

Understanding the diagnosis of diabetes nursing essay

[Health & Medicine](#), [Nursing](#)



Introduction

This case study will describe the care of a patient newly diagnosed with Latent autoimmune diabetes of adulthood (LADA). It will demonstrate the author's understanding of diabetes and its complications, and highlight the importance of providing high quality information to empower the patient to manage the disease. The Nursing and Midwifery Council's guidelines will be adhered to by using pseudonyms to protect patient confidentiality and the patient will be known as Mr James Smith. In the United Kingdom there are currently over two and a half million people with diabetes mellitus, and up to half a million people with the condition who don't know they have it. It is estimated that including both adults and children, fifteen per cent of these figures are patients suffering from Type 1 diabetes and eighty five per cent are patients suffering from Type 2 diabetes (Diabetes. co. uk, 2009). The World Health Organisation in 1999 defined diabetes mellitus as " a metabolic disorder of multiple aetiology characterised by chronic hyperglycaemia with disturbances of carbohydrate, protein and fat metabolism resulting from defects in insulin secretion, insulin action, or both" (Sign, 2001, p. 2). In our bodies, fuel and oxygen are vital for cells to stay viable. Glucose is our major fuel and comes from the food we eat. Levels of blood glucose concentration are monitored by beta cells found in the islet of langerhans located in the pancreas. These cells secrete the hormone insulin when glucose levels are high and less insulin when glucose levels lower. When the beta cells do not function properly, and the blood glucose concentration rises, this is known as diabetes (Matthews et al, 2008, p. 3). Diabetes mellitus is generally categorized into Type 1 and Type 2 (Matthews et al, 2008, p. 1). Type 1

diabetes is a result of an autoimmune destruction of the beta cells of the islets of langerhans in the pancreas (Hitman, 2001, p. 10). Typically, people with Type 1 diabetes are usually under 40 years of age, of slim build, ketosis-prone, islet cell antibody and/or glutamic acid decarboxylase autoantibodies (antiGAD-Ab) positive, experience a rapid onset of symptoms and are unable to survive without insulin treatment (Hillson, 2008, p. 14). The commonest form of the disease is Type 2 diabetes and can be characterized by the disorders of insulin resistance and insulin secretion (Zimmet et al, 2004, p. 9). The risk of developing Type 2 diabetes escalates with obesity, physical inactivity, and age. These factors are attributing to the rising number of people being diagnosed with the disease, ultimately causing an explosion in the prevalence of Type 2 diabetes (McGuire and Rao, 2007). Meeto (2004, p. 646) suggests that a diagnosis of diabetes will instantly increase the persons' risk of developing microvascular and macrovascular complications. Early prevention of these complications are key to ensuring people live long healthy lives (Hillson, 2008, p. 270).

Rationale

The author of this case study works as a diabetes specialist nurse/research nurse in a local district general hospital where she first met Mr James Smith. The gentleman is forty six years old, lives with his wife and reports to have good health. He is not treated with any medication, is a non-smoker and limits his weekly intake of alcohol to eighteen units. Mr Smith attended an outpatient appointment after he was referred by his General Practitioner to the consultant diabetologist and his team for specialist advice with a six

week history of polyuria, polydipsia and weight loss. Rubin and Jarvis (2007, p. 23) suggest that frequent urination, thirst, fatigue, and weight loss can be early symptoms of diabetes mellitus. The gentleman was diagnosed with a form of diabetes known as latent autoimmune diabetes of adulthood (LADA). This is a slowly progressive form of Type 1 diabetes in which there is autoimmune destruction of the beta cells in the pancreas (Deutekom, Heine, and Simsek, 2007). The author's interest in latent autoimmune diabetes of adulthood stems from the fact that many people with this type of diabetes are often misdiagnosed with Type 2 diabetes. Latent autoimmune diabetes of adulthood has an insidious onset of hyperglycaemia comparable to that of Type 2 diabetes (Appel et al, 2009, p. 156). Making the correct diagnosis of latent autoimmune diabetes of adulthood is imperative as patients will usually have an absolute insulin deficiency within an average of two to six years, and will require initiation of insulin therapy (Davies et al, 2008, p. 1354). Correctly diagnosing Mr Smith was especially important due to his occupation as a train driver. Hillson (2008, p. 432) suggests that people treated with oral hypoglycaemic drugs may be allowed to drive trains if they can prove their diabetes is well controlled and they have no tissue damage which may impair functions necessary for the role. However, people treated with insulin are not permitted to be in control of trains because of the greater risk of hypoglycaemia.

