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MISDIAGNOSIS OF TYPE 2 DIABETES AS TYPE 1 IN OVERWEIGHT ADULTS: A CASE-BASED ANALYSIS OF MANAGEMENT AND OUTCOMES

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Abstract

Ten years ago, at the age of 28, an overweight man aged 38 received a diagnosis of Type 1 Diabetes Mellitus (T1DM). His diabetes stayed under control throughout ten years while doctors adjusted his insulin therapy each year without signs of diabetic ketoacidosis developing. Laboratory reanalysis showed high C-peptide markers (5.0 ng/mL) pointed toward well-functioning pancreatic tissues alongside negative autoimmune test results, which led to establishing T2DM as the new diabetes condition. Switching his treatment to the oral antidiabetic medicines metformin and sitagliptan helped him achieve substantial medical benefits through dropping 13 kilograms of weight together with an HbA1c reduction to 6.6%, allowing him to stop taking insulin completely. The correct diagnosis requires C-peptide testing because it distinguishes between Type 1 and Type 2 Diabetes so healthcare providers can select proper treatments that improve patient results.

INTRODUCTION

The metabolic condition diabetes mellitus develops from insufficient insulin manufacturing along with problems with insulin response and damage to insulin synthesis, according to the American Diabetes Association (2024). The diabetic population achieved 537 million cases in 2021, while expert forecasts show this number will grow to 783 million by 2045. Statistics show Type 2 diabetes represents 90 to 95% of diabetes cases since weight problems, along with physical inactivity and family medical history, cause it (CDC, 2023). Since 1980 the World Health Organization documented a worldwide increase of diabetes cases by four times (according to 2023 data). Type 2 diabetes occurs most commonly among people of white background who are older than 40, but individuals from African Caribbean, Black African, and South Asian communities develop the condition before reaching the age of 25. **[1]** The healthcare costs of diabetes continue rising because of death statistics, while diabetes control needs immediate improvement to prevent these economic burdens. **[2] [3]**

Clinical Overlap between T1DM and T2DM in Young Adults

The combination of typical β-cell destruction alongside early T1DM symptoms in slender people renders identifying T1DM difficult, and it becomes hard to differentiate T1DM from other diabetes types. Medical professionals now define Type 2 Diabetes Mellitus (T2DM) as a condition characterized by insulin resistance, typically found in people who are overweight or obese. The diagnosis of Type 1 Diabetes Mellitus (T1DM) becomes challenging for physicians who treat patients with Latent Autoimmune Diabetes in Adults (LADA)

because it belongs to the T1DM classification. Detection of autoimmune diseases becomes challenging in obese adults who are overweight because doctors incorrectly identify their medical condition as type 1 diabetes. Medical presentations in specific patients lead to an elevation of incorrect medical diagnoses.[4] [5] [6]

Importance of Accurate Classification

Medical teams need to establish immediate differentiation between T1DM and T2DM therapy because the required treatments substantially diverge. The treatment of T1DM patients includes continuous insulin delivery, but T2DM patients must begin with oral drugs along with medical lifestyle changes. Patients suffer from improper medical care because doctors misidentify the type of diabetes their patients have. Initiating insulin-based therapy for diabetes patients can lead to negative outcomes, including increased susceptibility to low blood sugar episodes [6] [7]. Patients remain untreated against vital treatments for insulin resistance and their metabolic syndrome elements because medical providers make incorrect diagnoses.

Several recent studies highlight this diagnostic dilemma:

Thomas NJ et al. (2018) indicated that forty percent of type 1 diabetes patients get wrong diagnoses of type 2 diabetes because their age and body mass index match the criteria for type 2 diabetes. The early implementation of autoantibody and C-peptide tests is crucial because it helps prevent treatment errors, according to the authors [8]. Two adult patients discussed in Manov et al. (2023) received wrong type 2 diabetes diagnoses after laboratory tests revealed autoantibody presence. The research examples demonstrate the problems that occur when healthcare practitioners base their diagnoses solely on clinical features [5]. Medical research details how an adult male patient experienced successive T2DM treatment until doctors discovered his autoimmune diabetes condition. [7] .According to Al-Musa (2019) , the testing of C-peptide led to a proper diagnosis of T2DM in an obese adult patient after they were initially diagnosed with T1DM due to dependence on insulin. [9]. These studies converge on a common theme: clinical features alone are often insufficient to distinguish diabetes types, particularly in adults outside the classic age brackets or BMI profiles.

