

Is diabetes mellitus complicated by ketoacidosis in the elderly always latent autoimmune diabetes of the adult?

Introduction

Diabetic Ketoacidosis (DKA) which is seen usually in Type 1, latent autoimmune diabetes of the adult (LADA) and rarely in Type 2 Diabetes Mellitus (DM) is a acute complication.^{1,2} It is the cause of 50% of hospital admissions due to diabetes in young patients and also 1-2% of all diabetic hospital admissions. According to United States database, the annual incidence of DKA is 4.6-8 episodes per 1000 diabetic patients. The mortality rate in developed countries is reported to be between 2-10%. There is 20% mortality over 65years age.

Case 1

66year-old female patient was admitted with confused concious and impaired orientation. Vital signs in the initial evaluation of the patient were as follows. TA: 100/70mm Hg, respiratory rate 28/min, heart rate 124/min, fever 38.4C. Upon admission, blood glucose was determined as 651mg/dl in the emergency department. Arterial blood gas analysis was consistent with metabolic acidosis with increased anion gap. The patient's urine analysis was evaluated as ketone positive. She was diagnosed as pneumosepsis (confirmed by physical examination, blood and sputum cultures) and diabetic ketoacidosis. The patient was treated with diabetic ketoacidosis treatment protocol. The patient had history of hypertension, but no history of DM in either herself or her family. Her height, weight, BMI were 160cm, 75kg, BMI 29.3kg/m², respectively. The patient's HbA1c was determined as 10.5%. C-peptide level of the patient was lower than normal (1.8ng/ml), the antibody was negative. Treatment was regulated with diet and frequent intermittent subcutaneous insulin therapy. She was considered to be diabetic ketoacidosis diagnosed firstly as hyperglycemic crisis.³⁻⁵

Case 2

80year-old male patient was admitted to our emergency department with confused conscious. The patient's vital signs were stable. The blood glucose level was measured as 718mg/dL, urinalysis was ketone positive,arterial blood gas analysis was as follows : pH 7.01, pCO₂ 20.4mmHg, HCO₃ 3.5mmol/L, Na: 137mmol/L, Cl: 107mmol/L. The patient was treated as diabetic ketoacidosis and urinary tract infection. He had HbA1c level of 10.4%, C-peptide <12:10ng/ml, islet cell antibody positive (1:32), anti GAD> 2000IU/ml (<10), insulin antibody 40.62% positive. The patient who were diagnosed at 65years age and followed for 15years was hospitalized to the clinic with diabetic ketoacidosis. He was evaluated as LADA due to the positive antibodies.

Discussion

DKA can be seen in the elderly, whether autoimmune DM or not. Along with insulin deficiency, elevated catecholamine activates cortisol and growth hormone sensitive lipase and causes the

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destruction of triglycerides and the release of free fatty acids. They are used for making ketone bodies, beta-hydroxy butyric acid and acetoacetic acid. Acetoacetate is converted to acetone with non-enzymatic decarboxylation and ketone bodies produced are partly excreted in urine. At physiological pH, ketoacids are separated and increased hydrogen ions reduce serum bicarbonate levels by connecting bicarbonate. Ketone bodies with in the form of anions in circulation increase anion gap. Metabolic acidosis with increased anion gap occurs with reduced bicarbonate level. The mortality rate increases with age in DKA, while the rate is 10% under 75years of age, 19% between 79-84years of age and reaches 35% over 85years. There is no difference in DKA treatment according to age. It is an acute complication of diabetes regardless of age. Autoimmune diabetes should be kept in mind in the differential diagnosis, while assessing each patient.

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Conflict of interest

Author declares that there is no conflict of interest.

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