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Case Report

Bony Deformity in Bardet Biedl Syndrome – A Rare Case Report with X-RAY Findings

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Abstract

Bardet Biedl syndrome is a rare autosomal recessive condition which has a wide spectrum of symptoms. This syndrome was first described by Bardet and Biedl in 1920. The incidence is 1 in 100,000 with a higher prevalence in Arab and Bedouin populations wherein the incidence is 1 in 13,500. Chromosomal tests are available which can be done prenatally as well as postnatally. The most common clinical presentation is retinal dystrophy and the cause of mortality in most patients is End stage Renal Disease. This case report describes the presentation of a 16 year old Indian girl with this rare ciliopathy.

Key Words: Autosomal Recessive, Bardet Biedl Syndrome, Ciliopathy, Hypothyroidism, Obesity.

Introduction:

Bardet Beidl Syndrome is a rare autosomal recessive disorder, belonging to the family of ciliopathies.[1,2] The cardinal symptoms of this condition comprise of rod-cone dystrophy, central obesity, polydactyly, complex female genitourinary malformations, cognitive impairment, male hypogonadism, and renal dysfunction.[3,4] The secondary features include speech disorders, strabismus, cataract and astigmatism, craniofacial dysmorphism hepatic fibrosis, ataxia brachydactyly or syndactyly, nephrogenic diabetes insipidus, developmental delays, congenital heart disease and diabetes mellitus.[2] According to a study by Beales et al. if four cardinal or three cardinal plus two secondary features are present, then it is diagnostic of Bardet Biedl syndrome.[2]

Mutations have been detected in 16 different genes (*BBS1-BBS16*;BBS – Bardet Biedl Syndrome) out of which four distinct BBS loci have been mapped.[5, 6, 7,8] They are 11q13 (BBS1) – which is the most common, followed by 16q21 (BBS2), 15q22.3-q23 (BBS4) and 3p(BBS3). BBS3 is the rarest of all.[8,9,10]

Other ciliopathies with which BBS shares phenotypic traits include Joubert (JBTS), Alström (ALMS) and Meckel (MKS) syndromes.[11,12] Another syndrome which closely resembles BBS is Laurence Moon syndrome. Till 1970, they were considered as a single entity – known as Laurence moon Bardet Biedl syndrome (LMBBS). Since they do not share phenotypic traits, they are now referred to as two separate conditions. Presence of progressive spastic paresis is characteristically seen in Laurence Moon syndrome while polydactyly is seen in BBS.[13]

Case report:

A 16 year old Indian girl, born out of a third degree consanguineous marriage presented with deformity of both lower limbs since the age of one and half years, when she had begun walking. The child was observed to be obese since the age of 3 months although her birth weight was 2.8 kilograms. She is also unable to see distant objects clearly. There was no developmental delay, but she goes to a special school, where her performance is satisfactory.

She was evaluated for the deformity at the age of 7 and was diagnosed to have bilateral tibia vara. Corrective osteotomy for the left tibia and temporary lateral epiphysiodesis for the right tibia were performed and the deformities were corrected. She did not follow up since the age of 8 years.

She presented at the age of 15 with pain abdomen and recurrence of deformity. She gave a history of irregular menstrual cycles since 7 months following surgery for right torsion of the ovary. She also presented with history of recurrent urinary tract

infection and inability to see distant objects clearly. Hence she was collectively evaluated by department of obstetrics and gynaecology, ophthalmology, medicine and orthopaedics.

On general examination, she was conscious, cooperative and oriented .Her BMI was found to be 42.1 (height – 164 cm, weight – 114 kg), hence she is morbidly obese. In the right hand, the 4th and 5th fingers, syndactyly was observed along with polydactyly. No thyroid swelling, no neurocutaneous markers were present.

Orthopaedic evaluation revealed waddling gait with windswept deformity of the knees - right side – 20 degree valgus and left side 35 degree varus. No other deformities or limb length discrepancy was observed. **(Figure No. 1-5)**

