



How to develop an information booklet on steroid-induced hyperglycaemia

L Mackay*, L Barrow

Background

Glucocorticoid (steroid) medications are important therapies that influence the function of most cells and are commonly prescribed for inflammatory and autoimmune conditions, endocrine disorders and malignancies. Although steroids are known to provoke or exacerbate hyperglycaemia,¹ it often remains necessary to continue their usage even if such symptoms develop. The literature highlights that prolonged use of oral or injected steroids may precipitate steroid-induced diabetes (SID), or cause hyperglycaemia in patients with established diabetes.¹⁻³ The risk of SID can be further increased when there is a family history of diabetes or previously diagnosed gestational diabetes.⁴ SID is caused by stimulation of gluconeogenesis and glycogen synthesis, resulting in increased hepatic glucose production and insulin resistance. In clinical practice, it has been observed that no readily available written information exists for patients who may develop

Summary

Glucocorticoid (steroid) drugs are frequently used to treat numerous diseases. Such drugs influence cell function, thereby stimulating gluconeogenesis and glycogen synthesis, which may subsequently lead to hepatic glucose production and insulin resistance. Anecdotally, patients have a poor understanding of the hyperglycaemic effects of steroid treatment, which may be compounded by a lack of available patient literature. Those who could benefit most from such information are in-patients receiving steroid treatment: the ability to understand and retain verbal information is often compromised for these people, due to their physical status and their lack of internet access. We developed and tested an illustrated booklet entitled 'Understanding Steroids and Diabetes' that explains, in general terms, the effects of steroids on blood glucose levels and gives possible treatment options. This booklet is suitable for primary or secondary care, for all patients with (or at risk of) steroid-induced diabetes. To date, over 2800 copies have been distributed.

Key words

Steroids; hyperglycaemia; diabetes; patient information

this condition. However, 'patients need complete and accurate teaching to deal with the problems from this secondary disease'.⁵

Anecdotally, patients often have a poor understanding about the hyperglycaemic effect of steroid treatment. It is thought that a significant number are not computer literate or have access to internet sources. Healthcare professionals need to provide information to patients regarding their medical treatment, including the consequences of introducing new medication, as recommended by the Department of Health.⁶

Project aim

To produce a straightforward, easy-to-understand booklet specifically for patients at risk of SID to provide them with an explanation of:

- What diabetes is
- The treatment for diabetes
- The link between steroids and diabetes
- The importance of controlling blood glucose levels.

Booklet development

Initially, a literature search was performed to establish whether patient information on SID already existed. The search terms used individually and in combination were 'diabetes', 'steroids' and 'hyperglycaemia'. The databases searched included OVID, CINAHL, PubMed, and Cochrane. The search revealed that no such written information exists for patients. Websites such as National Health Service Choices⁷ returned no results for 'steroid induced diabetes' and for 'steroids', apart from one line of information about side-effects. The Diabetes UK website⁸ returned nothing when a search was made for 'steroid-induced diabetes'.

Subsequently, we developed text for a new patient information booklet on SID, entitled 'Understanding Steroids and Diabetes'. Various relevant photographs were taken using medical photography services, following which the authors selected appropriate pictures to accompany the text. Funding for

Authors

L Mackay, BSc, RGN, Diabetes Specialist Nurse

L Barrow, BSc, MA, RGN, Diabetes Specialist Nurse

*Correspondence to:

L MacKay, Metabolic Unit, Anne Ferguson Building, Western General Hospital, Edinburgh EH4 2XU, UK
e-mail: liz.mackay@luht.scot.nhs.uk

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Final text taken from the booklet 'Understanding Steroids and Diabetes' written by Liz MacKay and Lesley Barrow

What are steroids used for?

Steroids work mainly by reducing inflammation. They are used to treat various conditions where inflammation occurs. Examples of these conditions:

- Rheumatoid arthritis
- Asthma
- Inflammation of the bowel
- Some types of malignant diseases
- Some autoimmune conditions

Steroids help improve many illnesses. Examples of steroids used:

- Prednisolone
- Hydrocortisone
- Betamethasone
- Dexamethasone
- Deflazacort.

Some people taking steroids experience side-effects. The purpose of this booklet is to give you information about steroids and high blood sugar levels.

A short course of steroids (e.g. 1–2 weeks) may cause no problem with your blood sugar level. Also inhaled steroids and steroid skin creams are not likely to cause diabetes.

If you are prescribed steroid pills on a frequent basis or in large doses, then the risk of developing diabetes increases. This risk is further increased if you have a family history of diabetes or developed diabetes during pregnancy.

If you already have diabetes then you may notice a rise in your blood sugar levels, usually meaning that your diabetes treatment may need altering.