Uniqueness and Importance of This Case

This case is clinically significant because it demonstrates the misdiagnosis of T2DM as T1DM in an overweight adult. The author highlights the wrong interpretation of obesity as a disabling T2DM diagnosis, whereas the diabetes literature usually discusses neglected T1DM in elderly patients. Medical professionals treated this patient with insulin for different years while the patient's C-peptide levels remained whole and doctors did not detect any autoimmune markers. Effective oral treatments were delayed while glucose regulation became more complicated, and the patient faced a negative impact on their lifestyle due to this wrong diagnosis. According to new research conducted by Abel and Kevin Xiang at UC Davis, hyperinsulinemia, or excess blood insulin, is the cause of heart failure [10]. The case evidence demonstrates why medical professionals must revisit existing diagnostic methods when patients display atypical behaviors that do not match recognized T1DM/T2DM diagnostic templates.

Case Presentation

The male patient, aged 38, who is overweight, visited the outpatient department because he failed to decrease his weight even though he adhered to dietary changes and regular exercise. At his clinical checkup, the patient did not report any symptoms related to diabetic lapses or metabolic complications.

Medical and Family History:

The healthcare provider diagnosed polyuria and polydipsia in the patient who received a diagnosis of diabetes mellitus when he turned 28 years old. The medical assessments showed he had a fasting plasma glucose of 350 mg/dL alongside an HbA1c of 11.2%. The physician diagnosed Type 1 Diabetes Mellitus (T1DM) based on the existing test results because additional examinations (such as autoantibodies or C-peptide measurements) were not performed. Doctors prescribed twice-daily premixed insulin (Mixtard 70/30) to the patient.

For a duration of 10 years, the patient successfully followed his insulin treatment plan combined with

lifestyle change protocols. His diabetes treatment achieved good results as he avoided all forms of diabetic ketoacidosis (DKA). The patient's doctor needed to raise his insulin dosage throughout the years until his current presentation required 20 IU in the morning and 12 IU in the evening. His measurements included a body weight of 85 kilograms and a height of 169 centimeters, leading to a BMI value of 29 kg/m², which falls under the category of overweight.

Clinical Presentation and Reevaluation:

The patient came to age 38 with persistent weight difficulties that persisted despite food restrictions and physical activity. His current HbA1c measurement reported a value of 7.2%, which showed a moderately controlled glucose level. The physician considered misdiagnosing his diabetes type due to his stable health condition together with no ketosis occurrence and prolonged time using insulin without revealing autoimmune signs.

A diagnostic re-evaluation was undertaken, revealing the following:

- C-peptide level: 5.0 ng/mL (normal: 0.5–2.0 ng/mL), indicating robust endogenous insulin production.
- Renal, liver, and thyroid function tests: Within normal ranges.
- Lipid profile and urine ACR: Normal.
- ECG, fundoscopy, and arterial Doppler studies: No evidence of microvascular or macrovascular complications.

Revised Diagnosis and Management:

The medical team modified the diabetes diagnosis to Type 2 Diabetes Mellitus (T2DM) based on high C-peptide levels and preserved pancreatic beta-cell function without developing DKA. The physician initiated a step-by-step process to decrease insulin medications, followed by starting oral antidiabetic pills.

- Metformin 500 mg TID
- Sitagliptin 100 mg OD
- Multivitamin supplementation

Outcomes:

The patient showed substantial enhancement of their condition during two months of taking oral medication.

- Weight decreased to 72 kg.
- BMI reduced to 25.2 kg/m²
- HbA1c improved to 6.6%.

The patient experienced better health while avoiding any incidents of low blood sugar levels. The patient showed stable blood glucose levels during the period without needing insulin treatment.

