Case Report

# Flatbush diabetes – An entity not to be missed- interesting case report

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## ABSTRACT

Diabetes is an endocrinological disorder and one of the most common diseases for which admission is warranted. To classify, diabetes is important as various subtypes have different natural history and management. Atypical diabetes or Flatbush diabetes is an entity between Types I and II. Its pathophysiology is poorly understood as the patients usually present with episodes of diabetic ketoacidosis but has glutamic acid decarboxylase antibodies negative and no insulin deficiency. Here, we present an interesting case of atypical diabetes which is an entity not to be missed by clinicians in their practice.

**Key words:** Antibodies, Atypical diabetes, C-peptide, Flat bush diabetes, Type 1B diabetes

Diagnosing diabetes is not difficult, but it is important to classify it keeping in view the natural history and management. In some asymptomatic patients or with mild symptoms, laboratory diagnosis is the only finding to label a patient. Diabetes is a large group of metabolic disorders with varied presentations characterized by hyperglycemia, but it is important to ensure etiology and pathophysiology accurately in every patient. With 90% of patients compromising Type I and II diabetes, atypical cases of diabetes are infrequent and need a proper classification of these cases for proper management. Flatbush diabetes is atypical diabetes which is common in Africa [1].

Here, we present a rare case report, in which the patient was evaluated fully and fitted in the definition of atypical diabetes or so-called Flatbush diabetes. Clinicians should know this condition since the pathophysiology and natural history are somewhat different from the usual Type I or II diabetes.

## CASE REPORT

A 50-year-old male presented in the emergency department with complaints of polydipsia and polyuria for the past 1 week. For the past 2 days, he also complained of dyspnea, nausea, and six episodes of bilious vomiting. For the past 1 day, he complained of pain in the epigastric region, fever up to 100 degrees Fahrenheit, and dry cough. There were no neurological complaints. Personal and family history was non-contributory.

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On examination, the patient was conscious, cooperative, and well oriented to time, place, and person. His body mass index was 27 kg/m$^2$. His pulse was 110 beats per minute regular with good volume, no special character, and no vessel wall palpable. His blood pressure was 126/76 mmHg in the left arm in the supine position. There was no postural fall of his blood pressure. His respiratory rate was 34/min. His Glasgow coma scale was 15/15. Pallor, cyanosis, jaundice, lymphadenopathy, dependent edema, jugular venous pressure, and clubbing were not present. His tongue and axilla were dry. He had acanthosis nigricans on the neck. His cardiovascular, nervous system, respiratory, and abdominal examination were normal.

Investigations were done, which showed hemoglobin of 13.1 g/dL, total leukocyte count of 13,600/cu mm, and platelet count of 270,000/mm$^3$. Liver function tests showed serum glutamic pyruvic transaminase levels of 31 IU/L, serum oxaloacetic transaminase levels of 39 IU/L, alkaline phosphatase levels of 194 IU/L, bilirubin total 0.9 mg/dL, and albumin 3.7 g/dL. Renal function tests showed blood urea nitrogen – 16 mg/dL and serum creatinine – 1.0 mg/dL. Electrolytes were done and the values were sodium – 136, potassium – 3.7, and chloride – 103. Random blood glucose was 445 mg /dL, and urine ketones were four plus. Glycated hemoglobin (HbA1C) was 10.5% by high-performance liquid chromatography method. Fasting connecting (C) peptide levels after glucose control were 0.84 ng/ml (normal – 0.81–3.85). Arterial blood gas analysis (ABG) was done, which showed pH of 7.01, bicarbonate (HCo3) 3.3 meq/L, partial pressure of carbon

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dioxide (PCo2) 12.9 mmHg, partial pressure of oxygen (Po2) 140 mmHg, serum lactate levels of 3.2 mmol/L, and oxygen saturation on room air 99%. Anion gap calculated was 34 and serum osmolality was 312 mmol. Chest X-ray, ultrasound abdomen, and electrocardiogram were normal. A working diagnosis of diabetes with high anion gap metabolic acidosis was made.

The patient was treated conservatively with crystalloids, potassium infusion, regular insulin infusion, and empirical antibiotics. The patient improved over the next 72 h and his ABG showed a pH of 7.44, HCo3 of 23.9, PCo2 of 32, and PO2 of 141 on oxygen 3 L/min. Anion gap improved to 12 and urine ketones were negative. The patient was discharged on premixed insulin, statins, and medical nutrition therapy. His glutamic acid decarboxylase 65(GAD) antibodies and islet cell antibodies were negative. The patient was followed up, and premixed insulin 30:70 was titrated as per fasting and postprandial sugars. After 3 months of follow-up, his HbA1C was 6.5% and the patient was shifted on 1 g metformin and statins were continued.