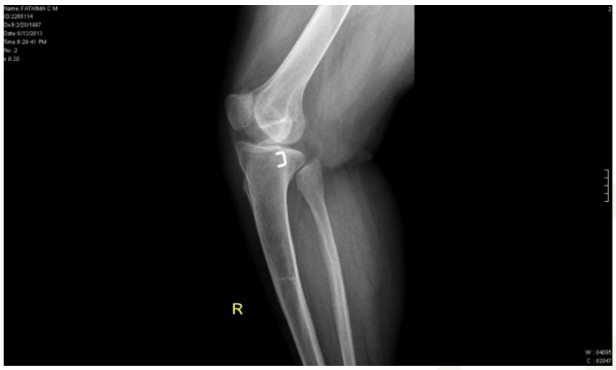

Figure No. 1

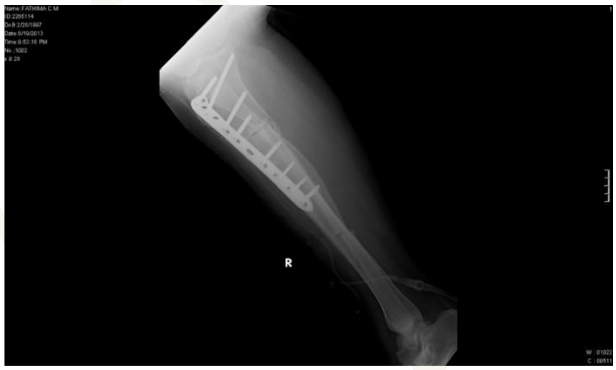

Figure No. 2

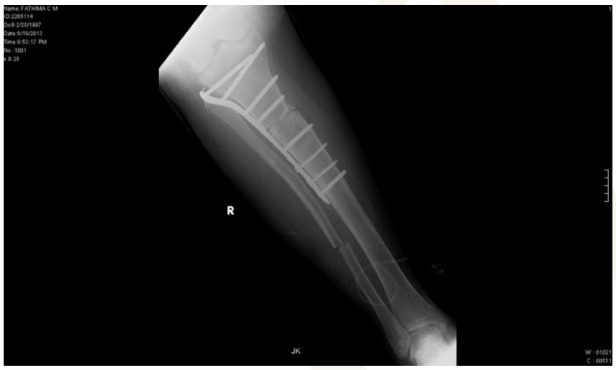

Figure No. 3

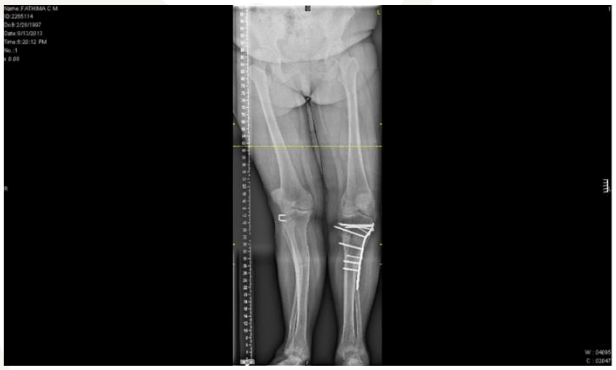

Figure No. 4

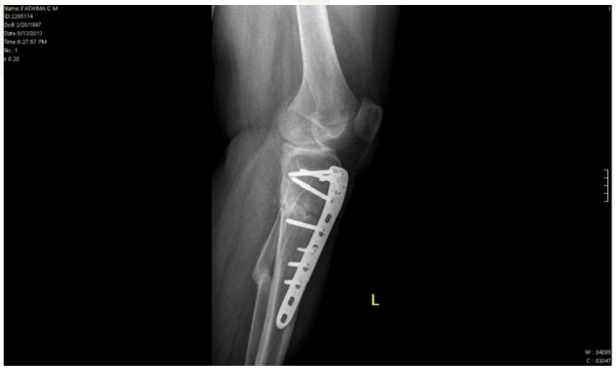

Figure No. 5

Opthalmologic evaluation suggested high myopia. There was no evidence of retinitis pigmentosa. Patient did not cooperate for Goldman's parametric analysis. A complete thyroid and sugar profile was done based on which a diagnosis of hypothyroidism and diabetes was made and she was started on medications for the same. Echocardiography was done which was normal. On ultrasound of the abdomen, a small left ovary was seen and the right ovary was absent. Secondary sexual characters are not well developed, breasts not completely developed. She is currently admitted for correction of the deformity of the knee.

Discussion:

Bardet Biedl syndrome is a multisystem, rare autosomal recessive disorder. The patient here presented with obesity, syndactyly, polydactyly, hypothyroidism, diabetes mellitus and hypogonadism and fulfills 'Beales criteria' for diagnosis of Bardet Biedl syndrome. This case report describes the presentation of Bardet Biedl syndrome along with skeletal deformities - Deformities of the knee associated with recurrence.

Various other rare associations have been reported in patients with Bardet Biedl syndrome such as hypokalemic paralysis, dilated cardiomyopathy and renal osteodystrophy.[14,15,16] Some reports also suggest that renal dysfunction is present in almost 100 % patients, the earliest manifestations being polydipsia, reduced concentrating ability and polyuria. A case report describes Bardet Biedl syndrome in a Romanian boy who presented with End stage renal disease at the age of 4.[17] Another case report presents the association of the syndrome to multiple skeletal deformities such as kyphosis, skeletal fractures and bilateral hip dislocation.[15]

Since there is multisystem involvement, the patient must undergo fundoscopic examination of the eyes, blood pressure measurements and urinalysis for glucose, protein and leukocytes. Electrocardiography, echocardiogram, ultrasound of the kidneys and urinary tract should be done to check the progress of the disease and alter management. The patient here has undergone ophthalmologic, gynaecologic, cardiac, orthopaedic and endocrine evaluation. She has been treated symptomatically for Diabetes Mellitus, Hypothyroidism and skeletal deformity. No renal dysfunction or gross visual impairment has been detected yet. Advice has been given to her regarding compliance to medication, diet and regular follow up.

Conclusion:

Although rare, diagnosis of this condition initiates complete evaluation, follow up and undertaking measures that can improve the quality of life of the patients. Visual impairment is the most common manifestation and its progression must be monitored to delay the onset of blindness. It is important to monitor renal function as renal dysfunction is the most common cause of death.

Training, rehabilitation, change in diet, exercise are the main supportive modalities along with regular follow up. Management alters with the progression of symptoms. Diagnosis of the condition is confirmed by genetic evaluation. Chromosomal tests are available which can be done prenatally and postnatally. This enables evaluation of similar cases if suspected in the family. The life expectancy varies with the severity of symptoms and course of management.

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