

Identifying Parental Preferences for Corticosteroid and Inhaled Beta-Agonist Delivery Mode in Children With Acute Asthma Exacerbations

Sarah Szlam and Donald H. Arnold

CLIN PEDIATR published online 8 July 2014

DOI: 10.1177/0009922814542482

The online version of this article can be found at:

<http://cpj.sagepub.com/content/early/2014/07/14/0009922814542482>

Published by:



<http://www.sagepublications.com>

Additional services and information for *Clinical Pediatrics* can be found at:

Email Alerts: <http://cpj.sagepub.com/cgi/alerts>

Subscriptions: <http://cpj.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [OnlineFirst Version of Record](#) - Jul 14, 2014

[OnlineFirst Version of Record](#) - Jul 8, 2014

[What is This?](#)

Identifying Parental Preferences for Corticosteroid and Inhaled Beta-Agonist Delivery Mode in Children With Acute Asthma Exacerbations

Clinical Pediatrics
1–4
© The Author(s) 2014
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/0009922814542482
cpj.sagepub.com


Sarah Szlam, MD¹, and Donald H. Arnold, MD, MPH¹

Abstract

This study examines caregiver preferences of single-dose dexamethasone (DEX) versus 5-day oral prednisolone in treating acute asthma exacerbation in a pediatric emergency department (PED). A secondary objective was preference for mode of home inhaled β -agonist administration. Caregivers of patients 2 to 18 years with an acute asthma exacerbation treated in the PED completed a 1-page questionnaire including asthma history and preferences for steroids and β -agonist administration. One hundred caregivers completed the questionnaire. Within the preceding year, 79% had an asthma exacerbation and 73.7% ($n = 99$) were prescribed prednisolone. DEX was preferred by 79% of caregivers. Preferences were independent of caregiver demographics except in cases of prior intensive care admission, where DEX was less favored (odds ratio = 0.27, $P < .046$). No difference existed in mode of home β -agonist administration. Most caregivers prefer DEX in acute asthma exacerbation management. No difference exists for home β -agonists. These results may advise clinical practice in pediatric acute asthma exacerbation.

Keywords

acute asthma exacerbation, pediatric emergency medicine

Background

Acute asthma exacerbation is one of the leading reasons children present to the pediatric emergency department (PED). Standard of care includes inhaled β -agonists and oral steroids. Once improved to a state where these medications can be safely administered at home, patients are often discharged to complete a 3- to 5-day course of oral steroids and continue with inhaled β -agonists as needed for symptom relief. A study by Butler and Cooper demonstrated that only 64% of asthma patients completed the prescribed steroid course at home.¹

Recent studies, however, have demonstrated that oral dexamethasone (DEX) given as a single dose in the emergency department is as effective as prednisolone.^{2–4} Patients given the single dose of DEX showed improvement in asthma symptoms and no greater rate of relapse in comparison with those treated with the standard 5-day steroid burst.^{2–4} Single-dose DEX offers complete compliance as the medication is administered in the health care facility; this approach is also cost effective.^{2–4} DEX would eliminate the need for filling a steroid prescription as well as home administration of a medication, which may be beneficial for caregivers. However, some

caregivers feel more assured in their child's treatment when they are able to administer medications at home.

To our knowledge, parental preference for DEX versus a home course of prednisolone or other corticosteroids has not been examined. The objective of this study was to evaluate parental preferences in the use of single-dose oral DEX versus prednisolone. As data demonstrate the 2 modes equally effective in the treatment of acute asthma exacerbation, parental preference can help guide practitioners in the treatment of pediatric patients presenting to the PED to improve patient compliance and caregiver satisfaction.

Methods

We recruited caretakers of pediatric patients between the ages of 2 years and 18 years with an acute asthma

¹Vanderbilt University, Nashville, TN, USA

Corresponding Author:

Sarah Szlam, Division of Pediatric Emergency Medicine, Monroe Carell Jr. Children's Hospital at Vanderbilt, 2200 Children's Way, Suite 1014, Nashville, TN 37232, USA.
Email: sarah.m.szlam@vanderbilt.edu

Table 1. Characteristics of 100 Children With Acute Asthma Exacerbations in a Pediatric Emergency Department Whose Parent Completed Survey of Discharge Medication Preferences.

