

Type 2 Diabetes mellitus in a Nigerian child: a case report

*Otaigbe BE, Imafidon EE

Paediatric Care Hospital, 8C Elelenwon Street, GRA Phase 2, Port Harcourt, Rivers State, Nigeria

Abstract

Background: Type 2 diabetes mellitus initially said to be an adult disease is now reported in children and adolescents in the developed countries because of increased incidence of obesity and sedentary habits associated with westernization and lifestyle changes. There is a paucity of reports from Africa

Method: A 9year old overweight female with a BMI of 28kg/m² and a strong family history of DM in at least two generations presented with polyuria and weight loss. The mother had gestational diabetes and is on oral hypoglycaemics. Fasting blood sugar was 11.9mmol/l. Urinalysis had +1 of glucose, no ketones. She was managed with diet control and exercise.

Result: The patient has remained euglycaemic in the past two months without drugs and is losing weight.

Conclusion: Type 2 diabetes mellitus is being reported in an obese Nigerian child with a family history of DM and high socio-economic class. Routine screening of overweight children with a family history of DM is recommended.

Key words: Type 2 Diabetes mellitus, obese, Nigerian, child

African Health Sciences 2011; 11(3): 454 - 456

Introduction

Before 1980, Type 2 diabetes mellitus (T2DM) was rarely reported, accounting for <2% of all cases of paediatric DM,¹ however a recent increase in incidence in children and adolescents has been documented in several populations paralleling the increase in prevalence and degree of obesity in children and adolescents².

Recent data collected between 2002 and 2003 showed the percentage of Type 2 diabetes mellitus among all new paediatric diabetic cases in 10 to 19 year olds in the USA was 14.9% for Caucasians, 46.1% for Hispanics, 57.8% for African Americans, 69.7% for Asian/Pacific Islanders, and 86.2% for American Indians³. In Japan up to 80% of all new cases of paediatric DM are T2DM⁴. Given the rising rates, it is believed that T2DM will be the predominant form of DM among children from a variety of ethnic backgrounds by 2015.⁵ In Nigeria, the only reported case of T2DM is in a 15year old female⁶. An internet search did not show any more from other parts of Africa. This is therefore, to the best of our knowledge, the youngest presentation of T2DM in an African child.

Case report

A 9-year old female presented in a clinic with a one month history of weight loss and excessive urination of 3days duration. There was no history of polyphagia, polydipsia or dysuria. The mother is a known diabetic diagnosed with gestational diabetes 3 years ago and presently on oral hypoglycemics. A fasting blood sugar (FBS) done at home was 11.6mmol/l.

The child is the second of three children in an affluent family but her siblings are well. There is a positive family history of diabetes in mother, maternal grandmother, maternal grand aunt, paternal uncle and paternal grandmother. Findings on examination were those of an overweight child (BMI-28kg/m²) not dehydrated with no evidence of acanthosis nigricans. Weight at presentation was 54kg. Systemic examination was essentially normal. Random blood sugar at presentation was 11.9mmol/l, and Urinalysis showed +1of glucose and absent ketones. A provisional diagnosis of Type 2 diabetes mellitus was made.

The patient and parents were counseled and patient placed on dietary control with elimination of high-calorie beverages such as juices, soda, reduction of foods with high glycaemic index such as table sugar, ice cream, white bread etc and increased intake of food with low glycaemic index such as pasta, skim milk, sweet potatoes, as well as reducing portion of food and increasing exercise. The aim was to achieve the expected weight for age.

*Correspondence author

Dr Barbara Otaigbe
Paediatric Care Hospital
8C Elelenwon Street
GRA Phase 2, Port Harcourt
Rivers State, Nigeria
Phone no: +2348023193927
E-mail: barbiejoe64@yahoo.com

Tests for insulin antibody and antiglutamic acid decarboxylase (anti-GAD) were negative. Cortisol level was normal with a value of 232.76nmol/l (240-418nmol/l), cholesterol level was elevated at 5.6mmol/l (<5.0mmol/l). The electrolyte results were within normal ranges with Sodium 137mmol/l (128-142mmol/l), Potassium 4.4mmol/l (3.4-4.8 mmol/l), Bicarbonate 25mmol/l (24-30 mmol/l), Urea 3.3 mmol/l (2.4-6.0mmol/l) and creatinine 75mmol/l (60- 120mmol/l). HbA1c was not done. A definitive diagnosis was Type 2 Diabetes Mellitus.

