Bardet-Biedl Syndrome With Gait Ataxia: A Case Report

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Citation

M Joshi, V Jain, N Jajoo, A Jain, S Kumar. *Bardet-Biedl Syndrome With Gait Ataxia: A Case Report*. The Internet Journal of Internal Medicine. 2007 Volume 7 Number 2.

Abstract

Bardet-Biedl syndrome (BBS) is a rare autosomal recessive condition characterized by retinitis pigmentosa, dysphormic extremities, central obesity, ataxia, and renal involvement1. We report probably the first case of BBS with documented gait ataxia from South East Asia. The diagnosis had been missed many times until the patient presented at our hospital. The relevant literature has also been reviewed.

INTRODUCTION

Bardet–Biedl syndrome (BBS) is a rare genetic disease which is autosomal-recessive in nature. It is characterized by obesity, mental retardation, dysphormic extremities (syndactyly, brachydactyly or polydactyly), retinal dystrophy or retinitis pigmentosa, hypogonadism and renal anomalies (amongst the dominant features)$_1$.BBS is a rare disease with prevalence rates of 1:140000 to 1:160000 in North America and Europe, respectively$_2$. Only case reports are available from Asian and Australian continents.

CASE REPORT

A 20 year old young male presented with symptoms of acute onset ataxia and severe anemia. He was born of nonconsanguineous parents, and had brachydactyly (fig-1) in all four limbs. His initial motor and mental development milestones had been normal. History of gradually progressive diminution of vision since the age of 3 years and presently had developed complete blindness. His parents had noticed him to be overweight since childhood. Presently he had symptoms of anemia with history of recent onset ataxia. He had no history of seizures, or any hearing loss.

Figure 1

Figure 1: Brachdactyly

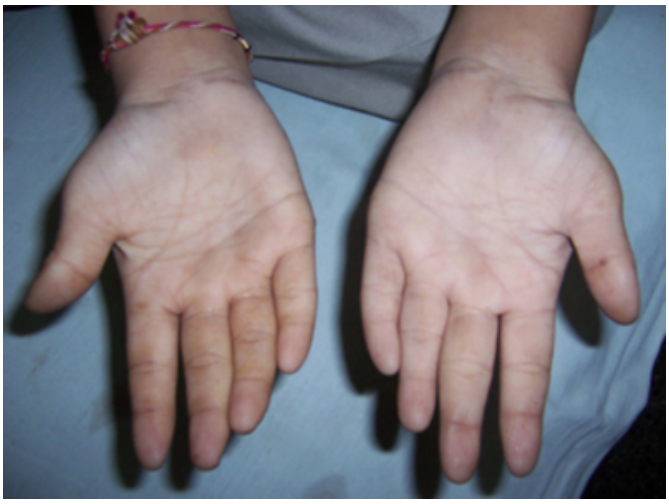


Figure 2

Figure 2: Retinitis pigmentosa

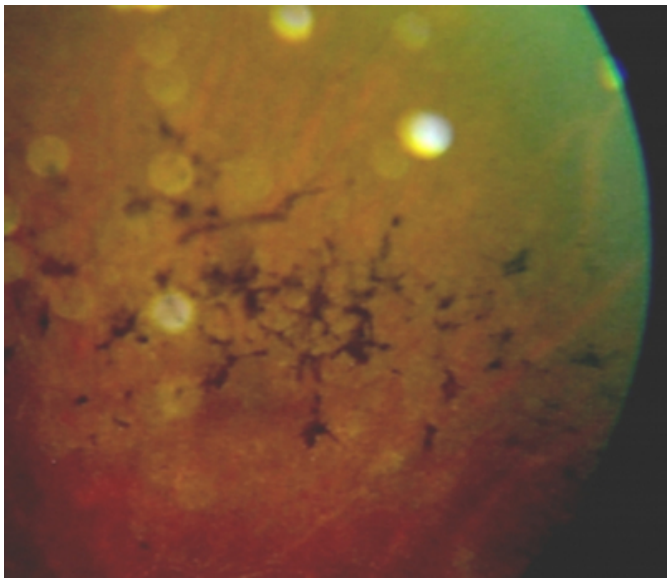
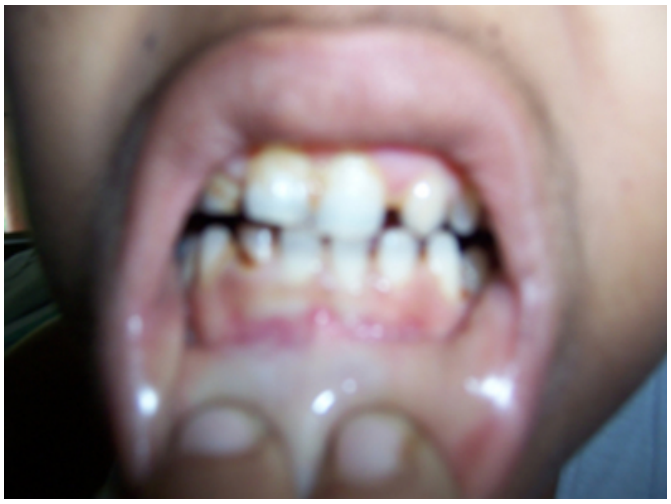


