Inadequate quality of administration of intranasal corticosteroid sprays

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Purpose: Considering the fact that many mistakes are still being made by asthmatic patients when inhaling lung medication, it is important to gain insight into current techniques used to administer intranasal corticosteroid sprays (INCS) in allergic rhinitis patients. In this study, we aimed to get insight into daily use of INCS and to determine if improvement of the technique is required.

Patients and methods: A checklist, based on available patient information leaflets (PILs) and literature, was used to determine the participants’ application of the techniques used to administer INCS. These applied techniques were compared with steps described in PILs and recommended essential steps.

Results: In the overall population (64 participants) four participants (6%) carried out all steps as described in the PIL and seven participants (11%) carried out all recommended essential steps.

Conclusion: The technique used to administer INCS is inadequate. Uniform and generally applicable instructions are needed and patients using INCS should be guided better.

Keywords: intranasal corticosteroid sprays, allergic rhinitis, administration techniques, quality of administration

Introduction

Allergic rhinitis (AR) is a common disease, affecting children, adolescents, and adults. The prevalence ranges from 8.5% in children to 27.2% in adults.1–3 Pharmacological agents for AR are aimed at preventing and reducing symptoms. Antihistamines and corticosteroids are available in oral and intranasal dosage forms. In case of corticosteroids, intranasally administered sprays or drops are preferred due to adverse effects (AEs) after systemic use.3

Considering the fact that many mistakes are still being made by asthmatic patients during inhalation of lung medication, it is important to gain insight into current techniques used to administer intranasal corticosteroid sprays (INCS) in AR patients.4 Relatively little research has been done about the relation between intranasal administration technique and efficacy. The technique of INCS may affect efficacy, adverse events, and compliance.5

In studies, recommendations are imposed to reach highest efficacy and prevent AEs.6–8

In this descriptive, observational study, we aimed to get insight into the current techniques used to administer INCS and to determine if improvement of the technique is required.

Material and methods

Participants were selected from the drug surveillance databases of public pharmacies in Drachten (The Netherlands). Participation was based on the following inclusion criteria:
patients were aged 8–30 years old and had been using INCS for a minimum period of 1 week. Patients were excluded when they were unable to complete study procedures or did not understand and speak the Dutch language fluently. The following active compounds were included: beclomethasone, budesonide, fluticasone furoate, fluticasone propionate, and mometasone furoate, brand name and generic dosage forms were included. Eligible patients were approached randomly and actively asked if they wanted to participate in the study. When patients wanted to participate, the application technique of the INCS was directly observed in a face-to-face interview. The objective of the interview was to gain insight into the techniques used to administer INCS. All participants were interviewed and observed by the same investigator. The administration techniques were scored using a checklist. This checklist included all maneuvers for daily administration of INCS as indicated in the patient information leaflet (PIL) of the spray the participant used. The complete instruction for administration of INCS in PILs contained a maximum of eleven steps; however for some steps different instructions were described and not all steps were described in the different PILs (Table 1). The recommended essential steps were based on available literature (Table 2). In the analysis, descriptive statistics were used and a significant difference between populations could not be proved in this study. The study protocol was approved by the medical ethics committee of Medical Centre Leeuwarden (MCL). All patients and, if necessary, their caregivers, gave written informed consent.

Results
We analyzed the application of the recommended maneuvers in 64 participants by direct observation of intranasal administration (Table 1). Participant characteristics are presented in Table 3. Overall, the majority of participants were female, used an INCS for AR on a daily basis, got prescribed mometasone furoate, and had an average age of 18.4 years. Only four participants (6%) carried out all steps as described in the PIL. The complete instruction for administration of INCS in PILs contained a maximum of eleven steps; however for some steps different instructions were described and not all steps were described in the different PILs (Table 1). The recommended essential steps were based on available literature (Table 2). In the analysis, descriptive statistics were used and a significant difference between populations could not be proved in this study. The study protocol was approved by the medical ethics committee of Medical Centre Leeuwarden (MCL). All patients and, if necessary, their caregivers, gave written informed consent.

Table 1 Steps in PIL

<table>
<thead>
<tr>
<th>Steps in PIL</th>
<th>Instruction carried out, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shake the spray</td>
<td>58 (91%)</td>
</tr>
<tr>
<td>2. Remove the dust cap</td>
<td>64 (100%)</td>
</tr>
<tr>
<td>3. Blow the nose</td>
<td>31 (48%)</td>
</tr>
<tr>
<td>4. Instruction for hand position</td>
<td>64 (100%)</td>
</tr>
<tr>
<td>5. Instruction for closing the nostril*</td>
<td>47 (73%)</td>
</tr>
<tr>
<td>6. Instruction for head position*</td>
<td>7 (13%)</td>
</tr>
<tr>
<td>7. Instruction for position of the spray*</td>
<td>10 (45%)</td>
</tr>
<tr>
<td>8. Inhale instruction*</td>
<td>61 (98%)</td>
</tr>
<tr>
<td>9. Exhale instruction*</td>
<td>30 (54%)</td>
</tr>
<tr>
<td>10. Clean instruction*</td>
<td>29 (52%)</td>
</tr>
<tr>
<td>11. Replace the dust cap</td>
<td>62 (97%)</td>
</tr>
</tbody>
</table>

Notes: The eleven steps for administration of INCS as described in the PIL available for patients in The Netherlands, INCS as indicated in the patient information leaflet (PIL), are described in the different PILs. Different instructions for the same step are described (indicated with *). It is indicated how many participants (n, %) carried out the instruction per step.

Abbreviations: PIL, patient information leaflet; INCS, intranasal corticosteroid sprays.

Table 2 Recommended essential steps

<table>
<thead>
<tr>
<th>Essential steps</th>
<th>Instruction carried out, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Shake the spray</td>
<td>58 (91%)</td>
</tr>
<tr>
<td>2. Blow the nose</td>
<td>31 (48%)</td>
</tr>
<tr>
<td>3. Point the end of the nozzle slightly outwards, away from the septum</td>
<td>26 (44%)</td>
</tr>
<tr>
<td>4. Squirt a spray of mist in the nose while breathing in</td>
<td>63 (98%)</td>
</tr>
<tr>
<td>5. Breathe out through the mouth</td>
<td>31 (48%)</td>
</tr>
</tbody>
</table>

Notes: Described are the five recommended essential steps for administration of INCS as indicated in the patient information leaflet (PIL), for daily administration of INCS as described (Table 2). It is indicated how many participants (n, %) carried out the instruction per step.

Abbreviation: INCS, intranasal corticosteroid sprays.

We analyzed the application of the recommended steps for daily administration of INCS as described (Table 2). In this population seven participants (11%) carried out all the recommended essential steps. Shaking the device and inhaling were carried out by almost the whole population (91%...
Either way, patients need to administer the medication optimally. This can be achieved by an additional instruction comparable with the existing instructions for adequate inhalation of lung medication.

## Conclusion

In conclusion, this study shows that the technique used to administer INCS is inadequate in most patients studied.
For this reason, more attention should be given to this in health care. Uniform and generally applicable instructions are needed and patients using INCS should be guided better.

Ethics approval and informed consent
The study protocol was approved by the medical ethics committee of MCL. All patients and, if necessary, their caregivers gave written informed consent.

Data sharing
This manuscript contains all data used for the presented results (Tables 1–3). No additional unpublished data are available.

Author contributions
All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

Disclosure
The authors report no conflicts of interest in this work.

References