

An audit of knowledge and treatment of hypoglycaemia

Hypoglycaemia in patients with diabetes is often poorly treated and documented. Elizabeth Hackett describes steps taken at a large teaching hospital to improve monitoring and staff education.

Patients who have diabetes spend twice as long in hospital than those who do not have diabetes.¹ This may be influenced by the occurrence and mismanagement of hypoglycaemia among inpatients (see background box).

It was recognised that hypoglycaemia was poorly treated and documented. This led to an audit, which had two distinct parts:

1. Investigation of the theoretical knowledge of ward nursing staff about the treatment of hypoglycaemia
2. Investigation into how hypoglycaemia had been treated in patients

The audit was repeated one year later following a number of interventions.

Methods

Investigation of theoretical knowledge

Thirty randomly selected nurses (a maximum of two from each ward) were presented with three hypothetical scenarios describing patients who were experiencing differing degrees of hypoglycaemia.

The first and second scenarios described conscious patients who were able to swallow safely; the second patient had a lower blood glucose level than the

first. The third scenario described an unconscious patient.

The nurses were given a list of possible treatment options (some appropriate, some less appropriate and some inappropriate) and were asked to select and prioritise options for each scenario. The questionnaire contained nine options including “give a sandwich, biscuit or glass of milk”, “administer insulin” and “bleep doctor”.

Treatment of hypoglycaemia Diabetes monitoring charts were screened on the wards and any blood glucose levels below 4mmol/L were recorded. Medical and nursing notes were examined to find out how the patients had been treated.

Results: first audit

Scenario one A total of 70% of nurses correctly stated that they would give a rapid-acting carbohydrate to a hypoglycaemic patient as their first course of action. However, 30% elected to give a longer-acting carbohydrate. Parenteral treatment (glucagon or dextrose 50%) was selected by 13% of nurses as an option, however this was unnecessary for a patient who was able to swallow safely.

A total of 46% of the nurses did not select the option to use a longer-acting carbohydrate after using a rapid-acting

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carbohydrate. A longer-acting carbohydrate is usually recommended once the blood glucose level has risen above 4mmol/L, to prevent hypoglycaemia from recurring. In addition, 10% of nurses did not indicate that they would re-measure blood glucose levels following treatment and only 60% said that they would document what had happened in the medical or nursing notes.

Scenario two The answers for scenario two were similar to those for scenario one, but 33% of nurses selected parenteral treatment (sometimes as a first treatment choice), even though the patient was able to swallow safely.

Scenario three A total of 47% of nurses said that they would call the doctor if the patient was unconscious and 50% said that they would administer parenteral treatment. Both of these responses were considered ‘correct’. However, 3% said they would give oral treatment.

Only 10% of nurses indicated that they would administer a longer-acting carbohydrate once the initial hypoglycaemia had been successfully

Background

Hypoglycaemia is generally defined as a blood glucose level of less than 3.5mmol/L, although a consensus definition among leading diabetes organisations is lacking. Most patients taking insulin will experience a hypoglycaemic episode at some time and 25% of patients who have taken insulin for more than five years will have experienced severe hypoglycaemia.²

Sulphonylureas are less likely to cause hypoglycaemia than insulin, although it is estimated that in the UK more than 5,000 patients per year will experience severe hypoglycaemia caused by a sulphonylurea.²

Hypoglycaemia requiring hospital admission is a substantial burden on the NHS — the cost of each admission is estimated to be approximately £1,000.²

Action taken in hypoglycaemic patients	First audit (%)	Second audit (%)
Hypoglycaemia not treated	38	54
Oral carbohydrate given	56	28
Appropriate	30	50
Sub-optimal	70	21
Unknown	0	29

Table 1. Treatment options received by patients

Time to blood glucose level re-monitoring (minutes)	First audit (%)	Second audit (%)
<30	4	20
30–50	11	-
30–60	-	17
60–120	-	6
Not re-monitored	61	49
Time not documented	24	8

Table 2. Patients receiving blood glucose re-monitoring after a hypoglycaemic episode.

treated. Furthermore, 10% did not select re-measuring blood glucose levels as an option and only 57% said they would make an entry in medical or nursing notes.