Assessment

In the local area, patients diagnosed with Type 2 diabetes over forty five years of age are generally cared for by their General Practitioner. Mr Smith's

General Practitioner recognised that he did not stereotypically fall into the category of someone with Type 2 diabetes and referred him to the secondary care clinic for an urgent review. At the initial clinic appointment a full assessment was carried out by the diabetes team to attain a diagnosis and make plans for Mr Smith's care. The standardized assessment tool for assessing new patients was used (see appendix 1). The gentleman's weight was 79.6 kg and height 1.83 metres, calculating him a body mass index (BMI) of 23, and he has no family history of diabetes. It is acknowledged that when patients are newly diagnosed or have been previously diagnosed with adult onset diabetes and do not fit the traditional stereotype of a patient with Type 2 diabetes, such as obesity, signs of insulin resistance, and a family history of the disease, then an alternative diagnosis should be considered (Appel et al, 2009, p. 156). Mr Smith's blood pressure was measured as 118/66 mm Hg. It is recommended that patients with diabetes should aim for a target diastolic blood pressure of ≤ 80 mm Hg, and systolic blood pressure of <140 mm Hg as part of primary prevention of coronary heart disease, (SIGN, 2001, p. 15). Anti-hypertensive medication was therefore not required as the gentleman's blood pressure was within these targets. A sample of laboratory blood glucose had been checked by the General Practitioner and was recorded as 24.2 mmol/l. If patients have classical symptoms of diabetes and random venous plasma glucose of ≥ 11.1 mmol/l, then a diagnosis of diabetes can be made. If patients are asymptomatic, then a second sample should be collected to confirm the diagnosis (Hillson, 2008, p. 8). A capillary blood glucose sample was measured at 18 mmol/l, however this method should not be used to diagnose diabetes. Hillson (2008,

p. 8) recommends that only a laboratory venous glucose measurement should be used to diagnose diabetes. Normal blood glucose levels are in the range of 4-8 mmol/l, and a reading of 10 mmol/l or above is high and can be defined as hyperglycaemia. Initial symptoms of hyperglycaemia include, thirst, dry mouth, passing increased volumes of urine, and high blood glucose readings (Matthews et al, 2008, p. 96). Venous blood samples were collected which included urea and electrolytes, liver function tests, thyroid function tests, lipid profile, HbA1c and full blood count. These tests are recommended as part of the annual review process (Hillson, 2008, p. 42). All of the blood tests returned normal except the cholesterol level and the HbA1c result. The cholesterol level was 5.6 mmol/l, therefore Mr Smith was prescribed Simvastatin 40 mg. Fisher (2008, p. 33) recommends that the total cholesterol target level should be <4.0 mmol/l and Simvastatin 40 mg can be used to achieve this. Mr Smith's HbA1c was measured at 13.9% indicating a high level of glucose circulating in the bloodstream. HbA1c is a measurement of glucose control over a period of two to three months (Rubin and Jarvis, 2007, p. 132). Patients with Type 1 diabetes should aim for their HbA1c to be less than 7.5%, and less than 6.5% if they have increased arterial risk (NICE, 2004, p. 2). It is acknowledged to be important to involve the patient in making decisions about setting their individual HbA1c target (NICE, 2008, p. 5). From the 1st June 2009 HbA1c will be dual reported with the International Federation of Clinical Chemistry (IFCC) units until the 1st June 2011 to allow global comparison of HbA1c results (Diabetes. co. uk, 2009). A urinalysis was performed which measured glucose +++ but was negative for ketones. Hillson (2008, p. 102) recommends that all new

patients, insulin treated patients, and patients with high blood glucose levels should have urine tested for ketones. Their presence in large amounts can be indicative for insulin treatment. The consultant suspected that Mr Smith was suffering from latent autoimmune diabetes of adulthood and requested glutamic acid decarboxylase (GAD) antibodies to be checked from a venous blood sample. Latent autoimmune diabetes of adulthood can be distinguished from Type 2 diabetes by the presence of these antibodies (Davies et al, 2008, p. 1354).