Age in years (median [IQR])	6 [3-9]
Race n, (%)	
White	22 (22)
African American	75 (75)
Asian	2 (2)
American Indian	1 (1)
Ethnicity	
Hispanic	10 (10)
Non-Hispanic	90 (90)
Gender	
Male	68 (68)
Female	32 (32)
Currently on albuterol at home	
Yes	95 (95)
No	5 (5)
Currently on flovent at home (n = 98)	
Yes	64 (65)
No	34 (34.6)
History of asthma exacerbation in the last year	
Yes	77 (79)
No	20 (20)
History of PICU admission	
Yes	27 (27)
No	73 (73)
History of parent with asthma	
Yes	55 (55)
No	45 (45)
History of sibling with asthma	
Yes	39 (39)
No	50 (50)
N/A	11 (11)
Highest level of caretaker education (n = 98)	
High school	52 (52.1)
College	26 (27.1)
Graduate school	5 (5)
Vocational/technical school	7 (7.3)
None of the above	8 (8.3)
Insurance status	
Commercial	28 (28)
Medicaid	72 (72)

Abbreviations: IQR, inter quartile range; PICU, pediatric intensive care unit.

exacerbation treated in our tertiary children's hospital PED with oral steroids and inhaled β -agonists. Just prior to initiation of the study, our PED changed treatment guidelines to recommend a single-dose DEX at 0.6 mg/kg (maximum 16 mg) in place of a course of prednisolone because of the demonstrated efficacy of single-dose DEX in recent studies.³ Patients were therefore treated with either DEX as a single dose while in the PED or with prednisolone to complete a 5-day course based on provider and

caregiver preferences. Neither steroid nor β -agonist choice affected whether a questionnaire was administered. Participants were excluded from the study if the primary caregiver was non-English speaking. Written informed consent was obtained, followed by administration of the paper questionnaire to the primary caretaker by a clinician or nurse caring for the patient. The clinical team was not made aware of questionnaire results and did not use the results in clinical decision making. The patient's electronic

Table 2. Survey Responses of 100 Caregivers Who Completed Survey of Discharge Medication Preferences of Children With Acute Asthma Exacerbations in a Pediatric Emergency Department [n (%)].

History of 5-day home steroid course in the last year (n = 99)	
Yes	73 (73.7)
No	26 (26.3)
Caregiver preference for steroid	
One time dose in PED	79 (79)
History of PICU admission	19 (24)
5-Day course at home	21 (21)
History of PICU admission	8 (38)
Reported ease of filling an RX	
Very hard	1 (1)
Moderately hard	5 (5)
Easy and convenient	94 (94)
Importance that RX be filled prior to discharge from the PED	
Very (difficult to get to pharmacy to fill RX)	38 (38)
Sort of (it is hard for me to get to a pharmacy)	5 (5)
Preferred	45 (45)
Not important	12 (12)
Caregiver preference for MDI or nebulizer at home (n = 98)	
MDI	52 (53)
Nebulizer	46 (46.9)
Caregiver preference for use of home MDI in the PED to verify function (n = 98)	
Yes	84 (85.7)
No	14 (14.3)

Abbreviations: PED, pediatric emergency department; PICU, pediatric intensive care unit; MDI, metered dose inhaler.

medical record was accessed to ascertain demographic and asthma history (eg, prior hospitalization). Study data was entered into a secure, online database (REDCap).⁵

We used χ^2 test to examine associations of proportions and a multivariable logistic regression model to examine adjusted associations of preference for DEX or prednisolone treatment with the prespecified covariates age, race, education level of the parent, insurance coverage, ease of filling a prescription for the parent, asthma exacerbation in the preceding year, asthma in a parent or sibling, and prior pediatric intensive care unit (PICU) admission for asthma. Data were analyzed using STATA 10.0 (StataCorp, College Station, TX).

Results

During the study period, August 2013 to April 2014, 100 eligible primary caretakers were invited to participate and completed the questionnaire; no caretaker declined participation. On some individual questions answers were found to be incomplete, and the denominator is specified in these cases. Primary demographic characteristics of the children of study participants were age (median [interquartile range]) 6 [3-9] years of age, 68 (68%) male, 75 (75%) African American, and 72 (72%) with Medicaid insurance. The majority of patients had a

history of acute asthma exacerbation within the last year and a steroid course for asthma within the last year. Ninety-five (95%) had albuterol for home use, and 27 (27%) had a prior PICU admission (Table 1).

