Hypoglycaemia management in older adults: Results of an audit in an Australian hospital

Ziping Helen Huang, Pauline Hill

Hypoglycaemia is associated with an increased mortality rate in older people with diabetes. Research has shown that hypoglycaemia in people over 70 years is associated with a two-fold increased mortality rate during hospitalisation and at 3-month follow up (Kagansky et al, 2003). A hypoglycaemic management protocol was introduced in a 300-bed metropolitan public hospital in South Australia and an audit was carried out in 2012 to assess hypoglycaemia management in older adults. This audit aimed to examine the adherence of nurses to the hypoglycaemia management protocol in the hospital and patient outcomes following a hypoglycaemic episode. This article describes the findings of this audit and discusses the implications for clinical practice.

The prevalence of hypoglycaemic episodes among the older people with diabetes in hospital ranges from 5.2% to 6.5% (Kagansky et al, 2003; Kosiborod et al, 2009). Hypoglycaemia is associated with an increased mortality risk in patients with advanced age. Kagansky et al (2003) found that hypoglycaemia occurring in people aged 70 years or older was associated with a two-fold increased mortality during hospitalisation and 3-month follow up. Evidence also showed hypoglycaemia increased the in-hospital mortality rate for those older adults with diabetes and acute cardiac events (Svensson et al, 2005; Kosiborod et al, 2008; Yang et al, 2010).

This article describes an audit carried out in a 300-bed metropolitan public hospital in South Australia to examine the adherence of nurses to the hospital's hypoglycaemia management protocol (see *Figure 1*) and patient outcomes following a hypoglycaemic episode. The current evidence-based hypoglycaemia treatment protocol (Cryer et al, 2003; American Diabetes Association, 2007; 2010; Diabetes Outreach, 2009) was implemented in the hospital in 2007 and reviewed in 2012. The protocol includes a flow chart and "hypokit" which provides clinical guidance for hypoglycaemia treatment of patients who are treated with insulin or oral hypoglycaemic agents. The protocol was developed as part of a state-wide initiative of the Metropolitan Public Hospital Diabetes Nurse Manager Group. Education programmes about the hypoglycaemia treatment protocol were provided in all clinical settings. A post-implementation evaluation of the hypoglycaemia flow chart and kit discovered that more than 90% of ward nurses found it easy to use. Ease-of-use is important to encourage nurses to follow the hospital protocol in order to manage hypoglycaemia events effectively and optimise patients' treatment outcomes. It is also essential for nurses to provide clear and accurate documentation of each event.

The purpose of the audit was to examine the adherence of nurses to the hypoglycaemia management protocol following a hypoglycaemic episode in older people (aged 65 or above) admitted to a metropolitan public hospital in South Australia.

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Article points

1. Hypoglycaemia is associated with an increased mortality rate in older people with diabetes.
2. A hospital in South Australia carried out an audit to examine the adherence of nurses to the hospital's hypoglycaemia management protocol when managing older people and patient outcomes following a hypoglycaemic episode.
3. The audit found the adherence of nurses to the current hypoglycaemia management protocol in the hospital was suboptimal and documentation of hypoglycaemic events was inadequate.

Key words

- Hospital audit
- Hypoglycaemia
- Older adults

Authors

Ziping Helen Huang, Diabetes Nurse Educator, GP Plus Health Care Centre; Pauline Hill, Senior Lecturer, School of Nursing & Midwifery, Flinders University, Australia.

"Nursing documentation of hypoglycaemic symptoms and treatment with complex carbohydrate was insufficient."