Action Plan

At the first clinic appointment a diagnosis of latent autoimmune diabetes of adulthood had not been confirmed as the GAD antibodies result was not available. However a diagnosis of diabetes was confirmed, and a structured programme of care was discussed, agreed and initiated and was reviewed at each subsequent clinic visit. Delivering a high quality diabetes service aims to empower the patient to manage their own diabetes through the development of skills, knowledge, and access to services which will ultimately allow them to live a long life without complications related to the disease, (The National Service Framework for Diabetes: Standards, 2001).

The potential diagnosis of latent autoimmune diabetes of adulthood was discussed at the initial clinic appointment with Mr Smith to facilitate robust management. The consultant felt it was important to allow an understanding that insulin initiation may be required in the near future and the implications this may engage for him with his occupation. Appel et al. (2009, p. 156) suggests that understanding the physiology of the diagnosis facilitates

optimal management to prevent complications of the disease. It was anticipated that with the appropriate support and guidance from the specialist team, Mr Smith would be able to make the necessary changes in his life to assist exceptional management of the disease.

Implementation

Mr Smith was provided with education regarding diabetes and its management by the team based on the following: Understanding the diagnosis of diabetes Medication advice Blood glucose monitoring Dietary advice Exercise Complications Occupation advice

Understanding the diagnosis of diabetes

The physiology of diabetes was discussed with Mr Smith and written literature was provided, as well as advice on how to access help and support. Diabetes UK (2009) recognises that providing good quality information at the time of diagnosis and providing advice of how to access guidance and assistance in the future is fundamental to people managing their diabetes.

Medication advice

Metformin was prescribed for Mr Smith with an initial dose of 500mg twice daily, with advice to increase this dose to 1000mg twice daily after two weeks. NICE (2008, p. 9) suggests the dose of metformin should be increased over a period of weeks to minimise the risk of developing gastrointestinal side effects. Metformin is from a group of drugs called biguanides. Its mode of action is to decrease hepatic gluconeogenesis and

increase the glucose uptake by the muscles, hence escalating insulin sensitivity (Turner and Wass, 2002).

Blood glucose monitoring

A blood glucose meter was demonstrated and provided to Mr Smith to allow measurement of capillary whole blood. Batki and Thorpe (2001, p. 41) suggests that maintaining near normal glucose levels can help reduce the risk of developing complication's such as retinopathy, nephropathy, and neuropathy. NICE (2004, p. 7) recommends that patients with Type 1 diabetes mellitus self monitoring their blood glucose should aim for: Pre-prandial blood glucose level of 4.0-7.0 mmol/litre Post-prandial blood glucose level of < 9.0 mmol/litre Mr Smith was made aware of these target ranges, however was reassured not to expect these results initially until treatment was established, and lifestyle and dietary changes had been modified.

Dietary advice

Diabetes UK (2009) identifies that having a healthy diet plays a vital role in controlling your weight, blood fats, and blood pressure, ultimately leading to a healthier life. The charity distinguishes ten steps to maintaining a healthy diet which include: Eat three meals a day and avoid omitting meals Include starchy carbohydrate foods with each meal (e. g. bread, potatoes, rice, pasta and cereals) Reduce the fats you eat, particularly the saturated fats (e. g. margarine, butter and cheese) Aim to eat five portions of fruit and vegetables a day Incorporate more beans and lentils in your diet Aim to eat at least two portions of oily fish a week (omega 3, a polyunsaturated fat is contained in

oily fish and can help protect against heart disease) Restrict sugar and sugary foods Aim for less than 6g of salt intake per day (salt intake greater than this can raise blood pressure, which may lead to stroke and heart disease) Drink alcohol in moderation (a maximum of three units per day for men and two units per day for women is recommended. Alcohol can also lead to hypoglycaemia, therefore it is recommended not to consume alcohol on an empty stomach) Do not use any diabetic food or drinks (these are expensive, offer no benefit over ordinary versions, and may have a laxative effect) Dietary advice and written literature was provided to Mr Smith by the dietician in the specialist team using this information. Mr Smith's body mass index (BMI) was 23 and within the healthy range. A BMI of 20-25 is normal, greater than 25-30 is overweight, and greater than 30 is obese (Matthews et al, 2008, p. 130).