The majority of caretakers 79 (79%) reported preferential use of DEX administration in the PED to a course of prednisolone (Table 2). In the multivariable logistic regression model (Table 3), there were no adjusted associations of DEX preference with age, race, ethnicity, insurance status, care giver education level, history of asthma exacerbation, history of asthma in sibling or parent, or reported ease of filling the prescription. There was an association of DEX preference in caregivers of patients who had a prior PICU admission such that these caregivers had a lower preference for DEX in comparison with prednisolone (odds ratio = 0.27; 95% confidence interval = 0.07-0.98).

Among caregivers who prefer a 5-day steroid course of prednisolone at home, 38% had a history of a PICU admission, of the caregivers who chose a single-dose DEX in the PED, 24% had a PICU admission. However, the difference was not statistically significant ($P = .198$, χ^2).

The majority of caregivers (94%) reported that filling a prescription was easy and convenient. Thirty-eight percent stated it was very important and 45% would prefer to have all of their medications at the time of

Table 3. Multivariate Logistic Regression of Caregiver Preference for Single-Dose Dexamethasone on Relevant Covariates.

Predictor Variable	Odds Ratio	95% Confidence Interval	P Value
Age	1.02	0.89-1.18	.74
Race: African American	0.98	0.29-3.39	.98
Hispanic ethnicity	3.81	0.38-38.72	.26
History of asthma in parent	1.45	0.48-4.40	.52
History of asthma in sibling	0.63	0.29-1.40	.26
History of asthma exacerbation	2.84	0.75-10.64	.12
History of PICU admission	0.27	0.07-0.98	.046
Caregiver level of education	0.96	0.65-1.42	.85
Medicaid insurance	0.66	0.20-2.18	.49
Reported ease of filling a prescription	1.32	0.19-9.06	.78
Personal transportation to pharmacy	0.81	0.12-5.26	.83

Abbreviation: PICU, pediatric intensive care unit.

discharge even if they had a personal vehicle and reported filling prescriptions as easy and convenient.

Eighty-four percent of caregivers reported that they would prefer home metered dose inhaler (MDI) be used while in the PED to verify that it is working and being administered appropriately. When asked about MDI versus nebulizer use at home, 53% of caregivers prefer MDI use.

Conclusion

Our study findings indicate that the majority of caregivers strongly prefer use of single-dose DEX in the treatment of an acute asthma exacerbation. However, caregivers of patients with a history of PICU admission in the past preferred prednisolone. We speculate that these caregivers feel more in control and assured in their child's treatment by giving medication at home. Nonetheless, the majority of caregivers prefer to have all medications at the time of discharge from the PED despite reporting ease of filling a prescription. Providing caregivers with a one-time steroid thus eliminates the need for families to fill a prescription and ensures that the patient will receive the complete course of this medication.

This study was limited in that it was a survey administered at a single center and included English-speaking families only, thus missing approximately 7% of the local Hispanic non-English speaking community.⁶

The results of this investigation may inform clinical practice in acute care settings in which pediatric patients with acute asthma exacerbation are managed.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: UL1 TR000445 from NCATS/NIH (Vanderbilt CTSA).

References

1. Butler K, Cooper WO. Adherence of pediatric asthma patients with oral corticosteroid prescriptions following pediatric emergency department visit or hospitalization. *Pediatr Emerg Care*. 2004;20:730-735.
2. Qureshi F, Zaritsky A, Poirier MP. Comparative efficacy of oral dexamethasone versus oral prednisone in acute pediatric asthma. *J Pediatr*. 1991;139:20-26.
3. Cross KP, Paul RI, Goldman RD. Single-dose dexamethasone for mild-to-moderate asthma exacerbations: effective, easy, and acceptable. *Can Fam Physician*. 2011;57:1134-1136.
4. Altamimi S, Robertson G, Jastaniah W, et al. Single-dose oral dexamethasone in the emergency management of children with exacerbations of mild to moderate asthma. *Pediatr Emerg Care*. 2006;22:786-793.
5. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42:377-381.
6. Arnold DH, Gebrestsadik T, Abramo TJ, Harert TV. Noninvasive testing of lung function and inflammation in pediatric patients with acute asthma exacerbations. *J Asthma*. 2012;49:29-35.