

# Parental Pediatric Corticosteroid Preferences

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Corticosteroids are often prescribed in the acute care management of asthma. Prednisolone can be administered intramuscularly (IM) or orally in 2 different concentrations. This study evaluated parental preference for three prednisolone preparations based on the route of administration, taste, and volume required. Accompanying adults (AAs) of pediatric patients were interviewed about their preferences based on the 3 factors. Those AAs who passed the health screen (51 of 214) were asked to taste 2 oral prednisolone preparations and reinterviewed about their corticosteroid preferences. Of the 214 AAs, 96% were parents. Of the group, 43% preferred IM corticosteroids whereas 40% preferred oral corticosteroids. Without considering taste as a factor for oral corticosteroids, 94% preferred the more concentrated syrup compared with the less concentrated one. When told that the less concentrated syrup tasted better, 58% preferred the less concentrated/better tasting syrup. After the 51 taste test subcohort subjects tasted the syrups, 96% preferred the less concentrated/better tasting syrup over the more concentrated/poorer tasting syrup. Taste is more important than volume of administration for this particular corticosteroid comparison. Simply asking parents about their IM/oral and syrup formulation preferences may be the easiest way of optimizing their treatment plan. (*Am J Emerg Med* 2001;19:29-31. Copyright © 2001 by W.B. Saunders Company)

An acute wheezing exacerbation in children with asthma is a common condition requiring acute care or emergency care.<sup>1</sup> Early treatment of an acute exacerbation with corticosteroids has been shown to prevent progression of airway inflammation and decrease the need for subsequent emergency care and hospitalization.<sup>1</sup> Although corticosteroids can be administered parenterally in the office, clinic, or emergency department (ED), continuing the course of corticosteroids generally requires oral administration as an outpatient. Several factors including efficacy, toxicity, cost, and compliance influence the emergency physician's choice of medication. Assuming that the first three factors are comparable, the physician's choice of medication is often based on patient compliance. Compliance in young children is often predicated by the ease with which the medication can be administered by their caregivers.<sup>2</sup> Several studies have examined the influence of taste in antibiotic choice and administration.<sup>2-5</sup> However, a literature search revealed no comparable study on the use of corticosteroids, such as prednisolone, in childhood asthma.

Currently, young children (those not old enough to swallow pills) presenting to the office, clinic, or ED with acute wheezing requiring corticosteroids may be given one of several prednisolone preparations as examined in this study: parenteral methylprednisolone and oral prednisolone liquids in two different concentrations (1 mg/mL and 3 mg/mL). They differ by their route of administration and by their tastes and volumes required. Given that all three have relatively comparable efficacy,<sup>6,7</sup> toxicity, and cost, the corticosteroid of choice should therefore depend on patient compliance with the therapy.

In the case of childhood asthma, compliance is influenced by the ability of caregivers to regularly administer the corticosteroids to their children. Dyspnea worsens the possible side effects of stomach upset and vomiting associated with oral medications. The purpose of this study is to survey the parental preferences of the three forms of corticosteroids. A parent's preference should influence the physician's choice of corticosteroids as it would directly affect patient compliance.

## METHODS

Oral corticosteroids tested: Two prednisolone syrups: Pediapred (1 mg/mL; Medeva, Surrey, UK) and Prelone (3 mg/mL; Muro Pharmaceuticals, Tewksbury, MA). No substitutions with generic prednisolone preparations were used.

### *Study Participants*

The study was conducted at two outpatient pediatric clinics. Adults presenting to the clinics with a child, hereafter defined as accompanying adults (AAs), were approached to be subjects for the study. Their children must have been under 10 years of age, but need not be visiting the clinic for an asthma related illness. A convenience sample of 214 subjects underwent an initial questionnaire at these two sites.

