Hypertriglyceridemia in a boy with Bardet-Biedl Syndrome – Case Report

Małgorzata Wójcik MD PhD, Katarzyna Roguska MSc , Dawid Piotrowski, Agata Zygmunt-Górska MD, Dominika Januś MD PhD ,Prof. Jerzy B. Starzyk MD PhD
Department of Pediatric and Adolescent Endocrinology, Chair of Pediatrics, Institute of Pediatrics, Jagiellonian University Medical College, Kraków, Poland

Introduction

Bardet-Biedl syndrome (BBS) is a rare autosomal recessive ciliopathy characterized by retinal dystrophy, obesity, post-axial polydactyly, renal anomalies, mental retardation and hypogonadism. BBS diagnosis is confirmed by sequencing of 16 known *BBS* disease-causing genes, which encode proteins responsible for formation of BBSome and chaperonin complex, which interact with *BBS3* (a GTPase) to mediate ciliogenesis and organization of the cilium. Defective immotile cilia possess a "9+0" configuration resulting in left-right asymmetry, which is caused by disturbed bidirectional interflagellar transport of particles required for cilium maintenance and developmental cell signaling including Wnt and hedgehog pathways leading to BBS (Fig.1)

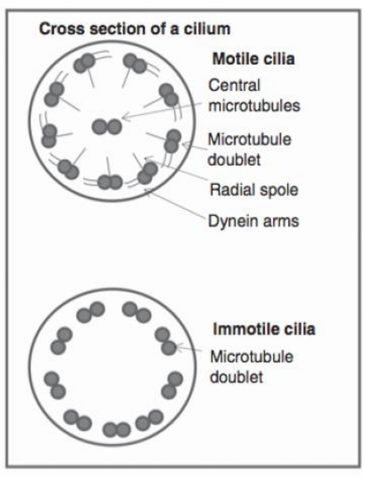

Fig.1. Structure of BBSome forming cilium (Adapted from Baker et al 2009).

Patient

INITIAL PRESENTATION

Male patient admitted at the age of 16 months

Physical Examination:

- upper and lower extremities polydactyly
- current severe central obesity (BMI 28 kg/m2)
- recurrent upper airway infections
- psychomotor retardation
- severe gastroesophageal reflux disease

Initial Diagnosis: Bardet-Biedl syndrome type 2

EVALUATION AND DIAGNOSIS

Genetic examination: 46, XY karyotype

Psychiatric examination:

- severe mental retardation
- no speech development until 10 y/o
- mental development of 2 y/o at the age of 9.5 y/o
- no reaction to vocal and visual gestures at 9 y/o
- partial deafness in the left ear

	16 months/o	11 years/o	8 weeks post fenofibrate
TGL	**3.01 mmol/L**	**8.41 mmol/L**	**1.82mmol/L**
LDL cholesterol	3.11 mmol/L	2.13 mmol/L	3.31 mmol/L
HDL cholesterol	0.94 mmol/L	0.70 mmol/L	4.6 mmol/L
AST	36 U/L	29.7 U/L	22.7 U/L
ALT	20 U/L	34.1 U/L	30.4 U/L
TSH	2.56 µIU/mL	2.44µIU/mL	
Cortisol at 8 a.m.	-	5.6 ng/mL	
Fasting serum glucose	4.4 mmol/L	4.4 mmol/L	
Fasting serum insulin	2.13 µIU/mL	9.8 µIU/mL	
Serum glucose (120)	-	4.9 µIU/mL	
Serum insulin (120)	-	58.9 µIU/mL	
HOMA-IR		0.4	

