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Dementia: a growing problem for older people with diabetes?

Stephen Phillips and Anne Phillips explain why there is a raised risk of cognitive impairment in older people with diabetes. They discuss its impact on diabetes management and ways to support the older people affected

Diabetes mellitus is common in older populations, as discussed in a previous article in this series (Phillips and Phillips, 2011). In part, this is due to much improved outcomes in diabetes, with better risk management strategies (Hawthorne, 2009).

The aim of this article is to investigate the impact and risk of diabetes in, specifically, vulnerable older people, particularly those developing cognitive impairment leading to dementia.

The ethical aspects of health-care decision making for people with dementia can be challenging (Beauchamp and Childress, 2009). Loss of memory and cognitive dysfunction can make it difficult for people to take a full role in decisions about their care, and requires intervention and support from carers (often a close relative).

The desire to both avoid harm and achieve national blood glucose targets can be difficult to achieve in the care of some older people with diabetes, as Phillips and Phillips (2011) explained in a previous article. Cognitive impairment such as dementia makes treatment decisions in diabetes even more complex.

Practices nurses are at the forefront of providing individualized diabetes care in conjunction with multi-disciplinary teams including social services, home carers, residential and nursing home carers, community nurses, partners and community mental health teams. This article explores the questions arising in such care, and uses the experience of Barry as an example (*Case Study 1*).

Dementia: definitions

Raffaitin et al (2009) described dementia as the most severe pathological form of brain ageing. The term 'dementia' is used to describe a variety of cognitive and behavioural symptoms including memory loss and disturbance; impairment of abstract thinking, reasoning and judgment; mood and personality changes; and aphasia, apraxia or agnosia.

All types of dementia are progressive; the mental and physical symptoms worsen over time. There are four main types of dementia, each

with some differences in symptoms and pathophysiology (Burns et al, 2005):

- ▶ Alzheimer's disease (the most common form of dementia)
- ▶ Vascular dementia (mostly affecting people with diabetes due to the association with hypertension)
- ▶ Fronto-temporal dementia
- ▶ Lewy body dementia.

Mild cognitive impairment is a precursor for dementia in some people.

Epidemiology

Dementia affects about 1 in 100 of the UK population and its incidence increases with age (Knapp and Prince, 2007).

Dementia affects more women than men to a ratio of 2:3 (Knapp and Prince, 2007; Cukierman-Yaffe et al, 2009); but as women outlive men, this may not be unexpected.

There is some evidence of a genetic role in the development of dementia (Graham et al, 1999) but many environmental factors have also been implicated.

The onset of dementia is progressive and usually gradual (although cases or early onset can be more rapid). Eventually the person affected will struggle with everyday tasks and become totally dependent on others for all their activities of daily living.

Prevalence of dementia

Current estimates are that there are over 820 000 people in the UK with some form of dementia, with Alzheimer's disease affecting up to 60% of this group (Health Economics Research Centre, 2010).

The Alzheimer's Society (2011) estimates that, in people over 65 years of age, 1 in 14 is affected by Alzheimer's disease. The risk increases with age, and people over 80 years of age are thought to have a 1 in 6 chance of developing the condition (Alzheimer's Society, 2011).

The prevalence of dementia is predicted to rise to over 1 million people by 2025, an increase of 38% over the next 15 years (O'Connor, 2009). Furthermore, dementia has been estimated to cost the economy £23 billion in treatment and care (Health Economics Research Centre, 2010).

Dementia is one of the most common and devastating conditions of later life; with about 4.6 million new cases occurring worldwide annually (Ferri et al, 2005). The number of people with dementia is predicted to double every 20 years, to reach an estimated 81.1 million people worldwide by 2040 (Ferri et al, 2005).

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Type 2 diabetes and dementia progression

Type 2 diabetes is associated with increased cognitive impairment and dementia (Velayudhan et al, 2010). Strachan (2010) suggested that very high blood glucose concentrations are associated with poor memory, ill health and mood changes. This could be the result of alterations in cerebral blood flow causing osmotic changes in neurones, as a result of cerebral microvascular disease. Indeed,

diabetic retinopathy is a surrogate marker of cerebral microvascular disease, and people with retinopathy are likely to have a longer duration of diabetes and also be hypertensive (Gillibrand and Holdich, 2010).

The most common form of dementia affecting people with diabetes is vascular dementia (Jolley, 2009). The reason for this is thought to be the vascular complications of diabetes. Diabetes is a risk factor for cerebrovascular

disease and stroke; these can also cause cognitive impairment owing to ischaemic brain damage (Bruce et al, 2008).

Furthermore, diabetes is associated with damage to the central nervous system (CNS) and cognitive deficits; the CNS deficits range from moderate to severe depending on the quality of glycaemic control (Moireria et al, 2007).

