Comparison of Two Dexamethasone Dosages for the Treatment of Acute Asthma in Hospitalized Children

Karin Ng, B.Sc.(Pharm); Maggie Chui, B.Sc.(Pharm), ACPR; Alison MacDonald, B.Sc.(Pharm), ACPR; Karen Ng, B.Sc.(Pharm), Pharm.D, ACPR, BCPS

Background

- Acute asthma is a leading cause of hospitalizations in children.
- Early treatment with systemic corticosteroids is recommended in moderate to severe asthma exacerbations to reduce risk of relapse and length of hospital stay.
- At BC Children's Hospital (BCCH), dexamethasone is the primarily used oral corticosteroid in acute asthma due to its better tolerability.
- Dexamethasone dosages of 0.2 mg/kg/day and 0.3 mg/kg/day are both commonly prescribed at BCCH.
- The optimal corticosteroid dosage for the treatment of acute asthma is unknown.

Objectives

- Compare the effectiveness of dexamethasone 0.2 mg/kg/day versus 0.3 mg/kg/day in the treatment of acute asthma.
- Compare the safety of dexamethasone 0.2 mg/kg/day versus 0.3 mg/kg/day in the treatment of acute asthma.

Methods

- **Design:** Retrospective cohort study
- **Population:** Patients admitted to general pediatric wards at BCCH
- **Time period**: January 2009 to August 2013

Inclusion	Exclusion
• Aged 2 – 17 years old • Primary or secondary diagnosis of acute asthma • Received at least one dose of oral dexamethasone	• Admitted initially to ICU • Required initial IV steroids • Received PO dexamethasone >6 h post-ED presentation • Used systemic corticosteroid in previous 30 d

- **Statistics:** Descriptive, Student's t-test, Mann-Whitney U test
- **Sample size:** 75 patients per group

Results

Table 1: Baseline Characteristics

Patient Characteristics	0.2 mg/kg/day (N = 80)	0.3 mg/kg/day (N = 40)
Median Age – years (range)	3 (2-12)	3 (2-13)
Males – no. (%)	44 (55.0)	23 (57.5)
Mean Weight – kg (range)	19.0 (9.2-48.6)	18.8 (10.6-52.2)
Concurrent Pneumonia – no. (%)	23 (28.8)	14 (35.0)
Inhaled steroid use on admission – no. (%)	38 (47.5)	24 (60.0)
Previous hospital admissions for respiratory illness – no. (%)	39 (48.8)	15 (37.5)
Median Pediatric Respiratory Assessment Measure (PRAM) on admission – (IQR)	7 (6-8)	7 (6-8)

Figure 1: Box Plot of Primary Outcome

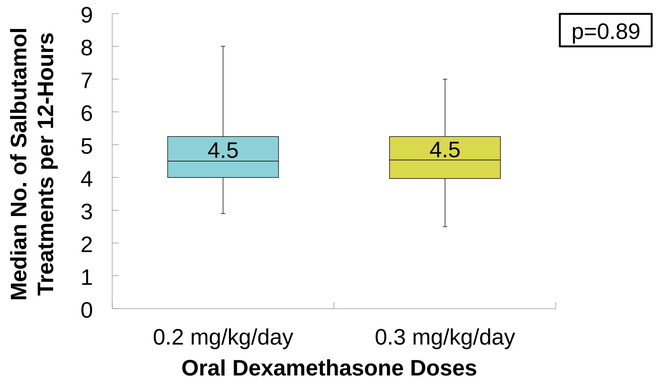


Table 2: Secondary Outcomes

Endpoints	0.2 mg/kg/day (N=80)	0.3 mg/kg/day (N=40)
Other therapies required >6 h post-steroid dose – no. (%)		
Oxygen	12 (15)	6 (15)
IV steroid	10 (12.5)	5 (12.5)
Epinephrine Nebules	1 (1.3)	2 (5.0)
Magnesium Sulfate	1 (1.3)	3 (7.5)
Aminophylline	1 (1.3)	0 (0)
PICU admission	0 (0)	0 (0)
Readmission within 48 h	0 (0)	1 (2.5)
All-cause mortality	0 (0)	0 (0)
Reported Dexamethasone Adverse Events		
Hyperglycemia	2	4
Psychosis	0	0
Vomiting	4	3

