

Inhaled beclomethasone and oral candidiasis

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SUMMARY Two hundred and twenty nine children aged 6 to 15 years attending the asthma clinic at the Royal Hospital for Sick Children, Edinburgh, had throat swabs taken to determine the incidence of candida colonisation of the oropharynx. One hundred children (group A), who were not receiving steroids, were compared with 91 children (group B) receiving less than 500 µg of inhaled beclomethasone a day and 38 children (group C) receiving 500 µg or more of inhaled beclomethasone a day.

Sore throat and hoarse voice were not related to the presence of candida or to treatment with inhaled steroids. The incidence of candida was greater in the groups given treatment with steroids but did not increase at a higher dosage, nor was it related to the type of inhaler used. There was only one case of clinical thrush in all the children studied.

The incidence of oropharyngeal colonisation with candida in normal children varies between 5.4% and 71.3%, depending on the method of isolation.¹⁻⁴

Numerous small studies have shown an increased incidence of colonisation among children taking inhaled steroids, though clinical thrush rarely occurs.⁵⁻¹⁰ Studies in adults have shown that rates of colonisation and incidence of oral thrush are dose related. It is not known whether there is a similar dose related effect among children nor whether the more concentrated aerosols—for example, beclomethasone—now available are associated with an increased incidence of oral candida colonisation.

This study sought to confirm the increased incidence of oropharyngeal candida colonisation among children treated with inhaled beclomethasone and to determine whether the incidence was dose related. It also sought to determine whether the formulation of beclomethasone used affected rates of colonisation.

Patients and methods

Two hundred and twenty nine children attending the asthma clinic at the Royal Hospital for Sick Children, Edinburgh, were studied. These were divided into three groups, all of which had the same age range of 6 to 15 years. Group A (100 children) were not receiving inhaled steroids. Group B (91 children) were receiving less than 500 µg/day of inhaled beclomethasone and had been receiving the same dose for at least six months. Group C (38 children) were receiving 500 µg or more of inhaled beclomethasone a day and had also been receiving the same dose for at least six months. None of the children in these groups had received oral or nasally administered steroids in the previous six months. Compliance with prescribed treatment was assumed. No children were taking antibiotics when they were studied.

All the children were asked if they had a sore throat or hoarse voice. The pharynx was examined for evidence of oral candidiasis (thrush), and throat swabs were taken. These were transported in trichomonas medium (containing penicillin and streptomycin) to the laboratory. The swabs were plated on agar and then returned to the medium and both plate and the medium containing the swab were incubated for 48 hours. The plates were then examined for growth of candida. If there was no growth the swab was replated on agar and the plate was incubated for a further 48 hours. If there was no growth of candida after this second 48 hour period it was assumed that there was no candida present originally on the swab—that is, the throat swab was negative. The results were analysed by means of the χ^2 test.

Results

For the 91 children in group B taking less than 500 µg/day of beclomethasone the mean dose was 290 µg/day (range 100–400 µg/day) and for the 38 children in group C taking 500 µg or more of beclomethasone a day the mean dose was 700 µg/day (range 500–1500 µg/day). The incidence of colonisation was significantly higher in group C than in group B.

Table 1 Incidence of oropharyngeal candidiasis, hoarse voice, and sore throat in children taking inhaled steroids by metered dose aerosol or rotahaler

Dose of inhaled steroid per day	Throat swab	No (%)	Method of inhalation			Sore throat
			Metered dose aerosol	Rotahaler	Hoarse	
Nil	Positive	29 (29)	—	—	0	1
	Negative	71 (71)	—	—	1	4
<500 µg	Positive	39 (43)	12	27	1	4
	Negative	52 (57)	17	35	0	1
≥500 µg	Positive	18 (47)	5	13	1	0
	Negative	20 (53)	6	14	1	3

tion with candida, sore throat, and hoarse voice in groups A, B, and C is shown in the Table.

The incidence of sore throat and hoarse voice was not related to the presence or absence of candida on culture nor to treatment with or without inhaled steroids.

The incidence of colonisation with candida was greater in group B compared with group A ($p < 0.05$) and also in group C compared with group A ($p < 0.05$). The dose of beclomethasone taken did not affect rates of colonisation as there was no significant difference in colonisation between groups B and C. Only one case of clinical thrush was detected in all the children. This child was in the group taking the low dose of beclomethasone.

The Table also shows colonisation with candida according to the mode of administration of beclomethasone for groups B and C. There was no significant difference in the incidence of candida when children using a metered dose aerosol were compared with those using a rotahaler.

Discussion

This study confirms the previously reported increased incidence of candida colonisation of the oropharynx in children taking inhaled beclomethasone.⁵⁻⁹ It also suggests that this increase is independent of dosage used as there was no significant difference between high and low dose groups (the former had 47% colonisation, the latter 43%). This contrasts with previous studies in adults, which have suggested that the incidence of oral colonisation with candida is dose related, ranging from 35% at a dosage of 200 µg/day to 77% at 800 µg/day.¹²⁻¹⁴

It was difficult to ascertain whether any of the children in the study had been taking antibiotics in the recent past, but we made certain that none were at the time the throat swab was taken. We believe that there were unlikely to be any more children in

the two groups receiving treatment with beclomethasone (groups B and C) who had taken antibiotics recently than in the group not receiving treatment with beclomethasone (group A) because all of the former had been stable with regard to their asthma for at least six months and had not required adjustment to their medication or treatment with oral steroids.

In this study sore throat and hoarse voice were not related to beclomethasone inhalation therapy as the incidence of these was not increased in the treatment groups. The occurrence of only one case of oral thrush in 129 children taking inhaled beclomethasone confirms previous observations from small studies that this is not common among children.⁵⁻¹⁰ Adults taking the same medication have a reported incidence of 4.5%–13%.^{11-13 15}

It has been shown that there is no difference in clinical effect between an aerosol inhaler and rotahaler when used to administer beclomethasone in the same dosage,¹⁶ and this study indicates that the likelihood of oropharyngeal colonisation with candida need not be a consideration when choosing which inhaler to use as there is no significant difference between the two. This is not only the case for the low dose group when a standard becotide aerosol inhaler is compared with a rotahaler but also for the high dose group when a becloforte aerosol inhaler is compared with a rotahaler.

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