Results

Of a 2-week alternate day FBS (with patient on diet and exercise) showed values ranging from 4.8-8.3mmol/l. Blood glucose has remained between 4.8 and 5.3 mmol/l and the patient has lost 2kg. She is on weekly follow up visits with regular monitoring of her FBS and urinalysis. Parents have been counseled on the possibility of commencing oral hypoglycaemics and possible insulin if glycaemic control is not maintained.

Discussion

Type 2 Diabetes Mellitus is a relatively new diagnosis in childhood in the developing countries and seen because of westernization and health style changes. There is an emerging risk associated with T2DM in overweight children.⁷ Between 74% and 100% of children diagnosed with T2DM will have a primary or secondary family member with the disease, and girls are 1.7 times more likely than boys to develop it.¹ Our patient is a 9 year old overweight female with a BMI of 28kg/m², has strong family history of DM in at least two generations and is of African origin. The first cases of T2DM among children recorded in the United Kingdom were in 8 girls between ages 9-16, of Pakistani, Indian or Arabic origin, all overweight and with family history of DM.⁸

The clinical presentation can vary from being asymptomatic to very ill with or without the classical symptoms of polyuria, polydipsia, weight loss, hyperglycaemia and glycosuria with or without ketosis.⁹ Our patient had polyuria, weight loss, hyperglycaemia and glycosuria.

The preferred screening test is a fasting plasma glucose test, which rarely misses children with asymptomatic or silent T2DM. However it may miss individuals with impaired glucose tolerance and early beta-cell dysfunction.⁹ Markers of T1DM namely glutamic acid decarboxylase 65 (GAD65), islet cell

antigen 512 (ICA512) and IAA (Insulin autoantibody) may be positive in up to one third of the cases of adolescent T2DM¹ but usually absent in T2DM. The GAD65 and Insulin antibody were absent in our patient. Type 2 diabetes mellitus is a chronic and progressive condition if left untreated but has well established treatments which can delay or prevent the consequences of the condition such as neuropathy, blindness or any other blood sugar complications, though the underlying tendency to hyperglycemia may still remain.

Treatment of T2DM in the paediatric population remains challenging because of the difficulty of successfully employing lifestyle changes. The most successful intervention combines dietary changes, exercise, and behavioral modification. Efforts should focus on eliminating high-calorie beverages such as juices, sodas, and energy drinks.⁹ The patient has done well on diet and exercise only.

The only pharmaceutical agents approved for treating T2DM in the paediatric population are metformin and insulin. Metformin has a modest secondary benefit of moderating weight gain and even inducing mild weight loss in the paediatric population¹⁰. Where T2DM is not well controlled by diet, exercise and life style modification, or in the early stage of the disease, insulin therapy are crucial for glycemic control.⁹

Conclusion

There are few reported cases of Type 2 DM in children in the world and fewer still in children from the developing world. A high index of suspicion is needed in an overweight child with hyperglycaemia, family history of DM, high socio-economic group and of African race. Routine screening of overweight children with a family history of DM is recommended.

References

1. American Diabetes Association; type 2 diabetes in children and adolescents. American Diabetes Association. *Diabetes Care*. 2000; 23 (3):381-9.
2. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA*. 2006; 295(13):1549-55.
3. Dabelea D, Bell RA, D'Agostino RB Jr, et al. Incidence of diabetes in youth in the United States. *JAMA*. 2007; 297(24):2716-24.

4. Pinhas-Hamiel O, Zeitler P. The global spread of type 2 diabetes mellitus in children and adolescents. *J Pediatr*. 2005;146(5):693-700.
5. Alberti G, Zimmet P, Shaw J, Bloomgarden Z, Kaufman F, Slink M. Type 2 diabetes in the young: the evolving epidemic: the international diabetes federation consensus workshop. *Diabetes Care*. 2004; 27 (7):1798-1811.
6. Anochie IC, Tabansi PN, Type 11 diabetes mellitus in a 15-year-old female with congenital hypothyroidism. *Port Harcourt Medical Journal* 2010; 5: 105-9.
7. Fagot-Campagna A Emergence of type 2 diabetes in children: epidemiologic evidence. *J Pediatr Endocrinol Metab* 2000;13 Suppl. 6:1395-402.
8. Ehtisham S, Barret TG, Shaw NJ. Type 2 diabetes mellitus in UK children, an emerging problem. *Diabet Med* 2000; 17(12) 867-71
9. Bradon M. Nathan, MD, the increase of type 2 diabetes mellitus in children. www.minnesotamedicine.com/Pastissues/Pastissues2007/November2007/ClinicalNathanNovember2007.aspx.
10. Freemark M, Bursey D. The effects of methformin on body mass index and glucose tolerance in obese adolescents with fasting hyperinsulinemia and a family history of type 2 diabetes. *Pediatrics*. 2001;107(4):E55.