The reason that blood glucose levels rise during steroid treatment is that the liver produces more sugar than normal, and your body is not able to produce enough insulin to cope with this increase. Also the insulin produced is not working properly, this is known as insulin resistance.

Insulin is a hormone produced by the pancreas that helps the glucose enter the cells, where it is used as fuel for the body.

So what is diabetes?

It is when your blood sugar rises above normal levels. Blood sugar levels should run between 4–8mmol. If you take steroid pills in the morning your blood sugar levels may rise dramatically during the afternoon and evening. You may feel very thirsty and pass urine a lot. You may feel really tired and sleepy. If the diabetes isn't treated, or if you have diabetes already and your diabetic treatment isn't

intensified, you may begin to lose weight and get recurrent infections.

What is the treatment for diabetes?

The baseline of all treatment for diabetes of whatever kind is eating a healthy diet and taking as much exercise as possible. This means reducing sugar, fat and salt and increasing fibre, fruit and vegetables in your diet. Any kind of exercise is beneficial: walking, housework, sport, or even armchair exercises.

However, you may also need tablets or insulin injections to keep your blood sugar levels under control. This depends on how high your blood sugar rises during the day. You may be shown how to check your blood sugar levels with a small meter at certain times in the day so that you and your diabetes nurse or doctor can decide if your tablets or insulin doses need to be increased. You will be taught how to recognise and deal with hypos (hypoglycaemia – blood sugar below 4mmol).

Why is it important to keep diabetes under control?

If you can keep good control of your blood sugar levels, you will feel better, but also the risk of developing the complications of diabetes will be reduced. Diabetic complications can include heart attack, stroke, eye damage, kidney failure, impotency in men, circulation problems to the legs, and nerve damage. So you can see how vital it is to keep your blood sugar within the normal range.

Your steroid therapy may need to be on a permanent basis. If so, and you have developed diabetes or you have pre-existing diabetes, you will be reviewed by your GP or asked to attend the diabetic clinic at the local hospital on a regular basis.

If your steroid treatment is intermittent, for example, you only take them with an acute recurrence of your illness, your diabetes treatment may need to be intermittent too. Inbetween steroid therapy, you may not need either diabetic tablets or insulin, but they may well need to be restarted if steroids are restarted.

If you have been on large doses of steroids but as you get better these doses are reduced, then treatment for your diabetes will also need to be reduced or you will be at risk of hypoglycaemia.

If you are on steroid therapy, you, your doctor, or nurse need to check your blood sugar levels regularly. If you are concerned that you may be developing diabetes, or your diabetes is getting out of control while on steroids, contact your GP or local diabetes clinic, if you attend there.

For further information about diabetes:

www.diabetes.org.uk



the production and printing costs associated with the booklet was obtained from the Lothian Diabetes Managed Clinical Network. Once in draft form, the booklet was sent for patient and peer review. Ethical approval was not required.

Informal assessment

Personal, qualitative comments were requested from patients, therefore no formal questionnaires or scales were applied. The views of eight patients were obtained.

A cross-section of health professional colleagues were also chosen to review the booklet, including:

- Hospital Consultants (n=3)
- Diabetes Specialist Nurses (n=6)
- Secondary Care Charge Nurses (n=10)
- Hospice Nurses (n=8)
- District Nurses (n=6)
- General Practitioners (n=4)
- CLAN – City Literacy and Numeracy Project (n=3)
- Patient Focus and Implementation group (n=10).

Most comments were favourable, however some changes were implemented following the review stages. The booklet was then sent to the Patient Communications Department for approval prior to publication.

Discussion

There is evidence that patients require printed information about their medication.⁹ However, it is

suggested that large amounts of written patient information is difficult to read¹⁰ and that patients' levels of reading ability are over-estimated by healthcare professionals.¹¹

As diabetes specialist nurses, we searched for patient information on SID and when none was identified, we compiled written information about SID from numerous sources.^{1,4,5} Although not a formal study, our work has demonstrated the lack of information available for patients with diabetes who require steroids, or patients requiring steroids who develop diabetes.

The booklet that we subsequently developed provides patient-friendly information for these populations. International interest in our booklet was generated following a poster presentation at the Federation of European Nurses in Diabetes (FEND) meeting in Rome in 2008.¹²

Shortcomings of the work are that no validated evaluation tool or questionnaire was used. Also, a limited number of reviewers were used, as this was initially a small project.

The booklet has been well received by healthcare professionals internationally and by patients locally. Production of this kind of literature needs to be considered by all nurses working with patients who are at risk of developing diabetes through the steroid medications that they are taking.

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