

Reducing risks of hypoglycaemia in acute admissions in the Department of Medicine for the Elderly

Joy Williams and Suchitra Raj

Introduction

Hypoglycaemia is an acute complication associated with the use of sulphonylureas and insulin in the treatment of diabetes (NHS Diabetes, 2011).

As part of a quality improvement and safety study, the team of diabetes specialist nurses (DSN) in a district general hospital reviewed all patients with diabetes admitted into the admission ward of the Department of Medicine for the Elderly (DOME). Over a 12 month period from November 2011 to October 2012, all patients treated with either a sulphonylurea or insulin were identified. This information was analysed and the data are presented here. This article will also provide an overview of hypoglycaemia and discuss the key risk factors of this acute complication of diabetes in older people.

The specific problems associated with ageing and managing diabetes in older people, as well as reducing the risk will be discussed, in order to support best practice and safer management in this client group.

Prevalence of diabetes in older people

Diabetes is the most common long term metabolic condition, affecting an estimated 10-25% of older people.¹ Indeed, older people now represent the largest sector of the population with the disease.² The combination of an increasing life expectancy and an ageing population has led to a rising number of older people with diabetes. The National Service Framework for older people predicts that the numbers of people surviving into their 80s and 90s will continue to increase,³ and therefore it is estimated that the number of older people presenting with diabetes will continue to rise. The challenge of managing diabetes in the older population is mainly due to age related morbidities, in addition to the higher prevalence of type 2 diabetes.⁴

Hypoglycaemia

Hypoglycaemia is an acute complication of diabetes that is diagnosed by a blood glucose level below four mmol/l. It requires urgent

treatment with 15-20 grams of rapid acting glucose to restore the blood glucose level to the normal range, and this should be followed by a longer acting carbohydrate to replace the liver stores with glycogen. Symptoms include shaking, sweating, confusion, nausea, hunger, and also tingling around the lips (which is under-recognised in older people).^{2,5}

Hypoglycaemia should be avoided in people who are unable to recognise or treat a hypoglycaemic episode. Reasons for hypoglycaemia occurring would be if the person omitted or delayed a meal, was more active than usual, ate a reduced carbohydrate meal, or imbibed alcohol. Polypharmacy complicates management as it can lead to confusion and pharmacological errors, which can cause hypoglycaemia due to incorrect use. Hypoglycaemia can have grave consequences in older people as they are more prone to falls and fractures.^{6,7} Mortality risk is greater following hospital admission, with some people experiencing permanent neurological damage.⁸

Reasons for hypoglycaemia

In the older person there can be a blunting of the sensations of hunger and thirst, so meals may be omitted through lack of appetite or cognitive impairment when the person believes they have eaten. Alternatively, the person may lack the energy or physical ability to prepare a meal, or they may be socially isolated and unable to shop. Patients who are housebound may be reviewed by healthcare professionals infrequently, and as a result medications are not adjusted in response to weight loss or declining renal or liver function. Renal impairment delays excretion of sulphonylureas and insulins, so doses need to be reduced in response to glycaemic control. Hypoglycaemia is underreported in this patient group because either they or their carers do not recognise the signs.⁹

Hypoglycaemia can occur at any age in those treated by sulphonylureas or insulin. Given the progressive nature of diabetes, it can be expected that older people will require more treatments, including these hypoglycaemics. Glibenclamide is not recommended in the elderly due to its long half life, which makes hypoglycaemia more of a risk.¹⁰

Consequences of hypoglycaemia

Many older people are living in residential care where there is a recognised lack of diabetes training and awareness of the disease amongst the care home staff.¹¹ Barrou et al recognise that people with diabetes are at an increased risk of developing dementia,¹² particularly vascular dementia. This poses immense challenges for those caring for these patients, and treatments need to be tailored to the individual's needs.