In the second part of this study, 51 accompanying adults under the age of 50 years agreed to taste the two corticosteroid preparations. Primarily, other participants were excluded for known medical conditions which may have been aggravated by corticosteroids. Participants were also excluded for any scheduled medical treatments/tests. Adults were selected because it would have been difficult for young pediatric patients to assess the relationship between taste, volume, and route of administration. Study subjects were informed that corticosteroids given parenterally versus given orally have the same efficacy.<sup>6,7</sup> Primary caregivers (largely parents) were selected because their ability to administer medications to their children would determine compliance.

The second part of the study was a single-blinded taste test of the two prednisolone syrups described. Volunteers

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were assigned a number based on the order they were interviewed. This number was then used to determine which corticosteroid they tasted first (odd for Prediapred and even for Prelone) to prevent sequence bias as noted in the report by Demers et al.<sup>3</sup>

Volunteers underwent a prequestionnaire to obtain demographic data and to assess their preference of medications based on route of administration, volume, and taste. Participants with prior exposure to corticosteroids were noted. A health screening questionnaire was then conducted for each participant to minimize the risk of side effects from the corticosteroid taste test.

If they passed the health screen, volunteers were then recruited to taste 0.7 mL of each of the two oral corticosteroid syrups administered in a plastic spoon, after an informed consent process. The two corticosteroid preparations were identified only by letter. As in previous taste experiments, the participants ate crackers and drank water to clear their taste sensations before tasting each of the two preparations.<sup>2-5</sup> Participants were then asked a series of questions regarding route of medication, volume of syrup medication, and taste of syrup medication, through a postquestionnaire to determine which corticosteroid they preferred and evaluated if their responses had changed from the prequestionnaire.

Both the pre- and postquestionnaires allowed participants to pick between two choices or give an answer of "no preference." To isolate volume and eliminate color as a factor, subjects were asked several times during the study to compare amounts of air in syringes and water in cups, which represented the same amount of actual medication required. Numbers were used to identify the syrups in the prequestionnaire and letters in the postquestionnaire to prevent association of the two drugs. Participants were not compensated monetarily and were able to end the study at anytime without consequence. This study was reviewed and approved by the medical center's institutional review.

## RESULTS

The characteristics of the 214 children with their AAs comprising the study cohort are summarized in Table 1.

**TABLE 1.** Demographics of the Study Cohort: 214 Children With Accompanying Adults

Mean age of children (years)	3.5 ± 3
Mean weight of children (kg)	15.5 ± 9
Relationship of AA to children	
Mother	154 (72%)
Father	51 (24%)
Other	9 (4%)
Medical insurance status of children	
Private	172 (80%)
Medicaid	40 (19%)
None	2 (1%)
Characteristics of AAs	
Has a child with history of asthma or wheezing	72 (34%)
Has heard of Solumedrol, Prelone, Prediapred or prednisone	84 (39%)
Has taken oral corticosteroids in the past	22 (10%)
Has a child who has taken oral corticosteroids in the past	28 (13%)

**TABLE 2.** Medication Administration Preferences of 214 Accompanying Adults

Prefer IM corticosteroid versus oral corticosteroids	
IM corticosteroid preferred	92 (43%)
Oral corticosteroid syrup preferred	86 (40%)
No preference	36 (17%)
Prefer less concentrated versus more concentrated syrup (taste not considered)	
Less concentrated syrup (1 mg/mL) preferred	6 (3%)
More concentrated syrup (3 mg/mL) preferred	200 (93%)
No preference	8 (4%)
Prefer less concentrated/better tasting versus more concentrated/poorer tasting	
Less concentrated/better tasting preferred	125 (58%)
More concentrated/poorer tasting preferred	78 (36%)
No preference	11 (5%)

The results of medication preferences are summarized in Table 2. Initially 43% of respondents preferred intramuscular (IM) methylprednisolone, 40% preferred oral corticosteroid syrup, and 17% had no preference. Subjects were then told that for the same effect, syrup drug 1 required 3 times the volume of syrup drug 2. At this point in the survey, 200 (93%) of the subjects, chose the more concentrated drug 2. Subjects were then asked that if drug 1 tasted better than drug 2, which drug would they prefer for their child. Given this new information, 125 (58%) of the subjects chose the better tasting drug 1, whereas 78 (36%) of the subjects chose drug 2.

