

Most patients overdose on topical nasal corticosteroid drops: an accurate delivery device is required

R. S. PATEL, M.B.CH.B., M.R.C.S. (GLAS), G. W. MCGARRY, M.B. CH.B., M.D., F.R.C.S. (EDIN),
F.R.C.S. (GLAS), F.R.C.S. (ORL-HNS)

Abstract

Otolaryngologists and general practitioners commonly prescribed intranasal corticosteroid drops for rhinitis. Compliance in real patients has not previously been studied, but is generally believed to be poor. Recent concerns over systemic adverse effects of topical corticosteroids have highlighted the risks of overdosing. Fifty patients, who were prescribed betamethasone, were prospectively studied for accuracy of compliance using a weighed dose study. Patients consistently administered inaccurate quantities of nasal corticosteroid drops, with a marked tendency to overdose up to four times the recommended daily dose (RDD) in some cases. The mean dose administered was 200 per cent of the RDD. Of the 50 patients, only seven (14 per cent) administered the correct dose. The introduction of metered-dose delivery systems should be considered to reduce the risk of inadvertent overdosing.

Key words: Nose; Treatment; Corticosteroids; Adverse Effects

Introduction

Otolaryngologists and General Practitioners frequently prescribe intranasal betamethasone (Betnesol, Glaxo Pharmaceuticals) (Scottish Drug Information Centre, personal communication).¹ This efficacious treatment is delivered via a standard dropper nozzle. When properly used, a constant volume of drug is delivered. Treatment regimens prescribe a specific number of intranasal drops for a short period (e.g. 6–8 weeks). Although it is difficult to appreciate the number of drops delivered, the assumption is that a standard dose of corticosteroid will be delivered to the nose.² Recent concern over systemic adverse effects caused by topical corticosteroids highlights the risks of overdosing.³ Whilst experimental studies have been performed in volunteers, the accuracy of nasal drop self-medication patterns has not been studied in real patients.⁴ This study aimed to assess the amount of drug used by outpatients and to compare this with intended doses.

Materials and methods

Fifty subjects (36 male, 14 female; mean age 40.7 years; SD 13.8 years) with rhinosinusitis (n = 36) and nasal polyposis (n = 14) were recruited prospectively. Subjects were advised to administer two drops of betamethasone in each nostril twice daily for 8 weeks. Thus the recommended daily dose (RDD) of betamethasone was eight drops. The

method of drug administration (head down and forwards) was fully explained by reference to a diagram and demonstrated to each subject prior to commencement of therapy.⁵ Each subject was provided with a pre-weighed sealed bottle of betamethasone and advised to contact the Otolaryngology Department when a further supply of drug was required. Re-prescriptions were mailed to each subject as required and sealed empty betamethasone bottles were collected for weighing. To report dosing accuracy in 'drops', three aliquots of 50 drops of betamethasone were weighed to calculate the mean drop weight. The inferred number of drops used per day was calculated by weighing the total amount of drug used by the subject divided by the drop weight and days of treatment. Using these data, the accuracy of self-medication was assessed.

Results

The average weight of a drop of betamethasone was 0.025 mg. This weight is consistent with previous literature and the manufacturer's information.⁵ Thus, RDD was 2 mg (8 drops \times 0.025 mg) and the ideal 8-week dose (8 WD) was 11.2 mg (0.2 mg \times 56 days). We defined three categories of drug use: underuse <75 per cent of RDD (<6 drops/day); correct use 75–125 per cent RDD (6–10 drops/day); moderate overuse 125–200 per cent of RDD (10–16 drops); and extreme overuse >200 per cent of RDD

From the Department of Otorhinolaryngology, Head and Neck Surgery, North Glasgow Hospitals University NHS Trust, Glasgow, UK.