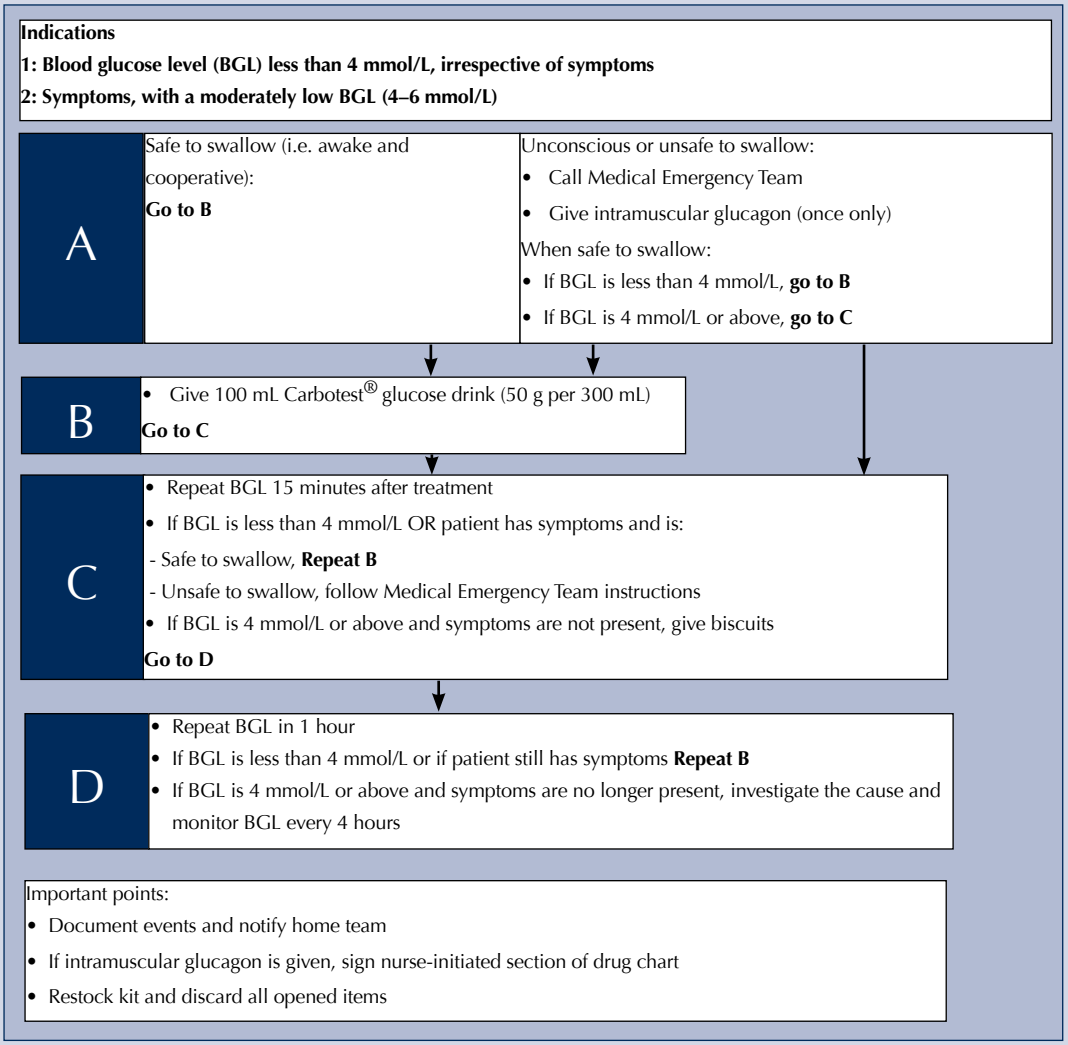

Figure 1. Hypoglycaemia management protocol for patients on insulin or oral hypoglycaemic agents.

Method

The audit was conducted retrospectively on case notes of people with diabetes admitted to a metropolitan public hospital over a 3-month period. People aged 65 or above with diabetes admitted to the hospital between 1 June and 31 August 2012 were identified through the electronic record system in the hospital. The sample of the case notes was categorised according to their clinical settings, including medical wards, surgical wards, intensive care unit, mental health units and rehabilitation units. The first 50 identified hypoglycaemic episodes of patients who were on insulin therapy or oral hypoglycaemia agents were audited with at least one case from each clinical setting. The audit tool recorded management of hypoglycaemia for conscious and unconscious patients. Data collection was completed by one chief researcher for internal consistency. Ethics approval was gained for the audit.