Insulin affects several brain functions including cognition and memory. Insulin

resistance, accumulation of advanced glycation end-products (AGEs), and/or changes in cerebral signalling have been shown to be associated with development of earlier-onset Alzheimer’s disease (Moireria et al, 2007; Bruce et al, 2008).

Hypertension in middle age also increases the risk of developing dementia (Qiu et al, 2005), as does obesity (Gorospe and Dave, 2007) and dyslipidaemia (Reitz et al, 2004); all of which are independent modifiable risk factors for diabetes, vascular disease and dementia.

CASE STUDY I

Barry is a 74-year-old retired engineer. He has type 1 diabetes and has a long history of good control using a multiple-dose injection regimen. More recently Barry’s partner has noticed he has been becoming increasingly short tempered and sometimes forgets commitments that they have made together.

Barry’s partner discloses her concerns to her practice nurse and together they agree to approach this when Barry has his annual review the following week. One concern the practice nurse has is Barry’s fierce independence concerning his diabetes and insulin injections. He will not discuss these with his partner as he sees his diabetes as his concern only.

At his annual review the practice nurse engages Barry in discussing an unrelated diabetes issue and notices he becomes quite animated. When she tries to relate this to his diabetes control, she finds that he is evasive and not able to recount his knowledge of his insulin doses or any hypoglycaemic episodes that his partner previously reported to her. This concerns the nurse, and she arranges to review him in a week’s time to undertake a review of his injection technique and to undertake a Mini Mental State Examination (MMSE). She also asks Barry to record his blood glucose tests and insulin doses over the next week to review with him when they meet.

Barry’s partner accompanies him to his appointment, but he does not have any blood glucose levels or insulin doses recorded and appears to not remember this was previously discussed with him. When reviewing his injection technique, the nurse has concerns as Barry’s technique is uncertain and unsteady. His practice nurse is concerned this is unsafe. On completion of the MMSE, Barry has a score of 21 out of 30, which indicates early stage dementia (NICE, 2011). Barry asks what his score means and the practice nurse discusses the possible implications with him.

Barry reacts with relief and expresses emotion, as he has been hiding his symptoms from his partner for sometime, not wanting to bother her. He is keen to be helped and together the practice nurse, Barry and his partner discuss the options available to them.

The high priority concerns are to refer Barry to his GP for further assessment and investigation, and to immediately ensure Barry’s safety using insulin. The practice nurse, together with Barry and his partner, discuss a change in Barry’s insulin regimen to make it easier for him to manage. The practice nurse also suggests that the community nursing team help Barry in the short term in the transition to this new regimen. Barry agrees to this.

Diabetes treatments

Planning of treatment and care for people with type 1 and type 2 diabetes is an important area for practice nurses and GPs. In particular, with declining cognitive function, safety is of primary concern. Using a partnership approach in considering treatment options and making alternative choices proactively can help maintain an individual’s independence for longer.

When cognitive functioning declines, routine and familiarity for the person affected is crucial. This is of consideration when care planning with someone using insulin, who may find a twice-daily regimen more suitable than a multi-dose regimen, where forgetting a dose or several doses is increasingly likely. New insulin safety guidance was released by the National Patient Safety Agency (2010) (*Case Study 1*).

The association between type 1 and 2 diabetes, hypoglycaemia and cognitive impairment has been highlighted by Strachan

(2011). People with cognitive impairment find it more difficult to self-manage their diabetes, making evaluating and deciding from the treatment choices available to them more difficult; if treatment is inappropriate as a result, this may increase the risk of hypoglycaemia.

In turn, hypoglycaemia increases the risk of cognitive dysfunction and physical disability, such as foot complications, which can, in turn, cause people to fall and sustain fractures (Mayne et al, 2010).

The combined consequences of diabetes and cognitive impairment therefore can have a substantial impact on an individual's quality of life, leading to loss of independence, increasing the fear of living alone and increasing dependence and demands on carers. Addressing such effects are of greater concern in older people living with diabetes than vascular risk reduction alone.

Triple jeopardy

There is also an increased risk for people with learning difficulties such as Down's syndrome developing both

type 1 and type 2 diabetes (NHS Choices, 2011). This raised risk is compounded by the fact that people with Down's syndrome who live to 35 years have a 15–40% chance of developing Alzheimer's disease; the same risk as that of the population in general at 75 years of age (Holland and Benton, 2004). This triple jeopardy needs to be recognized by practitioners in their annual screening of individuals and appropriate risk management strategies identified. However, the assessment and diagnosis of Alzheimer's disease in people with Down's syndrome is difficult to determine owing to the masking of symptoms by the complex nature of Down's syndrome presentation (Stanton and Coetzee, 2004).