Treating to target

The quality and outcomes framework set a target for general practitioners to achieve in order to receive financial rewards to fund the service. The aim was to encourage improved diabetes care, leading to a reduction of the long term complications of diabetes. However, this came with an increased risk of hypoglycaemia and a resultant increased risk of falls and confusion, which in the elderly can result in fractures, head injuries, and a loss of confidence and independence.

Method

The diabetes specialist nurse (DSN) visited the admission ward for DOME patients on a daily basis. Any patient with diabetes admitted over the preceding 24 hours who was prescribed either a sulphonylurea and/or insulin treatment was identified. Using a self designed proforma, they obtained data including presenting complaint, past medical history, initial diagnosis, most recent HbA1c, and renal and liver function tests. Based on the glycated haemoglobin (HbA1c) level and the patient's condition, the DSN made the appropriate changes to the diabetic medication regime.

Over a 12 month period, a total of 324 patients were identified who had diabetes. The average age for this patient population was 82 years (54-102). Out of these 324 patients, 145 were on agents known to cause hypoglycaemia, 76 were on insulin therapy, 69 were on sulphonylurea tablets, and seven were on a combination of both. The HbA1c was measured for these patients, and it was discovered that a total of 40 patients had an HbA1c level under 7.5%. Out of the 40 patients, five were admitted with a fractured neck of femur and nine were

admitted due to a fall or collapse episode. Seven other patients were admitted due to not coping at home, two were admitted due to documented hypoglycaemia, and two as a result of confusion. A further two patients had symptoms suggestive of transient ischaemic attacks. Four other patients were admitted due to various infections, and the reason for admission was unclear for the remaining nine. The DSN assessed these 40 patients, and as a result 20 had their sulphonylurea stopped, eight had their insulin doses reduced, and a further two had their sulphonylurea doses reduced. Ten patients had no changes made.

Discussion

Over the 12 month period, 44.7% of diabetic patients admitted were on hypoglycaemic inducing agents, either sulphonylurea or insulin, and 27.5% (n=40) patients had an HbA1c level of 7.5% or less. Side effects of diabetes treatment, most notably hypoglycaemia, can result in poor outcomes, such as traumatic falls and an exacerbation of comorbid conditions.¹³ This is apparent in our cohort of patients, where 12.5% were admitted with a fractured neck of femur. A further one in four patients were admitted with a fall or collapse episode that could have resulted in a traumatic bone injury.

The risk of hypoglycemia, which may lead to impaired cognition and function, is substantially increased in the elderly. In addition, older adults may have more neuroglycopenic manifestations of hypoglycaemia (dizziness, weakness, delirium, and confusion) compared with adrenergic manifestations (tremors and sweating).¹³ As a result, these symptoms may be missed or misconstrued as primary neurological disease (such as a transient ischemic attack), leading to an underreporting of hypoglycaemic episodes by affected patients.

Hypoglycaemia can pose a particular risk to older people if left untreated. In the frail older person, the consequences of a fall can range from distress and a loss of confidence to death from their injuries. Additionally, as a consequence of hypoglycaemia, there is an increased risk of suffering a major vascular event such as a stroke or myocardial infarction.²

It is recognised that hypoglycaemic episodes are both more frequent and severe in older people.² Frequent episodes of hypoglycaemia can lead to a loss of the warning signs of hypoglycaemia, and people may also have less warning signs of the condition as they become older.² This is because they have impaired glucagon and hormone responses. Renal impairment can lead to hypoglycaemia.

It has been suggested that for frail adults, people with a life expectancy of less than five years, and others in whom the risks of intensive glycaemic control appear to outweigh the benefits, a less stringent target of 8% is recommended.¹³ Studies have also shown it is less likely that the use of intensive therapy to target near normoglycaemia will show benefits among older adults with diabetes. Elderly diabetics may have a long duration of diabetes, a previous history of cardiovascular disease, or multiple cardiovascular risk factors, as well as many other comorbid conditions. These conditions limit the benefits of intensive therapy in older adults with diabetes. This is evidenced in the veterans affairs diabetes trial (VADT), which failed to show benefits in cardiovascular end points in the elderly population.¹⁴ Therefore, intensive management targeting normoglycaemia should be avoided in older adults. At a minimum, intensive control should be performed with great caution in older adults with diabetes.¹⁵

Recommendations

Treatments need to be considered with the general practitioner taking the lead on prescribing for the patient. Regular reviews of prescriptions are valuable to stop unnecessary medications. Computerised records of medications are recommended.