In the second part of the study, 51 of the 214 subjects participated in a taste test of Prediapred and Prelone which were each labeled Drug A and Drug B, respectively (medication names were not used). Actual medication volumes for their child's weight were displayed in medication cups for parents to better appreciate volume differences for Drugs A and B. Subjects were then asked the same questions regarding route of medication, volume of syrup medication, and taste of syrup medication. These results are summarized in Table 3. After the taste test, subjects more frequently preferred the less concentrated/better tasting syrup (Prediapred). Even the IM corticosteroid option was favored over the more concentrated/poorer tasting syrup. (It should be noted that all subjects agreed that Prediapred was better tasting than Prelone; however, Prediapred was labeled as "less concentrated/better tasting" whereas Prelone was labeled as "more concentrated/poorer tasting.")

## DISCUSSION

Compliance with outpatient pediatric medications depends on factors, which include cost, side effects, route of administration, and dosing. This study attempts to provide information on the preferences of caregivers for steroid medications for their children. We compared route of administration and taste/volume of oral medication.

In this population, on initial questioning, preferences for IM versus oral were split roughly in half. Possible reasons for caregiver preference for an injection likely include the certainty that the medication will be retained in the body. It is likely that parents who prefer painful parenteral medications have had difficulty giving oral medications for behavioral reasons or because their child has vomited medications frequently in the past. Without knowing this history, phy-

**TABLE 3.** Medication Administration Preferences of 51 Accompanying Adults After Tasting Both Oral Corticosteroid Syrups

Prefer IM corticosteroid versus oral corticosteroids after taste	
IM corticosteroid preferred	25 (49%)
Oral corticosteroid syrup preferred	18 (35%)
No preference	8 (16%)
Two way comparisons:	
Less concentrated/better tasting versus more concentrated/poorer tasting	
Less concentrated/better tasting preferred	49 (96%)
More concentrated/poorer tasting preferred	1 (2%)
No preference	1 (2%)
Less concentrated/better tasting versus IM methylprednisolone	
Less concentrated/better tasting preferred	27 (53%)
IM methylprednisolone preferred	14 (27%)
No preference	10 (20%)
More concentrated/poorer tasting versus IM methylprednisolone	
More concentrated/poorer tasting preferred	14 (27%)
IM methylprednisolone preferred	27 (53%)
No preference	10 (20%)

sicians will not know which parents are likely to experience difficulty in administering oral medications properly. It may be easier to simply ask parents if they prefer that the first dose be given IM or orally after a brief discussion of the differences. Parents may think that a “shot” is better, but they should be counseled that, studies comparing the two indicate that IM and oral result in similar outcomes.<sup>6,7</sup>

As expected, the vast majority of parents initially preferred to administer a smaller amount of oral medications to their children. However, when presented with the issue of taste, this preference shifted toward the better tasting drug despite the larger volume required, suggesting that taste is an important influence on preference, which is likely related to compliance.

It should be noted that Muro (the makers of Prelone) has since come out with a new formulation for Prelone which is better tasting and less concentrated (1 mg/mL), similar to Pediapred. However, the older more concentrated/poorer tasting (3 mg/mL) preparation is still available in proprietary and generic formulations. Thus, physicians who write prescriptions for “Prelone 3 mg/mL” will probably still get the equivalent syrup which is more concentrated/poorer tasting.

In summary, asking parents about their preferences for IM versus oral and the different oral preparations may be the simplest way of helping physicians to determine a more optimal treatment plan, because parental preferences can be difficult for physicians to predict. The results of this survey indicate that taste is more important than the volume of administration for this particular corticosteroid comparison.

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