Figure 3

Figure 3: Dental anomalies



On examination, he was found to be obese (body mass index: 31 kg/m^2); and pale. There was no pedal edema. The blood pressure was 110/70 mm of Hg. Cardiovascular, respiratory, and abdominal examinations were normal. His vision was restricted to perception of light in both eyes, and bilateral gaze-evoked nystagmus was present. Fundus examination revealed retinitis pigmentosa with bilateral optic atrophy (fig-2). On oral examination he had Dental crowding and hypodontia (fig-3). He also had high arched palate.

Nervous system examination showed signs of gait ataxia. No evidence of peripheral neuropathy was found. Features of hypogonadism were present. His secondary sexual characters were not well developed. Investigations revealed hemoglobin of 3.6 gm/dl,and MCV 106.9. His blood urea was 35 and serum creatinine was 1.1 mg/dl.

Ultrasonography revealed no renal anomalies. Echocardiography and EEG was normal. His CT scan brain was within normal limits.

DISCUSSION

Bardet Biedl syndrome, a rare autosomal recessive disorder, was first described by G Bardet and A. Biedl in early 1920's. Till 1970 it was assumed to be a part of the Laurence moon syndrome. But Amman recognized it as a distinct entity with cardinal manifestations of obesity, retinitis pigmentosa, polydactyly, mental retardation, and hypogonadism[3, 4]. About 11 different genes have been associated with the disease and mutations of these BBS genes account for the heterogeneity of the disease presentation. BBS1 locus is the most commonly involved genetic defect found in European patients The BBS4 locus appears to be the next most common gene defect found. The exact pathogenesis of BBS is unknown. It has been recently recognized that proteins coded for by the BBS4, BBS6, BBS8, and BBS10 genes are expressed in the basal body of cilia, and BBS is now regarded as one of the 'ciliopathies.' The gene products are probably involved in the signaling pathway in the cilia; abnormalities interfere with normal development, resulting in the diverse pathological effects of the syndrome.[5]

Initially the diagnostic criterion used to identify these patients was given by Schachat and Maumenee. In 1999 Beales et al defined a new improved criterion for the diagnosis of the condition. They found that the cardinal manifestations of BBS were limb abnormalities, most commonly postaxial polydactyly (70-90%), pigmentary retinopathy (90-100%), central obesity (70-95%), and renal involvement (25-100%). Complete form of this syndrome is very rare[6]. The neurological defects in these patients are slowly progressive spastic paraparesis. Ataxia is rare in BBS. A new scheme for diagnosing BBS is proposed (table -1), which should be helpful particularly in children[7].

Figure 4

Table 1: Modified diagnostic criteria

Primary features

Four features are required to be present of:

- Rod-cone dystrophy
- Polydactyly
- Obesity
- Learning disabilities
- Hypogonadism in males
- Renal anomalies

or

Three primary plus two secondary features are required of:

Secondary features

Speech disorder/delay

- Strabismus/cataracts/astigmatism
- Brachydactyly/syndactyly
- Developmental delay
- Polyuria/polydipsia (nephrogenic diabetes insipidus)
- Ataxia/poor coordination/imbalance
- Mild spasticity (especially lower limbs)
- Diabetes mellitus
- Dental crowding/ hypodontia/small roots/high arched palate
- Left ventricular hypertrophy/congenital heart disease
- Hepatic fibrosis

Ataxia has been documented rarely in Bardet-Biedl syndrome but is associated with the Laurence-Moon syndrome along with long tract signs. Many subjects (and their relatives) complain of clumsiness, discoordination, and poor balance and cite the latter as their main mobility problem, far outweighing the inconveniences of blindness. The lower limbs appear to be more severely affected than the upper limbs, which may in part be because of the weight on the lower limbs exaggerating the signs or a structural deformation of the spinocerebellar tracts. CT/MRI of the brain of these patients failed to show any isolated structural abnormality of the cerebellum which might account for these findings. In our case also CT brain was normal.

Management of BBS is supportive and includes training and rehabilitation for blind and mentally retarded patients, hearing aids for deafness, and diet and exercise for obesity. Organizations such as the Foundation Fighting Blindness and the Laurence-Moon-Bardet-Biedl Society provide emotional and social support and help in all-round development. Early and regular screening for hypertension, diabetes, and renal involvement is required, because most common cause of death is renal failure.

References

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