Treatment of hypoglycaemia A total of 72 episodes of hypoglycaemia were identified in 25 different patients, 88% of whom were receiving insulin. The number of hypoglycaemic episodes per patient ranged from one to 12.

An alarming number of hypoglycaemic episodes were not treated and fewer of those who were treated received optimal therapy (see Table 1). A range of different oral treatments were used, these were not necessarily the rapid-acting carbohydrates recommended in the local guidelines.

Another cause for concern was a lack of re-monitoring of blood glucose levels (see Table 2).

Interventions

Following the first audit a ‘diabetes prescribing and monitoring chart’ was created and introduced to the wards. The chart contained a hypoglycaemia treatment algorithm and space for recording the

monitoring, re-monitoring and treatment of the episode. Education on the treatment of hypoglycaemia was also provided to ward staff.

Results: second audit

Scenario one A total of 53% of nurses indicated that they would give a rapid-acting carbohydrate as their first choice — this was lower than in the first audit. A longer-acting carbohydrate was selected as a first option by 47% of nurses. Furthermore, 27% did not mention using a longer-acting carbohydrate once the hypoglycaemic episode had been treated.

Parenteral treatments were not selected as an option by any of the nurses. Similarly to the first audit, 7% of nurses did not indicate that they would re-measure blood glucose levels after treatment had been given and only 63% said that they would document what had happened in the medical or nursing notes.

Scenario two A total of 53% of nurses correctly said that they would administer a rapid-acting carbohydrate. However, 20% opted for a longer-acting carbohydrate and 27% chose glucagon as their preferred first choice of treatment.

Scenario three The answers were similar to those given in the original audit, although slightly more nurses (67%) said they would document their actions in the nursing or medical notes.

Treatment of hypoglycaemia During the re-audit, 89 episodes of hypoglycaemia were identified in 39 patients, 84% of whom were receiving insulin. The number of hypoglycaemic episodes per patient ranged from one to 10.

More hypoglycaemic episodes were untreated compared with the first audit. Fewer hypoglycaemic episodes were treated with oral therapies compared with the first audit, however more of these therapies were considered appropriate (see Table 1).

Re-monitoring of the blood glucose level after the initial treatment showed some improvement compared with the first audit (see Table 2). However, almost half of patients were still not re-monitored.

Discussion

The second audit showed that there were still deficits in nursing knowledge, and treatment of hypoglycaemia was still a problem. Little improvement had been

made since the first audit and in many cases the results were worse, despite the introduction of the new chart and the provision of education.

The reason for the lack of improvement is unclear however, since the original audit, the amount of food on the wards had been limited by the ‘infection control team’. This may have reduced the ability of nursing staff to find suitable treatments, however medicinal glucose and Glucogel (BBI Healthcare) were available from the pharmacy department. Additional education on treatment of hypoglycaemia may have been needed.

Next steps

Three additional interventions are planned:

1. Establishment of an online e-learning program about the treatment of hypoglycaemia
2. Introduction of a diabetes link nurse for each ward, who will receive further education on diabetes-related topics to pass onto other ward staff
3. Introduction of hypoglycaemia treatment kits

The hypoglycaemia treatment kits will contain the necessary treatments for hypoglycaemia, plus any monitoring equipment required and a copy of the hypoglycaemia treatment guidelines.

The kits will include rapid-acting carbohydrates, longer-acting carbohydrates, glucagon and dextrose 50%. An education campaign will be required when the kits are introduced and the diabetes link nurses will ensure that treatment guidelines are being followed on the wards.

A further audit will take place in the near future to measure the impact of the new interventions.

Elizabeth Hackett is a member of the UK Clinical Pharmacy Association Diabetes Group and principal pharmacist for diabetes at a large teaching hospital.

References

1. Department of Health. National Service Framework for Diabetes: standards. DH; London: 2001.
2. Amiel SA, Dixon T, Mann R, Jameson K. Hypoglycaemia in Type 2 diabetes, *Diabet Med* 2008;25:245–4.