

# Short Report

## Glucocorticoid misuse in a rural and semi-urban community of North Bihar: a pilot study

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**SUMMARY** Glucocorticoid misuse is a common problem in northern Bihar. There is very little published literature regarding the magnitude of glucocorticoid misuse in South Asia. All inpatients and medical outpatients presenting to Duncan Hospital with suspected glucocorticoid abuse were screened over a six-month period. Patients presenting with iatrogenic Cushing's syndrome and hypoadrenal crisis were assessed clinically and biochemically for the side effects of glucocorticoid misuse. Twenty-two patients were seen in the hospital over a period of six months. Fifteen patients presented with iatrogenic Cushing's syndrome (68.2%) and seven with hypoadrenal crisis (31.8%). Ten were found to have cataracts, six had a recent onset of diabetes, five had a recent onset of hypertension and 12 had osteoporotic fractures of the spine. Glucocorticoid misuse is an important problem which has been inadequately addressed in the rural and semi-urban communities of northern Bihar.

### Introduction

Glucocorticoid misuse is a common problem in northern Bihar. There are no research studies that have documented this issue in either India or the whole of South Asia. Glucocorticoids are freely available over the counter, liberally prescribed by local medical practitioners and widely misused by patients for the symptomatic treatment of febrile illnesses, joint pains, asthma and skin diseases. Hence, many people become steroid dependent. Glucocorticoid misuse can

present in two ways: iatrogenic (exogenous) Cushing's syndrome, presenting with Cushingoid signs and symptoms usually to the outpatient department; or hypoadrenal crisis, presenting with altered sensorium and/or shock when glucocorticoids are suddenly stopped. Further investigation can reveal long-term complications such as osteoporosis, type 2 diabetes mellitus and hypertension.

Duncan Hospital is located in the northwest region of Bihar on the Indo-Nepalese border and is a 240 bedded facility. It is the only secondary referral centre run by the voluntary sector for three districts: two districts in northern Bihar and one district in southern Nepal.

Literature from South Asia about glucocorticoid misuse is sparse. There are two letters to the editor in *Indian Paediatrics* regarding the misuse of glucocorticoids in Madhya Pradesh.<sup>1,2</sup> There is also a brief article in *The Tribune* (Chandigarh) regarding unlicensed practitioners prescribing glucocorticoids inappropriately.<sup>3</sup> In 1987, a review of drug prescriptions in numerous locations around India showed that glucocorticoids are inappropriately prescribed for presentations such as fever and infections with great frequency. Ten percent of private prescriptions and 5% of self-medicated drugs may include a steroid. Forty percent of the self-medicated oral steroids were hidden in fixed dose oral preparations with an antihistamine or bronchodilator as a combination.<sup>4</sup> A case report from the UK details a case of Cushing's syndrome in a Pakistani man who self-treated his asthma with a potent long-acting oral glucocorticoid (betamethasone) for more than 30 years. He presented with Cushingoid features, insulin resistance and refractory hypertension. He obtained the drug from his country of origin, with no understanding of the potential adverse effects caused by long-term use of steroids.<sup>5</sup> The apparent widespread availability, access and misuse of such potent steroids are a cause for concern in developing countries.

Antibiotic misuse has been highlighted in Indian medical literature, but there is no systematic review of glucocorticoid misuse. As we have seen a number of patients with iatrogenic Cushing's syndrome and hypoadrenal crisis presenting to Duncan Hospital, Raxaul, we conducted a pilot, observational study of patients presenting with symptoms of glucocorticoid misuse in order to gain a better understanding of this problem. First, we aimed to determine the number of patients seeking medical care at Duncan Hospital for complaints related to glucocorticoid misuse. Secondly, we did a clinical and biochemical evaluation in order to determine the prevalence of the different steroid-associated complications.

### Materials and methods

This study was a prospective, observational study involving all patients who presented with suspected glucocorticoid misuse to the inpatient and outpatient departments of Duncan Hospital over a six-month period between January

2011 and July 2011. This included patients with both iatrogenic Cushing's syndrome and hypoadrenal crisis. The inclusion criteria were:

- (1) A known or suspected history of chronic glucocorticoid use, plus (2) or (3);
- (2) Clinical features which suggest exogenous Cushing's syndrome such as: moon facies; nuchal pad of fat; premature cataract; truncal obesity with thin limbs; purple striae; proximal myopathy; symptoms of peptic ulcer disease; bone pains; hirsutism; ecchymosis (easily bruised); hypertension; and glucose intolerance;
- (3) Patients admitted with at least two of the following three criteria: a Glasgow Coma Scale score of  $< 15$ ; hyponatraemia (serum sodium  $< 135$  mEq/L); and hypotension (systolic blood pressure  $< 90$  mmHg).

Patients were excluded from the study if they were diagnosed with another cause of adrenal insufficiency such as Addison's disease or Sheehan's syndrome.

All patients meeting the selection criteria were evaluated by the principal investigator and a standardized proforma was completed. The data collection included: patient demographics; medication history (including the duration and reasons for cessation); knowledge of and education about glucocorticoids; presenting symptoms; clinical examination; and biochemical and radiological investigations. The data was then collated and analysed in a Microsoft Excel format (Microsoft Corp., Redmond, WA, USA).

Ethical approval was obtained from the institutional review boards (IRBs) of both the Emmanuel Hospital Association, Raxaul, Bihar, and the Christian Medical College, Vellore, Tamil Nadu.