Sulphonylureas would not be recommended for those patients with erratic eating habits, where the risk of injury from hypoglycaemia is greater than that from chronic complications. A person with dementia who is very agitated and active is at great risk of hypoglycaemia. This patient group have erratic eating habits; there are days when they eat little and other days when they eat sugary foods to excess, making it challenging to control their blood glucose levels. Safety is paramount in avoiding

hypoglycaemia or hyperglycaemia associated with a hyperglycaemic hyperosmolar state.

Safety, symptom control, and low hypoglycaemic risk are therefore considered to be as important as glycaemic control. Many older people have comorbidities, including the complications of diabetes. Given the risks, avoidance of hypoglycaemia is an important consideration in choosing therapeutic agents and establishing glycaemic goals in elderly adults. Insulin secretagogues such as sulphonylureas, as well as all types of insulin, should be used with caution in the frail elderly. Basal insulin administered once daily is often the drug of choice because, although great control is not achieved, a blood glucose level ranging between five and 15 mmol/l would be acceptable.

References

- 1 Peck G. Community diabetes nursing in our ageing population. *J Diabetes Nursing* 2003;7:181-3.
- 2 Sinclair AJ (ed). *Diabetes in old age*. Third edition. Chichester: Wiley-Blackwell, 2009.
- 3 Department of Health. *National service framework for older people*. London: The Stationery Office, 2001.
- 4 Krentz AJ, Bailey CJ. *Type 2 diabetes in practice*. London: Royal Society of Medicine Press, 2001.
- 5 Williams G, Pickup JC. *Handbook of diabetes*. Third edition. Oxford: Wiley-Blackwell, 2004.
- 6 Schwartz AV, Hillier TA, Sellmeyer DE, Resnick HE, Gregg E, Ensrud KE et al. Older women with diabetes have a higher risk of falls: a prospective study. *Diabetes Care* 2002;25:1749-54.
- 7 Nicodemus KK, Folsom AR; Iowa Women's Health Study. Type 1 and type 2 diabetes and incident hip fractures in postmenopausal women. *Diabetes Care* 2001;24:1192-7.
- 8 Sinclair AJ. Special considerations in older adults with diabetes: meeting the challenge. *Diabetes Spectrum* 2006;19:229-33.
- 9 NHS Choices. *Diabetes, type 2*. London: NHS, December 2011.
- 10 British Medical Association, Royal Pharmaceutical Society of Great Britain. *British National Formulary 59*. London: Pharmaceutical Press, 2010. Available at: <http://www.bnf.org>.
- 11 Richmond J. Time to take stock of our care of older people with diabetes. *J Diabetes Nursing* 2003;7:180.
- 12 Barrou Z, Lemaire A, Boddaert J, Verny M. Diabetes mellitus and cognition: is there a link? [Article in French]. *Psychol Neuropsychiatr Vieil* 2008;6:189-98.
- 13 Brown AF, Mangione CM, Saliba D, Sarkisian CA; California Healthcare Foundation/ American Geriatrics Society Panel on Improving Care for Elders with Diabetes. Guidelines for improving the care of the older person with diabetes mellitus. *J Am Geriatr Soc* 2003;51(5 Suppl Guidelines):S265-80.
- 14 Duckworth W, Abaira C, Moritz T, Reda D, Emanuele N, Reaven PD et al; VADT Investigators. Glucose control and vascular complications in veterans with type 2 diabetes. *N Engl J Med* 2009;360:129-39.
- 15 Kim KS, Kim SK, Sung KM, Cho YW, Park SW. Management of type 2 diabetes mellitus in older adults. *Diabetes Metab J* 2012;36:336-44.