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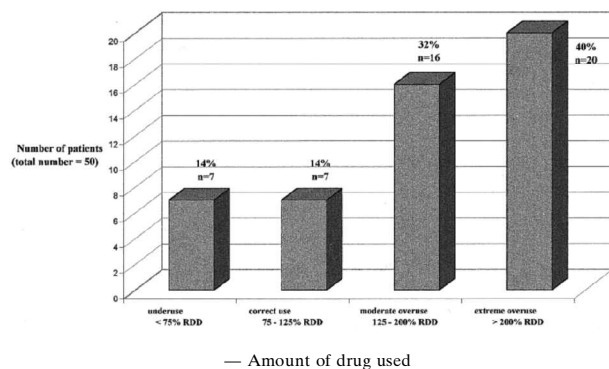


FIG. 1

Accuracy of patient self-medication with Betnesol nasal drops

(>16 drops/day). The mean number of drops administered per day was 16 (SD 8.0) drops or 200 per cent of RDD. Only 14 per cent ($n = 7$) of subjects used the medication within tolerable limits of RDD (Figure 1). Eighty-six per cent ($n = 43$) used inaccurate doses with a marked tendency to overdose. Medication overuse occurred in 72 per cent of subjects ($n = 36$) and extreme overuse in 40 per cent ($n = 20$).

Discussion

This study is the first reported objective assessment of the accuracy of patient self-medication with nasal drops. We have shown that patients consistently administered inaccurate quantities of nasal corticosteroid drops, with a tendency to overdose up to four times the RDD in some cases. Subjects reported difficulty in accurately judging the number of drops instilled. This inability to self-regulate administered doses of nasal drops has been reported previously,^{2,4} and may explain the observed poor compliance with RDD. However, overdosing may be deliberate and related to symptom severity. The author is currently investigating the possible relationship between amount of drug used and level of symptomatic benefit.

Betamethasone applied topically to the nasal mucosa is efficacious in the treatment of rhinosinusitis and nasal polyposis.⁶⁻⁸ Efficacy, combined with a low systemic side-effect profile, makes this agent a popular short-term treatment.^{1,6} A variety of techniques for self-administration of nasal drops have been described.^{5,9,10} Although all the popular techniques cause patient discomfort,¹¹ clinical evidence supports the 'head down and forwards' position as an instillation technique that provides effective treatment of osteomeatal complex disease.^{5,12} Our experience suggests that time taken to explain the benefits of correct head-positioning increases compliance and reduces the tendency to use the more comfortable 'head back' position, which is associated with poor distribution of drug to the nasal mucosa.¹³ Accordingly, the authors advise the less comfortable but more efficacious 'head down and forward' position of drug administration.

Iatrogenic Cushing's syndrome following chronic abuse of betamethasone is well-documented.¹⁴⁻¹⁶ Overdosing of corticosteroid drops is likely to be associated with increased ingestion and absorption by the gastrointestinal system. Betamethasone remains systemically active as it has negligible first-pass metabolism,¹⁷ and recent publications suggest that even short courses of betamethasone can be associated with hypothalamic-pituitary-adrenal axis suppression.^{18,19} The UK CSM has advised that the lowest effective dose of nasal corticosteroids should be used, and have warned of the risk of developing adverse systemic effects if standard doses of topical corticosteroids are exceeded.³ We have shown that there is a trend to overdose even during short standard dose courses of nasal corticosteroids. This theoretically exposes patients to systemic corticosteroid adverse effects. The authors do not advocate withdrawal of betamethasone, but suggest that metered-dose delivery systems could reduce the risk of inadvertent overdosing and until these are available, cautious supervision is advocated during nasal corticosteroid therapy.

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Address for correspondence:
 Mr R. S. Patel,
 Senior House Officer,
 Department of Otorhinolaryngology,
 Glasgow Royal Infirmary,
 16 Alexandra Parade,
 Glasgow G31 2ER, UK.

Fax: 0141 211 4896
 E-mail: dr_rajan_patel@hotmail.com

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