All patients with type 1 and type 2 diabetes admitted during the study period were selected from the electronic medical record system. Case notes were reviewed for hypoglycaemic episodes by the chief researcher. Data collected included demographics, comorbidities, diabetes medications, blood glucose levels, hypoglycaemic symptoms, treatments and ongoing monitoring as documented. Data was analysed for adherence to the protocol and PASW® Statistics Version 18 (SPSS Inc, 2009) was used to identify frequencies.

Results

A total of 180 case notes were examined, and 50 hypoglycaemia episodes were identified from 30 individual case notes. The sample of patients were aged between 65 and 93 years old (mean age 77.2 ± 7.4 years) and more cases involved men (31 compared to 19 women). There were 49 episodes of hypoglycaemia in conscious patients and one case was unconscious hypoglycaemia. Most of the cases were in the medical setting (76%) but there were also cases of hypoglycaemia in surgical, rehabilitation, mental health and intensive care settings.

The audit found that nurses' documentation of hypoglycaemic symptoms and treatment with complex carbohydrate was insufficient. In 45 of 50 hypoglycaemic episodes (90%), assessments of symptoms were not documented. Similarly, in 28 of 50 hypoglycaemic episodes (56%), treatment with complex carbohydrate food was not documented.

In the 49 cases of conscious hypoglycaemia, simple carbohydrates, such as Carbotest® (a glucose drink), were given in 37 cases (76%) as step-1 treatment, but only 22 cases (45%) were given the correct amount of Carbotest drink. Eleven cases had no documentation of treatment with a simple carbohydrate and in one case, the patient refused treatment with the Carbotest drink and breakfast was given as an alternative. Only 20 cases (40%) documented that the patient was given complex carbohydrate following unsuccessful treatment with simple carbohydrate.

Seventeen of the 49 cases of hypoglycaemia in medical wards, surgical wards, rehabilitation units and mental health units had recurrence of hypoglycaemia within 24 hours. In nine of those 17 cases (53%), step-1 treatment with simple carbohydrate was not correct or not documented. Furthermore, step-2 treatment with complex carbohydrate was not correct or not documented in 14 of these 17 cases (82%). Blood glucose levels were tested and documented after step-1 treatment in 37 cases (74%). Furthermore, in only 18 hypoglycaemia events (36%) it was documented that the patient was reviewed by medical officers. Among those reviewed, 11 (61%) did not have another hypoglycaemic episode within 24 hours.

Discussion

The primary aim of the audit was to examine the adherence of nurses to the current hypoglycaemia management protocol. In 49 conscious hypoglycaemic events, 76% of cases were given Carbotest drink as step-1 treatment. According to the protocol, 100 mL of Carbotest drink (equal to 15 g carbohydrate) should be given. However, the amount of Carbotest drink given varied in the audit. Twenty-two cases (45%) were given the correct amount and two cases (4%) were given 50 mL (half the recommended amount). Furthermore, nine cases (18%) did not document the amount of Carbotest drink that was given. In other cases, Milo, an Australian milk-based drink produced by Nestle®, and/or biscuits were given in step-1 treatment, which was not compliant with the protocol as both are complex carbohydrates.

In summary, correct step-1 treatment was provided in 45% cases. Documentation regarding the use of complex carbohydrate food as step-2 treatment was unsatisfactory, with 28 out of 50 cases (56%) not documenting any treatment with complex carbohydrate food. Complex carbohydrate food was offered in 20 cases (40%) as step-2 treatment of hypoglycaemia. However, alternative sources of complex carbohydrate food such as meals and Milo were offered instead of the recommendation outlined in the protocol. Interestingly, a patient in the mental health unit was given "biscuits, Milo, cheese and a muffin" following a hypoglycaemic episode. Incorrect treatment of hypoglycaemia and poor compliance of the protocol can increase patients' risk of experiencing another hypoglycaemic event or other undesirable outcomes.

Nurses' documentation of hypoglycaemic symptoms was also inadequate. In 45 out of 50 cases (90%) assessments of hypoglycaemic symptoms were not documented. This may indicate nurses' lack of knowledge regarding hypoglycaemic symptoms and understanding of the atypical presentation in older people. For example, older people often present with other health conditions, which may affect their experience of hypoglycaemia, therefore they can be more vulnerable to unrecognised hypoglycaemia.

