BARDET BIEDL SYNDROME : A CASE REPORT

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Summary

Bardet Biedl Syndrome is multisystem genetic autosomal recessive disorder characterised by progressive retinal dystrophy,obesity,mental retardation, hypogonadism,polydactyly and renal dysfunction.To date,fourteen genes have been cloned.Herein we discussed a patient with BBS who had some cognitive impairment.

Key words : Bardet bardet biedl syndrome; coromosome; ciliopathic

Introduction

Bardet Biedl Syndrome(BBS) is a rare genetic multi-system disorder is named after George Bardet and Arthur Biedl in 1920[1], affects less than 2,00,000 people in US population. Two forms of BBS have been identified, Bardet Biedl Syndrome 1 (BBS_1) has no linkage to cromosome 16, Bardet Biedl Syndrome 2 (BBS_2) is mapped to markers on chromosome 16.

This syndrome is a human ciliopathic (defect in cellular cilliary structure) genetic disorder of variable expressivity and wide range of clinical variability. Fourteen gene have been identified, BBS_1 to BBS_{14}. The BBS protein are located in the basal body and cilia of the cell[2]

Bardet Biedl Syndrome is inherited as autosomal recessive disorder. The recessive gene is carried by approximately 1 in 179 people. It is characterized by primarily deterioration of cone and rod cells in the retina of eye (progressive retinal dystrophy) with night blindness usually by the age 9 years and legal blindness often occurring by age 15 years. Post axial polydactyly, short stubby fingers and/or toes, more frequently in the feet than hands, webbing of toes, trunchal obesity usually begins at 1 or 2 years of age with hyperphagia occur in some patients[3]. Hypogonadism in male, renal abnormalities, learning difficulties, mental retardation[4]. There is wide range of secondary features that are sometime associated with BBS[5] including speech delay/ disorder[6], retinitis pigmentosa, strabismus, cataract, near sightedness, glaucoma, astigmatigrn[7], brachidactyly, syndactyly.The developmental delay includes gross motor skill, fine motor skill, psychological skill (interactive play/ability to recognize social cues termed as mild autism.

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Other features are polyuria, ataxia, mild hypertonia, diabetes mellitus, dental crowding/hypodontia, high arched palate, cardiovascular anomalies, Hepatic involvement, anosmia[8,9], auditory deficiencies, hirchsprung disease, multiple pigmented nevi.

Case report

A 12 years old male child of consanguineous parent from Bashkhali, Chittagong admitted to Chittagong Medical College Hospital with the complaints of yellow coloration of upper sclera and urine for 1 month, visual problem for 6 years. Visual problem first started with night blindness, later the boy became totally blind. The boy delivered at home at term by normal delivery without any antnatal, intranatal and post natal complication. According to mothers statement the birth weight of baby was a bit higher. Postaxial polydactyly was noted on both feet at birth. In infancy the boy was more obese than his peer, there was gross developmental delay e.g. sitting was at 1 years of age, walking at 2. years of age and speech was at 3 years of age. Mother complains that the baby had no eye contact from beginning, he did not play with other child, remain at home selfly. The boy was the 3rd issue of clinically healthy parent. There was a history one sib born with polydactyly of both hands and feet wit larger birth weight and died at 2 days of life. Other 3 sibs were alive and normal.

Physical examination reveals the patient had slightly long face, long filtrum and slightly short neck with high arched palate and yellow coloration of upper sclera. There were multiple pigmented nevi on face, postaxial polydacyly of both feet, short and stubby hand and feet, single palmer crease on left hand, wide carrying angle, pendulous abdomen, hepatospleenomegaly. Sexual Maturity rating (SMR stage) revealed absence of pubic hair, preadolescent testis and penis (SMR stage is retarted/<10 year stage). Minimental state examination (MMSE) revealed score 17 (< 20 is associated with cognitive impairment) Ophthalmic examination revealed characteristic sino pigmento with low visual acuity (hand movement and finger count from meter) and myopia (7 diopters). There was no renal disease. He was 123 cm long and weight 25 kg. Basal gonadotropin level & hematological profile were normal, liver function test revealed obstructive jaundice.

Based on the history and clinical presentation, the child was diagnosed to have Bardet Biedl syndrome.

Treatment

Bardet-Biedl Syndrome can be difficult to diagnose,especially in the young, because many of the symptoms are not yet obvious and vary considerably from one patient to another patient.

As there is no known cure, physicians concentrate on the treatment of specific organs and systems.There is no known treatment for progressive vision problems that occur in persons with BBS.However,there is much that can be done to prepare for a life with low vision.An ophthalmologist and other vision professionals can assist in making life for sufferers.

Discussion

The BBS were initially described by Bardet and Biedl in 1920s[12,13]. It is clearly different from a condition reported by Laurence and Moon in 1865. Prevalence rates in North America and Europe range from 1: 140,000 to 1: 160,000 live births, in Kuwait and Newfouland the rate is much higher.

The cellular mechanism is not clear, but BBS protein is evident to be components of the centrosome and basal body and have an impact on ciliary transport[11, 12]. The BBS1, BBS2, BBS3 and BBS4 gene contribute to ocular phenotype[2]. The BBS10 gene encodes a vertebrate specific chaponin like protein[12]. The BBS9 and BBS11 genes are expressed in adipose tissue[14,15].

Bardet Biedl Syndrome is characterized by retinal dystrophy; limb abnormality, obesity, renal disease, mental retardation and hypogonadism. Retinal dystrophy is the major feature present in 100% cases. There is atypical pigmentary retinal dystrophy of the photoreceptors with early macular changes[10,12]. In this case there is pigmentary lesion with reduce visual acuity which started from early childhood.

Obesity is the second major feature of BBS with a frequency of 72% - 96%. Obesity usually begins in childhood, majority of cases exhibiting symptoms within first year of life. Here history from mother reveal that the baby had higher birth weight and he was more obese than his peer, but recently he reduces weight due to anorexia.

Limb abnormality is the third major feature of BBS with varying frequency[11,13]. Post axial polydatyly, brachydactyly of both hand and feet are most common. Syndactyly, fifth finger clinodactyly and increase gap between the first and second toes are also associate. Post-axial polydactyly, brachydactyly of both hand and feet are present in this case but no syndactylies are present.

Mental retardation is present in BBS. An IQ of 79 or below is found in 44% cases. The decrease IQ level correlates with the presence of visual handicap[11, 12]. In our reported case IQ testing is done by mini mental state examination (MMSE). MMSE reveals his score is below 17 which indicate cognitive impairment.

Hypogenitalism is more frequently found in male than female[11,12]. Bardet Biedl Syndrome male has small penis and testis in 88% cases[12,13], here the baby has pre adolescent testis and penis with retarded SMR grading.

Renal dysfunction has been recognized recently to be a component of the BBS . Renal malformation in BBS had been reported infrequently. In one study, 46% patient had renal structural abnormalities. In this case there are no renal abnormalities.

With the major diagnostic features of BBS, multiple minor features have been documented at varying frequencies. These include developmental delay, speech and language deficit, psychosis, facial dismorphism, multiple pigmented nevi, neurological abnormalities, hearing loss. Metabolic and endocrine disturbance of dentition and liver function, anal atretia and hirchsprung disease [11,13] are also observed. Our patient has developmental delay, some pigmented nevi. These features might be considered a secondary feature for diagnosis.

Conclusion

Bardet Biedl Syndrom is rare genetic disorder, is diffiicult to diagnose and treat. There is no known cure. One should be cautious to evalute such a patient and concerntrate on the treatment of specific organs and system.

Disclosure

All the authors declared no competing interestes.

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