Figure 2: Bar Graph of Mean Number of Salbutamol Treatments

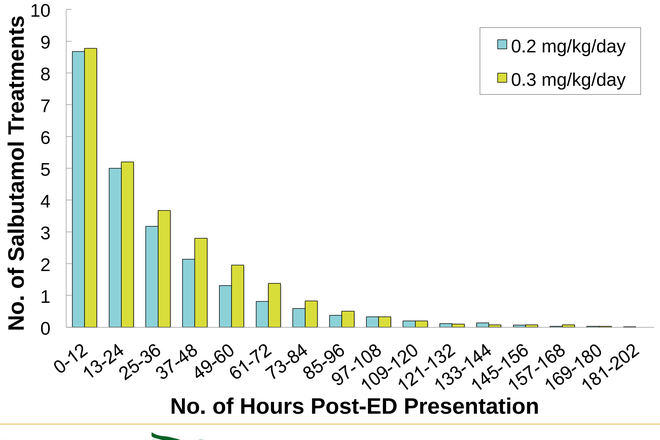
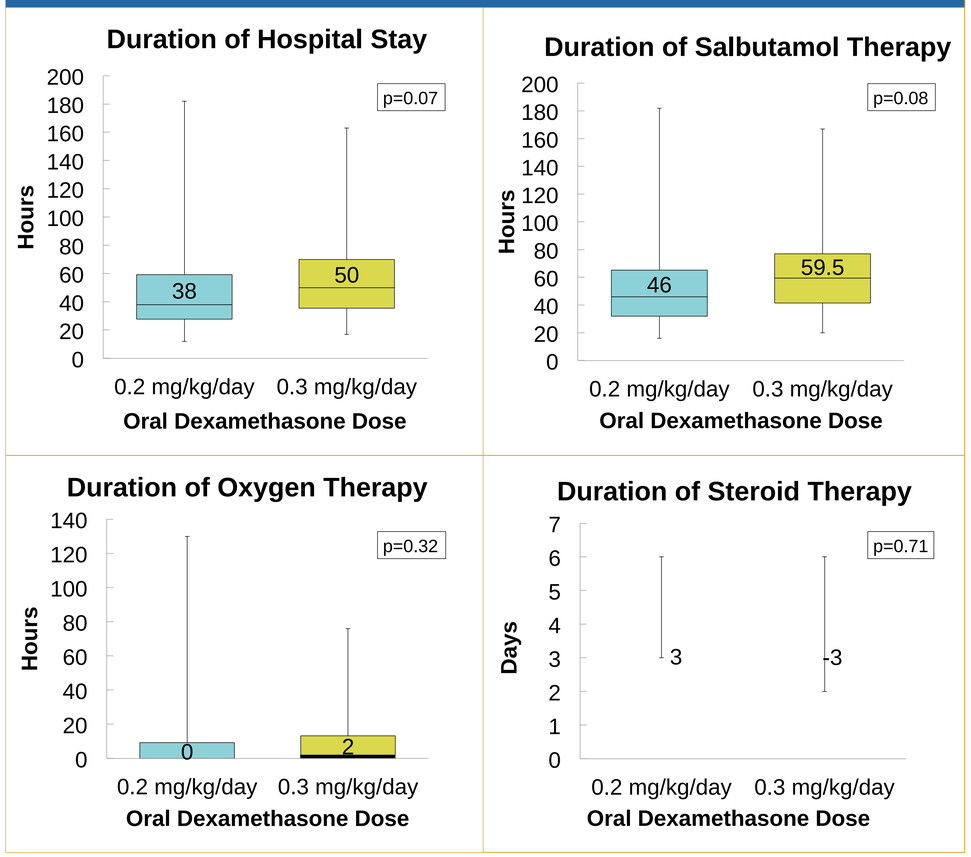


Figure 3: Box Plots of Secondary Outcomes



Limitations

- Retrospective review
- Surrogate markers used
- Sample size in the 0.3 mg/kg/day group not met
- Contamination bias: ~80% of patients in the 0.3 mg/kg/day group switched to dexamethasone 0.2 mg/kg/day after the first 0.3 mg/kg/day dose
- Results cannot be extrapolated to patients requiring initial IV corticosteroids

Conclusions

- No difference in effectiveness between dexamethasone 0.2 mg/kg/day and 0.3 mg/kg/day.
  - Larger study required to confirm finding.
- Signal suggesting potential increased adverse events in the dexamethasone 0.3 mg/kg/day group.
  - Further studies required to compare safety outcomes between different dexamethasone doses.

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