Discussion

The current case emphasizes the need for proper diagnosis of diabetes type when doctors first detect hyperglycemia in overweight adult patients. The wrong classification of Type 1 Diabetes Mellitus (T1DM) versus Type 2 Diabetes Mellitus (T2DM) has severe implications that shape both treatment approaches along with long-term results and patients' overall well-being.

Medical professionals diagnosed the patient with T1DM when he was 28 years old through hyperglycemic measurements, including fasting plasma glucose at 350 mg/dL combined with HbA1c of 11.2%, before performing any immunologic or biochemical tests for verification. The traditional technique exists in history, but medical experts currently see it as deficient. The latest diagnostic guidelines state that ambiguous patients, including those older than 25 years and overweight without ketoacidosis, need to confirm their diagnosis by checking autoantibodies such as GAD65, IA-2, and ZnT8 and C-peptide levels [1]. The American Diabetes Association (ADA) Standards of Care 2024 requires biochemical testing as a way to avoid incorrect classifications [11].

The second review found C-peptide levels reached 5.0 ng/mL, thus showing strong β-cell function, which contradicts T1DM, where C-peptide amounts stay substantially low [12]. The patient testified to never experiencing diabetic ketoacidosis, inclusive in the definition of insulin-deficient diabetes. All collected research data points towards a new diagnosis of T2DM, which matches current scientific knowledge regarding diabetes complexity in patients.

Mechanistic Insights into Pathology and Disease Progression:

Beta cell destruction through autoimmune mechanisms brings about complete insulin deficiency in people who have T1DM. T1DM exists as the opposing condition because it begins with β-cell destruction before showing progressive insulin deficiency. Adults who slowly lose β-cell function and need some insulin, along with signs of metabolic syndrome (like a high BMI), might be mistakenly diagnosed with T1DM, but they actually fit better with T2DM or LADA. Laboratory evidence of increased C-peptide indicates ongoing insulin production, which validates that the patient has insulin-resistant diabetes instead of T1DM with β-cell autoimmunity.

Clinical-Pathological Correlations:

Patients reveal clinical indicators that help establish their diagnosis. His continued use of insulin prolonged stability in glucose control alongside minimal occurrences of hypoglycemia and DKA-related problems. The patient requires only 32 IU of insulin per day at age 38, which deviates from typical T1DM patients who need increasing dosage amounts because they become entirely dependent on insulin [13].The patient achieved swift therapeutic improvement after stopping insulin treatment and then starting metformin and sitagliptin therapy by losing 13 kilograms of weight and reaching a normal BMI of 25.2 kg/m² and normalizing HbA1c to 6.6%. Insulin resistance stands as the main pathophysiological factor because the patient achieved successful glycemic control using oral medications that improve insulin sensitivity and incretin pathways.

The phenomenon of misdiagnosis is well-documented. Thomas and Jones (2023) observed in their review that adult patients who develop type 1 diabetes normally receive a misdiagnosis of type 2 diabetes because health professionals struggle to implement C-peptide and autoantibody tests in primary care settings [14]. Similar cases where adults with high BMI and preserved C-peptide were misclassified for years, leading to unnecessary insulin therapy [14] [15] [16]

The ADA 2024 and EASD 2024 guidelines urge clinicians to use a structured diagnostic strategy incorporating antibody screening and C-peptide measurement to prevent misclassification [17]. Early differentiation impacts not only therapy (insulin vs. oral agents) but also patient education, psychosocial counseling, and risk factor management, including cardiovascular disease prevention.

In this case, guideline-directed care enabled a paradigm shift in management, improving patient autonomy, quality of life, and potentially long-term prognosis.

Key Learning Points

- C-peptide testing is an essential, underutilized tool in diabetes classification.
- Adult-onset diabetes without DKA and with overweight status warrants thorough investigation before labeling as T1DM.
- Misclassification can lead to unnecessary insulin use, treatment fatigue, and increased healthcare costs.
- Early guideline-based diagnosis improves clinical outcomes, patient satisfaction, and reduces healthcare burden.

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