

The Challenges of Diabetes Diagnosis in Adult Populations in Primary Care Settings

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Abstract

Presentation

A 43-year-old male presented with a ten-day history of abdominal pain, urinary frequency, and nocturia.

Diagnosis

HbA1c and serum glucose levels revealed results consistent with a diagnosis of type 2 diabetes mellitus.

Treatment

The patient was prescribed 500mg of metformin and scheduled a follow up appointment with a diabetes practice nurse for a full work-up and discussion of lifestyle modifications.

Discussion

The importance of an accurate diagnosis between type 1 and type 2 diabetes is crucial, particularly in patients who present atypically with signs, symptoms, and characteristics from both categories.

Introduction

The prevalence of diabetes is estimated to be over 415 million worldwide and rising, contributing to significant strains on patients' quality of life and health services.¹ Diagnostic overlap in tests for type 1 (T1DM) and type 2 (T2DM) diabetes can present clinical challenges since each condition requires specific treatment approaches and the failure of prompt, appropriate action can lead to devastating short- and long-term consequences. Diagnosis in young people is typically straightforward, but previous reports have demonstrated that accuracy becomes more challenging in older populations.²

Case Report

A 43-year-old male presented to the general practice office with a ten-day history of lower abdominal and back pain, urinary frequency, and nocturia. There was no presence of fever, hematuria, dysuria, nausea, vomiting, or recent weight loss. He had no significant chronic medical conditions, surgical history, allergies, nor regular medications. His body mass index (BMI) was estimated to be less than 30. Social history was noncontributory. Family history consisted of a grandparent with a diagnosis of diabetes of unknown type. A urine sample demonstrated elevated glucose levels, trace protein levels, and no leukocytes, nitrites, blood, or ketones. A fingerstick blood test revealed a glucose level of 16.4mmol/L. A second same-day blood test was obtained in the emergency department which revealed a blood glucose of 10.0mmol/L. A second blood test was conducted the following day which revealed a blood glucose level of 10.8mmol/L and an HbA1c of 68mmol/mol (normal <42mmol/mol). The patient was diagnosed with T2DM, in accordance with the diagnostic guidelines outlined by American Diabetes Association and was prescribed 500mg of metformin to be taken twice a day.³ Follow-up appointments with the diabetes practice nurse demonstrated improved glycemic control, negating the need for specialist referral or for further testing of diabetes-specific autoantibodies.

Discussion

Clinical features along with glucose tests are often enough to distinguish between T1DM and T2DM.³ Overlapping features may include polydipsia, polyuria, and a family history of autoimmune disease, while distinguishing features may include age, BMI, or symptoms of diabetic ketoacidosis (DKA).⁴ A classic representation of T1DM is a younger patient with weight loss, while T2DM is an older patient with a high BMI. However, for adult patients who present atypically with features associated with both types of diabetes, this heuristic becomes ineffective. This is illustrated here, where an adult patient, who presented initially with abdominal and back pain (often a manifestation of DKA) with a short time-course of marked urinary frequency and nocturia, was ultimately diagnosed with T2DM.⁴

Although it is true that most adult diabetes cases fall under T2DM, studies have shown that the incidence of adult T1DM is higher than might be expected. One study, using data from 379 511 participants enrolled in the UK Biobank, reported that the incidence of T1DM diagnosed in individuals under the age of 30 (749/1286; 58%) was comparable to those diagnosed over the age of 30 (537/1286; 42%).² These trends were reflected in an Irish study, citing incidence rates of T1DM in individuals under age 35 (671/1527; 43%) to be similar to those over age 35 (535/1527; 35%) (Figure 1).⁵ There was also a significant positive linear relationship between age and incidence of T1DM amongst all age groups ($p=0.014$).⁵

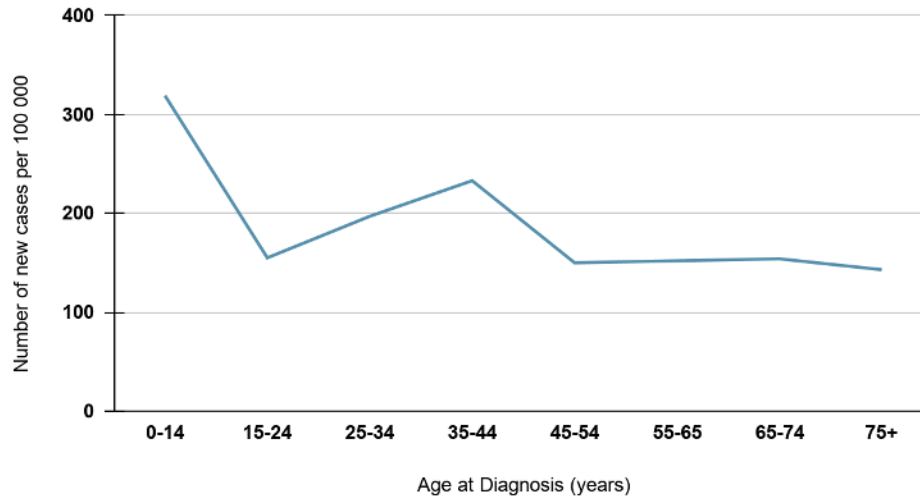


Figure 1: The number of new type 1 diabetes cases per 100 000 in the Irish population. Adapted from Gajewska, 2020.⁵

Indeed, physicians can find it challenging to arrive at an accurate diagnosis of diabetes in adult populations (Figure 2).^{2,6,7} Even established diagnostic algorithms, such as the UK National Institute for Health and Care Excellence (NICE) guidelines, are only able to demonstrate sensitivity and specificity rates of 81% and 41% respectively when tasked with identifying adults with known T1DM.⁷ Furthermore, certain distinguishing features may not be as indicative as previously thought (Table 1). For instance, some studies found that adults with T1DM are more likely to be overweight or obese compared to children with T1DM.⁸

Table 1: Clinical Features of T1DM and T2DM^{3,10}

Clinical Features	Type 1 Diabetes	Type 2 Diabetes
Ketoacidosis	Common	Rare
Hypoglycemia	Common	Rare
Weight Loss	Common	Uncommon
Peripheral or Hepatic Insulin Sensitivity	Normal or Decreased	Decreased
Insulin Levels	Low or Absent	High or Normal
Glucagon Levels	High or Normal	High or Normal
Time Course of Symptoms	Days to Weeks	Months to Years
Severity of Symptoms	Marked	Variable
Age	Any (most commonly during adolescence)	Any (most commonly during later adulthood)

Diagnostic accuracy is of utmost importance in patients with T1DM, who are at risk of developing DKA if glycemic control with insulin is not initiated promptly. The rate of DKA hospital admissions in adult populations with T1DM increased significantly between 1998 to 2013 in the United Kingdom, and those found to be at highest risk of admission were adults with less than a one-year history of T1DM.⁹ While our patient was diagnosed with T2DM, physicians should routinely consider the possibility of T1DM in adults presenting with symptoms and blood tests results suggesting a diagnosis of diabetes, particularly in primary care settings where most cases present. Furthermore, clinicians should consider the possibility of pancreatogenic diabetes (T3cDM), most commonly caused by chronic pancreatitis but can also result from pancreatic cancer, hemochromatosis, cystic fibrosis, or pancreatic resection.¹⁰

Declaration of Conflicts of Interest:

The authors have no conflicts of interest to declare.

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