## Results

During the study period, 20 women (90.9%) and two men (9.1%) presented to Duncan Hospital with glucocorticoid abuse. Fifteen patients presented with iatrogenic Cushing's syndrome (68.2%) and seven with hypoadrenal crisis (31.8%). During this time we had 9261 medical outpatients and 1705 medical admissions. None had completed any level of formal education. Prednisolone (45%) and dexamethasone (50%) were the most commonly used glucocorticoids with four patients (18%) who had used more than one steroid (Table 1). A total of 90.9% of patients reported regular use of the drug. Twenty (90.9%) of those presenting with glucocorticoid use had been using glucocorticoids for more than two years and five (23%) had been using them for 10 years or more (Table 2).

The indications for those who had utilized glucocorticoids were: joint pains (68.2%); chronic obstructive pulmonary

**Table 2** Duration of the use of glucocorticoids

Duration (y)	No. of patients
$< 2$	2
2–5	7
5–10	8
$> 10$	5

disease (COPD)/asthma (27.3%); and skin disease (4.5%). Ten patients had been prescribed the medication by a local village practitioner, one by a private medical practitioner and the remaining 11 had self-prescribed. Two patients reported being told about the side-effects of glucocorticoids by the prescriber, but none had any knowledge about the actual adverse effects of glucocorticoids. The seven patients presenting in hypoadrenal crisis (due to cessation of glucocorticoids), reported the cessation of glucocorticoids due to fever (4) and acute gastroenteritis (3).

On clinical examination the most common features of Cushing's syndrome were: moon facies; peptic ulcers; and bone pains. Other clinical features, in decreasing order of frequency, were: nuchal pad of fat; truncal obesity; proximal myopathy; hirsutism; cataract ecchymoses; and purple striae. On investigation, 12 patients (54.5%) had osteoporotic fractures of the lumbar spine, 10 (45%) had developed cataracts, six (27.3%) had abnormal random blood glucose tests and 12 (54.5%) had altered calcium metabolism. Twenty patients (90.9%) were followed up as outpatients and had a resolution of their symptoms. One patient was lost to follow-up and one had not returned for follow-up by the time that the study was completed.

## Discussion

In this study, most of the patients presenting with glucocorticoid misuse presented with iatrogenic Cushing's (90.9%). The majority were female (90.9%), most were middle aged and none had received any formal education. This lack of education is not surprising given the poor literacy rate among women of this age group in the state of Bihar.

Glucocorticoids that were misused were: prescribed by local practitioners (45.5%); self-medicated (50%); or prescribed by private practitioners (4.5%). Two (9.1%) patients had mentioned that the possibility of side-effects was mentioned to them when the prescription was dispensed, but none were able to name any. The lack of awareness of both practitioners and patients regarding these potentially dangerous drugs is a serious problem.

Glucocorticoids are all available over the counter. Prednisolone (45.5%) and dexamethasone (27.3%) were the most commonly misused. Tablets which had glucocorticoids in a mixed combination were not so common. The regularity and the duration of the drug use are of concern. Nevertheless, even for those who were socioeconomically disadvantaged, these drugs are cheap and available over the counter. Seeking good medical advice for a chronic illness such as joint pains, COPD/asthma and skin diseases is often seen as a more expensive alternative for those who are living below the poverty line.

A number of complications are seen in these patients which are known to be related to the long-term effects of

**Table 1** Glucocorticoids used by patients

Generic name	No. of patients
Prednisolone	10 (45%)
Betamethasone	2 (9.1%)
Dexamethasone	11 (50%)
Methylprednisolone	2 (9.1%)
Not sure	3 (13.6%)
Used more than one steroid	4 (18.2%)

glucocorticoids. Ten of the 22 patients had developed cataracts, six had recently developed type 2 diabetes mellitus and five had recent-onset hypertension. Bony complications were experienced by 12 people with altered calcium metabolism and 12 with osteoporotic fractures of the spine.

Seven patients presented with hypoadrenal crisis (with low blood pressure and low serum sodium) and required steroid replacement and sodium correction. Four had a fever and three had acute gastroenteritis which precipitated the sudden withdrawal of the steroids used in the management of their chronic illnesses. Hypoadrenal crisis needs to be considered when patients with seemingly simple illnesses suddenly deteriorate for unexpected reasons.

The patients who presented with a history of steroid use and features of Cushing's syndrome or hypoadrenal crisis were gradually taken off steroids using tapering doses and their underlying medical condition was appropriately addressed and treated. Of those who were treated, 20 (90.9%) were followed up in our outpatient department. They were taken off steroids using tapering doses, and their underlying medical conditions were appropriately addressed and treated.

## Conclusion

Glucocorticoid misuse is an unaddressed problem in the rural communities of northern Bihar and the patients seen by us may have been just the tip of an iceberg. Awareness has been raised regarding the emerging resistance problems due to antibiotic misuse, but glucocorticoid misuse also causes serious side-effects such as cataracts, diabetes, hypertension,

fractures and a potentially life threatening hypoadrenal crisis. Most misuse is due to the easy availability of the drug over the counter and a lack of awareness of the side-effects by both the patient and the prescriber.

There is a need to do a community prevalence study on this issue in order to determine the extent of this problem and to provide the information required in order to alert the appropriate health authorities to the problem. Continuing education programmes for local medical practitioners should also address the safe use of glucocorticoids.

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**Conflicts of interest:** All of the authors declare that they have no conflicts of interest.

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