Early diagnosis

Cognitive assessment is recommended by the National Institute for Health and Clinical Excellence (NICE) (2011) to ensure early diagnosis of dementia. The Quality and Outcomes Framework (QOF) recommends that each general practice maintains a register

of people diagnosed with dementia (British Medical Association and NHS Employers, 2011). Standard assessment tools that may be used in general practice are the Mini Mental State Examination (MMSE), the Six Item Cognitive Impairment Test (6-CIT), the General Practitioner Assessment of Cognition (GPCOG) and the 7-minute screen (NICE, 2011).

A new online screening test advocated by Age UK and the Alzheimer's Society for the assessment of cognitive function has been launched for individuals aged 50–70 years. It can be accessed free online at www.foodforthebrain.org.

Recognition of signs and symptoms

Declining cognitive function in diabetes can cause significant difficulties in self-care. People may not manage their tablet or insulin regimens correctly or may fail to recognize the need to eat in the later stages of dementia.

Early symptoms of dementia can include memory loss which makes any new treatment decision about diabetes control difficult to

communicate, understand and maintain. Language impairment, disorientation and changes in personality can occur, which are also symptoms of hypoglycaemia (Sinclair et al, 2010).

Difficulties with activities of daily living manifest, which can include forgetting to take medications and forgetting to eat regular meals. This can also promote hypo- and hyperglycaemia (Sinclair et al, 2010). Self-neglect can occur and individuals can become depressed and act 'out of character', which can indicate possible hypo- or hyperglycaemia.

Discomfort or pain may be difficult to express for people with cognitive impairment and carers need to be mindful of this and be extra vigilant to identify vascular changes or accidental injuries, in particular, in the feet.

Sinclair et al (2010) recognized the important role carers have in ensuring the individual affected is having their needs catered for, and also to ensure that diabetes management is maintained to keep the person well.

Practical decision making to reduce the incidence of hypoglycaemia and to reduce complicated treatment regimens might be confusing to the individual and the relaxing of haemoglobin A_{1c} (HbA_{1c}) targets is to be advised to try to minimize the risk of hypoglycaemia (Phillips and Phillips, 2011). Practice nurses may be the only professional contact someone with memory problems sees, so memory strategies and aids that people can use, e.g. diaries, text messaging services, phone alerts and Post-it notes, can

Age UK	National charity formed through the merger of Age Concern and Help the Aged offering advice on benefits, care and age discrimination	www.ageuk.org.uk
Alzheimer's Society	UK charity supporting people with dementia, their families and carers	www.alzheimers.org.uk
Atdementia	Provides information on assistive technology for people with dementia	www.atdementia.org.uk
Dementia Cafe	Offers information on dementia including news, training, forums, chat rooms, downloads, memory games, telephone support and a dementia café for people with dementia and their carers	www.dementiacafe.co.uk
Dementia UK	National charity committed to improving quality of life for all people affected by dementia. Supports Admiral Nurses, the specialist dementia nursing service	www.dementiauk.org
Diabetes UK	National charity for people with diabetes, providing advice and support on many aspects of living with diabetes	www.diabetes.org.uk

help remind the person to take their medication, especially in the early stages so that the individual can remain independent for as long as possible.

People with dementia may exhibit aggressive behaviour, restlessness, wandering and eating problems, all of which might be attributed to hypoglycaemia. Incontinence is also a common symptom of hyperglycaemia. Usually individuals require nursing home care in the latter stages of dementia.

Sources of support

Both diabetes and dementia are growing problems in the older population. Sources of support that may be available locally include memory assessment services, usually provided by a single assessment clinic or by community mental health teams (NICE, 2010). Practice nurses need to be aware of these services and also of the help that may be provided through other organizations (Table 1).

Conclusions

As practice nurses have such a unique role, often being the first point of care for people with diabetes and their families, their distinctive relationship can allow them to be curious and ask appropriate questions when reviewing people with diabetes. It is important to understand the association between dementia and diabetes, and how cognitive impairment can undermine the vigilant self-care required to manage diabetes well. With that understanding, assessment to diagnose cognitive decline and to

introduce supportive services can be provided.

Having honest conversations, with individuals like Barry and his partner can help promote the aims of the National Dementia Strategy, which highlighted the importance of early diagnosis to enable individuals and their families respond effectively to the progress of their dementia (Department of Health, 2009; Downs et al, 2002).

Conflict of interest: none

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KEY POINTS

- There are an estimated 820 000 people in the UK with some form of dementia
- Type 2 diabetes is associated with increased cognitive impairment and dementia
- Planning treatment and care for people with diabetes and cognitive impairment can help maintain their independence for longer
- Cognitive assessment is important to ensure early diagnosis

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