Exercise

Mr Smith's occupation as a train driver means that his working day is fairly sedentary. He does however adopt exercise into his daily routine by walking his dog and attending the gym three times a week. NICE (2004, p. 6) suggests that physical activity can reduce the risk of arterial disease. Mr Smith was offered encouragement to continue his current exercise regime and provided with the rationale for doing so.

Complications

Meeto (2004, p. 644) suggests that the diabetes team play an integral role as educators and facilitators of learning, and therefore are vital to assisting the patient to manage their diabetes to minimize the risk of developing

microvascular and macrovascular complications of the disease. Members of the diabetes team feel it is important to highlight these complications from the outset, and the following complications were discussed between the author and Mr Smith.

Microvascular complications

Microvascular disease causes thickening of the basement membrane of the capillaries which results in leakage or blockage to nutrients and waste substances (Hillson, 2008, p. 270). The following complications can be direct results of microvascular disease:

Retinopathy

Vascular changes in the retina of the eye occurring due to diabetes are classified as diabetic retinopathy. These changes can lead to visual impairment and blindness, and is the commonest cause of blindness in people of working age in Western Europe (Agardh and Agardh, 2004, p. 1187). Metcalfe (2001) suggests there is a strong correlation between poorly controlled diabetes and diabetic eye disease. All patients should have annual retinal screening, and early referral to an ophthalmologist to consider laser photocoagulation to improve prognosis of diabetic eye disease. Mr Smith had retinal screening performed which showed no retinopathy. His details were entered into the retinal screening register to ensure robust annual screening.

Nephropathy

Nephropathy is a medical term for diabetic kidney disease. Symptoms can include tiredness, nausea, loss of appetite, itchy skin, and swelling of the

ankles, hands, and eyelids due to a fluid build up. It can be diagnosed by detecting microalbuminuria in a urine sample sent to the laboratory, or more advanced disease can be detected on urine dipsticks (proteinuria), (Matthews et al, 2008, p. 157). Mr Smith had no protein identified in the urine dipstick performed at the clinic, thus a sample of urine was sent to the laboratory for detection of albumin.

Neuropathy

Diabetic neuropathy is nerve damage which can affect the sensory nerves, autonomic nerves, and the motor nerves (Matthews et al, 2008, p. 137). Mr Smith's feet were reviewed by a podiatrist and information on foot care was provided. SIGN (2001, p. 29) recommends that foot care education should be provided to all patients with diabetes, and screening for foot disease should be performed on an annual basis from diagnosis.

Macrovascular complications

It is recognised that having high blood glucose levels over a period of time can lead to stiffening of the large blood vessels which supply blood to the heart, brain and legs. A particular complication of these large vessels is called atherosclerosis. This occurs when fat deposits and fibrous tissue build up in the vessel wall which can cause narrowing, breakage and rupture, as well as stiffening of the vessels (Matthews et al, 2008, p. 127). The following describes complications of macrovascular disease which can be related to diabetes.

Coronary Heart Disease

The risk of death from coronary heart disease (CHD) is two-to-threefold greater in people who suffer from diabetes (Fisher, 2008, p. 51).

Atherosclerosis causes narrowing of the coronary arteries resulting in angina or myocardial infarction (Meetoo, 2004, p. 647).

Cerebrovascular Disease

Atherosclerosis can cause narrowing of the carotid arteries which carry blood to the brain. The result of this narrowing process can eventually interrupt or reduce the blood supply to the brain and lead to cerebrovascular accidents and transient ischaemic attacks (Matthews et al, 2008, p. 132).

