use of preoperative management of asthmatic children.

• This is most probably explained by the paucity of evidence-based data.

• Consensus guidelines for the preoperative management of asthmatic children are needed.
Future evaluation

A national survey of pediatric anesthesiologists to compare their strategies applied to the asthmatic child and their opinion on the role of the pediatric pulmonologist in the process.
School age - well control

7 years old boy, 4 years ago PICU hospitalization, no prophylaxis, 2 asthma exacerbation per year

Pulmonary function test prior to surgery 48%
School age-poor control

13 years old boy, high dose prophylactic ICS+LABA, asthma exacerbation 1-2 per month

Pulmonary function test prior to surgery -44%
Preschool – well control

2 years old girl, low dose ICS prophylaxis, no recent exacerbation

- no Tx: 6%
- SABA: 36%
- SABA+ICS: 27%
- po CS: 11%
- SABA+po CS: 11%
- SABA+ICS+po CS: 9%
- IV CS-alone: 2%
- IV total: 27%
School age-poor control

13 years old boy, high dose prophylactic ICS+LABA, asthma exacerbation
1-2 per month

Pulmonary function test prior to surgery -44%
Preschool – well control

2 years old girl, low dose ICS prophylaxis, no recent exacerbation

- no Tx: 6%
- SABA alone: 20%
- ICS+SABA: 36% (1-3 days: 9%, 4-7 days: 27%)
- systemic GCS: 51% (IV: 22%, PO: 25%, PO+IV: 4%)
- systemic GCS+SABA: 25%
- systemic GCS+ICS+SABA: 16%
Preschool-poor control

2 years old boy, low dose ICS prophylaxis, 2 courses of systemic GCS during the last 6 months

- SABA alone: 4%
- ICS+SABA: 49%
  - 4-7 days: 22%
  - 1-3 days: 27%
- Systemic GCS: 78%
  - IV: 13%
  - PO+IV: 27%
  - PO: 38%
- Systemic GCS+SABA: 31%
- Systemic GCS+ICS+SABA: 31%
School age-well control

8 years old boy, no prophylactic Tx, asthma exacerbation once in 6 months

Pulmonary function test prior to surgery – 38%

Systemic GCS include an IV dose just before anesthesia, or PO 1-5 days before anesthesia.
School age-poor control

9 years old boy, no prophylactic Tx, asthma exacerbation every 1-2 mo

Pulmonary function test prior to surgery – 40%
Preschool –well controlled

2 years old girl, low dose ICS prophylaxis, no recent exacerbation

Systemic CS 31% vs 20%

p = NS