These results suggest that nurses in the hospital need to improve their knowledge, assessment skills and documentation of hypoglycaemic symptoms. Unsteadiness, lightheadedness, poor concentration, trembling and sweating were identified by Jaap et al (1998) as the most frequently reported hypoglycaemic symptoms. These symptoms may increase the risk of falling among older adults.

Page points

1. The audit showed that in 45 of 50 hypoglycaemic episodes (90%) assessment of hypoglycaemic symptoms was not documented. In addition, in 28 cases (56%), treatment with complex carbohydrate food was not documented
2. In 17 out of 49 cases, patients had recurrence of hypoglycaemia within 24 hours. In nine of those 17 cases (53%), step-1 treatment with simple carbohydrate was not correct or not documented and step-2 treatment with complex carbohydrate was not correct or not documented in 14 of these 17 cases (82%).
3. The audit showed that 18 hypoglycaemia events (36%) were reviewed by medical officers. Among those reviewed, 11 cases (61%) did not experience another hypoglycaemic episode within 24 hours.

"Education needs to include engaging small group case-based discussions with a focus on clinical problem solving using the protocol rather than didactic lecture-style teaching."

An interesting case was reported from the mental health unit that described a patient waking up from sleep and checking his blood glucose level, which was 3.5 mmol/L. He was taking insulin therapy and reported to a nurse he had "a special feeling all over his body" when his blood glucose level was low, and that "it woke him if he was sleeping" However, the nurse did not recognise the patient's hypoglycaemia-related symptoms. Instead of providing hypoglycaemic treatment, the nurse checked the patient's blood glucose level using another meter. This case emphasises the importance of nurses recognising the individual's symptoms of hypoglycaemia and providing early intervention.

For each hypoglycaemic event in the hospital, nurses are expected to follow the hypoglycaemic treatment protocol to provide appropriate treatment, test blood glucose levels, document the event and ask the relevant medical officer to review the patients. It was documented that 18 cases were reviewed by a medical officer but there was no documentation recording whether or not the patient was reviewed by a medical officer in 31 of the cases (62%). Eleven of the 18 cases (61%) reviewed by the medical officers did not experience another hypoglycaemic episode within 24 hours and the risk of developing another hypoglycaemic episode was lower after a medical officer reviewed patients' diabetes medication and modified the dose. It should be emphasised that the medical officer's review is a part of the patients' overall diabetes management and treatment, not just a review of the specific hypoglycaemia treatment. It may be this subtle difference which is preventing nurses from seeking a medical officer review.

Older patients with comorbidities who are under tight glycaemic control are at high risk of severe hypoglycaemia (Greco et al, 2010). This may be due to impaired hepatic and renal function, which is prominent in people aged 80 years or older with type 2 diabetes (Greco et al, 2010). Strict glycaemic control is more likely to reduce the risk of vascular complications in people with diabetes in the long term, but it increases the risk of hypoglycaemia or even severe hypoglycaemia in older adults. Tomky (2005) suggested that long-lasting severe hypoglycaemia can lead to transient and even permanent cerebral damage. Therefore, safety in this older group should be carefully considered and their treatment plans should be individualised.

Due to the small sample size and missing documentation, there was no statistical significance showing a relationship between hypoglycaemic cases reviewed by medical officer and reduced hypoglycaemic reoccurrence. In addition, the sample was not randomly selected, therefore selection bias cannot be avoided.

Implications

In summary, the audit found the adherence of nurses to the current hypoglycaemia management protocol in the hospital was suboptimal and nursing documentation of hypoglycaemic events was inadequate. The results of the audit suggest:

1. There should be a greater emphasis on the importance of medical officers' review for patients' overall diabetes management, rather than as a review of nurses' hypoglycaemic management.
2. Education needs to include engaging small group case-based discussions with a focus on clinical problem solving using the protocol rather than didactic lecture-style teaching. ■

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