Table.1. Selected results of the biochemical tests

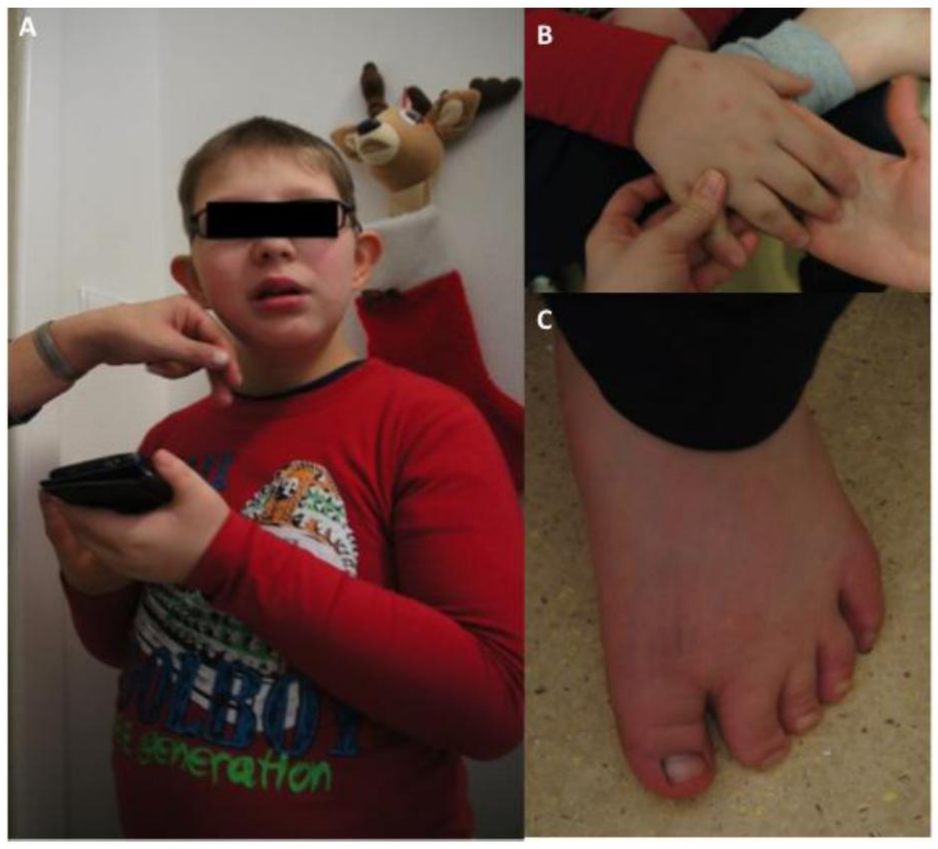

Fig.2. Images of patient presenting dysmorphic features of BBS. (A) demonstrates typical facial features: low-set ears, flat nasal bridge, deep set eyes. (B-C) deformed phalanges including the brachydactyly and scars from excision of accessory phalanges

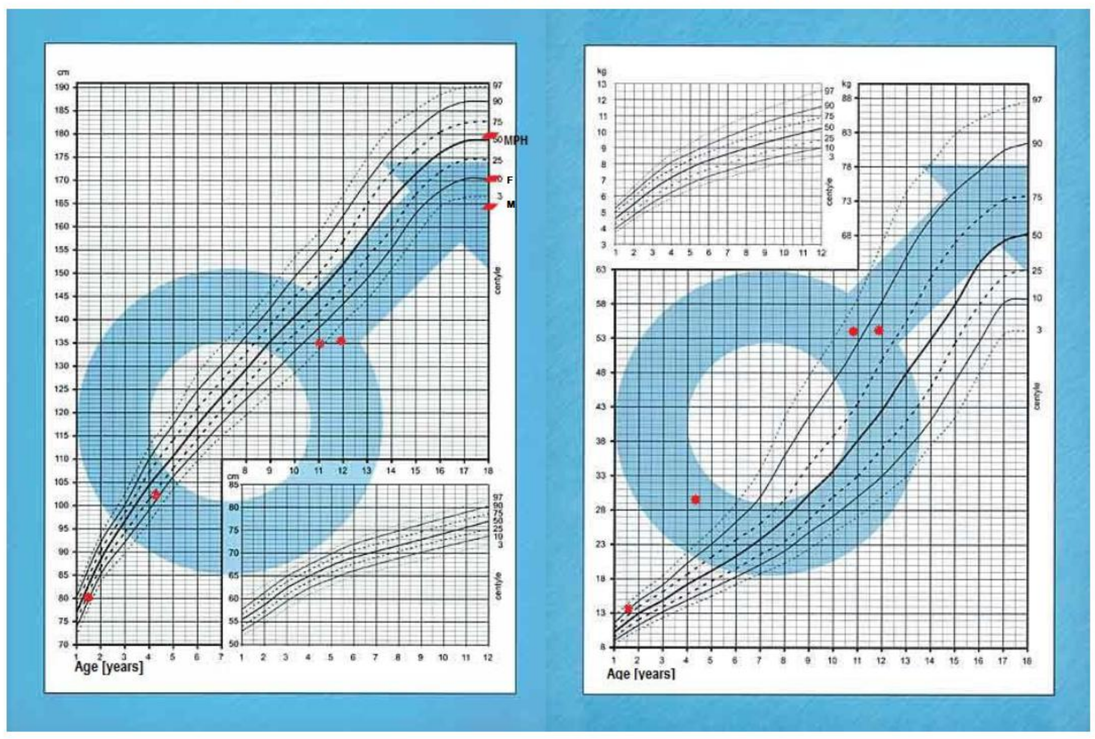

Fig.3. Patient's growth charts

DIAGNOSIS

Severe hypertriglyceridemia typically results from genetic origin. Family history was negative therefore familial form and secondary hypertriglyceridemia were excluded. The increased TG levels in this patient cannot be a result of typical endocrinopathies due to correct hormone levels. The combination of central obesity, high TG and decreased HDL suggests occurrence of metabolic syndrome although insulin levels are within range (Tab.1).

TREATMENT

Low fat diet was unsuccessful with resulting permanent severe elevated TG level (8.41 mmol/L). Administration of fenofibrate resulted in significant decreased of TGL (1.82 mmol/L) after 2 months. No adverse effects of fenofibrate have been noticed.

Conclusion

This case study describes the first case of BBS with hypertriglyceridemia which is a novel sign to the syndrome that cannot be explained by accompanying diseases, diagnosed up to date. Treatment with fenofibrate in BBS patients may be effective and safe.

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