Summarizing our case, the patient presented with osmotic symptoms, on investigations diagnosed as high anion gap metabolic acidosis. A diagnosis of diabetic ketoacidosis (DKA) was made. The patient improved early with the therapy and on follow-up his HbA1C improved, the patient had negative antibodies, and normal C- peptide levels (levels were in the normal range). A diagnosis of atypical diabetes or Flatbush diabetes was made.

## DISCUSSION

Flatbush diabetes is common in Africa. It was named after an area in New York [1] in the United States, where it was first described. It has got other names such as atypical diabetes, Type 1B diabetes, type 1.5 diabetes, atypical diabetes, and ketosis-prone Type 2B. The Aβ classification system for people with ketosis-prone diabetes is shown in Table 1 [2]. As per this classification, our patient falls in Type 2B ($A^{-}\beta^{+}$) since there were no antibodies and no evidence of loss of beta-cell function. Ekpebegh *et al*. [3] found that patients with $A^{-}\beta^{+}$, which is consistent with type 2 DM, comprised the majority of presentations (almost half of all admissions). The hallmark of Flatbush diabetes is as follows: (a) Present with sudden onset and extremely high BG levels (DKA) (as in our case), (b) the patients are insulin-resistant with acute, severe defects in insulin secretion without islet cell autoantibodies (as in our case), (c) following treatment early recovery is there and insulin secretion is recovered (as in our case), (d) if not obese, normal insulin sensitivity is not uncommon, and (e) HBA1c of 10–12 are not uncommon(as in our case).

**Table 1: Aß classification [2]**

| Subgroup | Features |
|---|---|
| Type 1A ($A^{+}ß^{-}$) | Positive autoantibodies but no evidence of beta-cell function |
| Type 1B ($A^{-}ß^{-}$) | No antibodies and no evidence of beta-cell function |
| Type 2A ($A^{+}ß^{+}$) | Positive autoantibodies and evidence of beta-cell function |
| Type 2B ($A^{-}ß^{+}$) | No autoantibodies and evidence of beta-cell function; the most common subgroup |

Flatbush diabetes seems to be somewhere between Type 1 and Type 2 [4]. Primarily seen in persons of sub saharan african descent, but Asians, Hispanics, and Caucasians can be diagnosed with Flatbush diabetes [5,6]. The mean age at diagnosis is 40 years (range: 33–53 years). It is not associated with HLA typing and there are no antibodies against the beta cells. The patient may be overweight such as our patient and has a male predominance, such as in our case. These patients may have some insulin resistance. These patients of atypical diabetes are not at increased risk for cardiovascular events unlike insulin resistant patients with type 2 diabetes mellitus. Differences in visceral, not subcutaneous adipose tissue volume, seem to determine insulin sensitivity. These can have spontaneous remission and long-term insulin independence. Therefore, lifelong therapy may not be required.

The major distinguishing feature of Flatbush diabetes and other forms of diabetes and also seen in our case is that when very high blood sugars are brought down with insulin, some (as in our patient) do quite well on oral medicines and/or lifestyle choices that are not as common in Type 2 DM patients. This syndrome of episodic diabetic ketoacidosis without immunologic markers of Type 1 diabetes is characterized by insulin dependence at the time of presentation but followed by the absence of insulin requirements for years, as observed in Type 2 diabetes. Some patients with flatbush diabetes have relapse and may have another episode of DKA. There are many case reports in the literature where Type 2 DM is presented as ketoacidosis and had recurrent episodes of DKA, but the patient was GAD65 negative [7]. After 10 years, about 60% need insulin for good control, which is close to the type 2 rate of insulin use. Flatbush is becoming more common in Africa and the Americas, accounting for 50% of the cases among African Americans who first present with DKA. In India, also, there are a few case reports of Flatbush diabetes [8].

Very less is known about the pathophysiology [9]. It appears that they are sensitive to the temporary damage to the beta cells by glucotoxicity and lipotoxicity. When these conditions are reversed, the beta cells are able to recover. There seems to be a combination of insensitivity to insulin and transient loss of ability to release insulin. Severe glucotoxic blunting of an intracellular pathway, leading to insulin secretion, may contribute to the reversible beta-cell dysfunction characteristic of KPDM patients. But still, complete pathophysiology is still unknown. There may be several subtypes of Flatbush diabetes. Some need insulin for control. Poor control may be precipitated by an infection. If there are antibodies, they probably are Type 1.

## CONCLUSION

Being aware of the other forms of diabetes helps us to spot cases, as a correct diagnosis is important in the treatment plan design and prevention of future DKA episodes. By bringing out this case report, we try to bring an important entity usually missed because this entity is not thought of and one should be careful

when a patient which is not diagnosed with type 2 DM presents with DKA.

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