Peripheral Vascular Disease

Peripheral vascular disease affects the blood supply to the peripheral tissues, and usually typically means disease of the foot and legs. Blood flow in the vessels is affected due to atherosclerosis, with the smallest vessels being the easiest to block (Matthews et al, 2008, p. 134). Hillson (2008, p. 273) suggests diabetic tissue damage can be prevented by adhering to the following: Stop smoking Exercise regularly Maintain Blood Pressure <130/80 without hypotension Maintain HbA1c between 6.0% and 6.5% without hypoglycaemia Maintain a BMI between 18.5 and 25 Keep cholesterol <4 mmol/l, LDL <2 mmol/l, and triglycerides <1.7 mmol/l Treat microalbuminuria Avoid added salt in diet Myhill et al. (2008) recognises that patients with latent autoimmune diabetes of adulthood have a similar risk of disease related complications as those suffering from Type 2 diabetes

mellitus, and therefore cardiovascular risk management should be of the same intensity.

Occupation advice

Mr Smith had already discussed with his occupational health department that he suspected he had diabetes. Regular assessments were planned by the occupational health department to support Mr Smith in his employment and consider any modification's required for his role, and frequent updates were requested from the consultant looking after the gentleman's diabetes care.

Evaluation

Mr Smith returned to the clinic six weeks later. The glutamic acid decarboxylase antibodies (GAD) results returned positive, confirming a diagnosis of latent autoimmune diabetes of adulthood. The gentleman's symptoms of hyperglycaemia were subsiding, however capillary blood glucose monitoring recorded by Mr Smith illustrated persisting elevated blood glucose levels in the ranges of 10.0 - 14.0 mmol/l. A prescription for glicazide 80mg twice daily with breakfast and evening meal was provided. Rubin and Jarvis (2007, p. 191) describes glicazide as belonging to a group of drugs called sulphonylureas. Their mechanism of action is to stimulate the beta cells in the pancreas to produce more insulin, however they can cause hypoglycaemia. A capillary blood glucose level of <4.0mmol/l is defined as hypoglycaemia. Symptoms are varied, and hypoglycaemia is classified as mild, moderate, and severe depending on these symptoms (Matthews et al, 2008, p. 87). The author provided verbal advice and written literature to Mr

Smith on hypoglycaemia, and discussed how to treat the symptoms if they occurred. Arrangements were made for Mr Smith to attend six monthly reviews at the secondary care clinic where he will be reviewed by the members of the multidisciplinary team. As well as this, contact numbers for the diabetes specialist nurses were provided to the gentlemen to facilitate easy access to specialist advice if required. At subsequent reviews, Mr Smith's HbA1c result was 6.3% with only rare mild hypoglycaemia in which he has good warning signs. His cholesterol level is 4.0 mmol/l, blood pressure is within target ranges and there is no evidence of any microvascular complications. At present Mr Smith is feeling well and is embracing self management of his diabetes, and he is having no difficulties in continuing his employment as a train driver.

Discussion and Recommendations

Mr Smith's diagnosis and management has highlighted the importance of acknowledging that an alternative diagnosis must be considered when assessing patients who do not stereotypically fit into the categories of Type 1 or Type 2 diabetes mellitus. As specialists in the field of diabetes, members of the team have presented the case of Mr Smith to their colleagues on numerous occasions. It is hoped by doing this, we will ensure people presenting to primary and secondary care suffering from latent autoimmune diabetes of adulthood are diagnosed correctly by healthcare professionals, and robust management is initiated to ensure best outcomes for the patient. Through being involved with the care and management of Mr Smith and writing this case study, the author has identified that a large body of

knowledge and information is available on Type 1 and Type 2 diabetes. However, virtually no literature is available to provide to patients on latent autoimmune diabetes of adulthood. This has been recognised as a flaw in our service, and the author has proposed to the team that written literature should be developed to support patient education.

Conclusion

This case study has described the physiological differences between Type 1 diabetes, Type 2 diabetes, and latent autoimmune diabetes of adulthood, as well as how the disease affects the body. The process of assessing and diagnosing diabetes has been explained, and the significance of establishing a correct diagnosis has been identified as key to facilitating robust management of the disease. A first-rate educational package has been illustrated as essential to empower the patient to manage their diabetes and achieve recommended target's to reduce the risk of complications. The author has developed exceptional knowledge of latent autoimmune diabetes of adulthood from being involved with Mr Smith's care and researching current literature, and will utilise this expertise to develop the recognition of this type of diabetes.