Research Paper Medical Science

Spondyloepiphyseal Dysplasia Congenita

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ABSTRACT

Spondyloepiphyseal dysplasia (SED) is a rare, type II collagen disorder characterised by short trunk disproportionate dwarfism with primary involvement of the spine and epiphysis of long bones. Two major forms of this disorder are known: SED Congenita and SED tarda.We present a case of SED Congenita having additional rare features viz. microcephaly and motor developmental delay detectable at the age of 5 years.

KEYWORDS

Introduction

Spondyloepiphyseal dysplasia (SED) was first described in 1966 by Wiedemann and Spranger and now is also known as Wiedemann-Spranger syndrome. SED is a disorder of growth with an abnormality of enchondral ossification affecting the vertebral bodies and the epiphyses of the long bones. Two major forms of this disorder are described viz SED Congenita and SED Tarda. They differ only in the inheritance pattern and age of onset. Many conditions in the same spectrum are also known. SED congenita is inherited as an autosomal dominant condition and is associated with a highly disproportional reduction in growth and severe coxa vara, and the milder tarda form which is an X-linked recessive condition, in which growth in adolescence is defective after normal childhood development. Clinically, SED is characterised by short stature (120 to 140 cm), often significant lordosis, pectus carinatum and may have associated features of myopia, retinal detachment and deafness and also cleft lip-cleft palate and muscular hypotonia

The most consistent radiologic findings in SED are a dysplastic odontoid process, flattened vertebrae and small and deformed (femoral) epiphyses (long-bone metaphyseal involvement is variable) In the cervical spine of children with SED congenita, atlantoaxial instability is the most commonly encountered and most dangerous problem, found in 30-40%. We report a rare case of SED Congenita with features including short stature (short trunk type of dwarfism),lordosis, and radiographic evidence of deformed vertebral bodies, deficient ossification pubes, flattened acetabular roof, flattened and deformed femoral head and additional rare features of microcephaly, motor developmental delay all detectable at the early age of 5 years at which she presented to us.

Case Report

Our case is a 5 year old female child who was brought by her parents with complaints of not gaining height.

she was born at home as a full term normal delivery, low birth weight with immediate cry at birth, and there were no postnatal complications. During pregnancy the mother had no history of any illness, fever, rash, drug intake or radiation/toxin exposure or any other significant antenatal history. The child did not suffer from any systemic disease, chronic illness or significant infections over these 5 year. However by history and by examine the child, we found that her gross and fine motor milestones were delayed. She had learnt to walk at around 18 months age, and was able to climb up and down steps one foot per step only recently at around 4 years age, able to make a circle but not able to make a rectangular, could speak only bisyllables at 12 month of age like mama, papa. her DQ was 70% indicating mil motor developmental delay. Hearing and social interaction was normal and she could understand spoken speech and carry out simple orders. The patient was severely stunted with a height of only 80 cms which was 3 standard deviations below the normal range. Thus falling below the 3rd percentile in the height chart. The trunk was primarily affected. Since the trunk was significantly short, upper segment to lower segment ratio was 1:1 which is lower for this age group. and arm span was infact more than the height i.e. 85 cm. Her weight was 8.2 kg.

She had microcephaly, her head circumference being only 42 cm which is below 3SD. There was no evidence of facial dysmorphism or other congenital anomalies. General examination revealed no abnormality except a wide based waddling gait. Genitalia were normal. Systemic and Neurological exam. was normal in all field.

To summarize, the patient was a case of pathological short stature involving the trunk i.e. short trunk disproportionate dwarfism and hence investigations were done towards findings the disorder that resulted in these features.

Basic routine blood investigations including serum levels of calcium, phosphorus, alkaline phosphatase, blood urea nitrogen and creatinine revealed no abnormality. T3, T4, TSH were normal.

Bone age on X-ray wrist was normal. Radiographs of the skeletal system were done which pointed the likely diagnosis. Detailed radiology of lumbosacral spine revealed the following findings: Deformed vertebral bodies like biconcave shaped or "H shaped" with platyspondyly with central depression and beaking of anterior 1/3rd of vertebral bodies. X-ray report of the pelvis and hip , deficient ossification of pube with pubic diastasis, flattened acetabular roof, flattened and deformed femoral head epiphyses with irregular outline.

The findings on the above X-rays were suggestive of spondy-

lo-epiphyseal dysplasia. abnormal morphology of vertebral bodies with pointed anteriorly and central depression giving rise to dumb-bell shaped vertebra in dorsal and in lumbar region. USG of abdomen and pelvis was normal.

The case was reviewed by orthopedician and radiologist for their expert opinion and the diagnosis of SED was confirmed by clinical and radiological findings, with the possibility of multiple epiphyseal dysplasia and type IV mycopolysaccharidosis (Morquio's syndrome) in the differential diagnosis. However, both these were ruled out because the result of the patient's mycopolysaccharide screen (urinary testing was glycosaminoglycan) was normal and because the involvement of the vertebral column was much more consistent with SED than with multiple epiphyseal dysplasia.

The characteristic clinical and radiological findings at this early age of 5 years suggested early presentation of disease which points the congenita variety of SED.

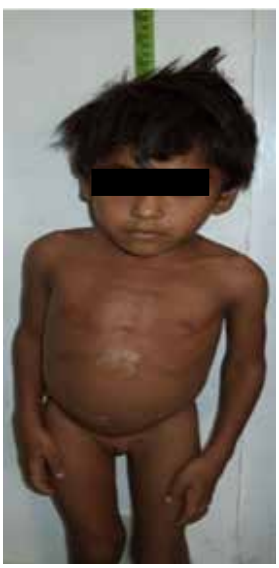

Fig-1-patient Rena,

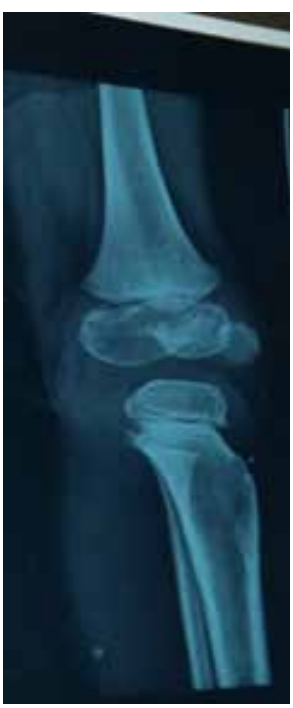

fig2-dysplastic epiphysis

Fig-3

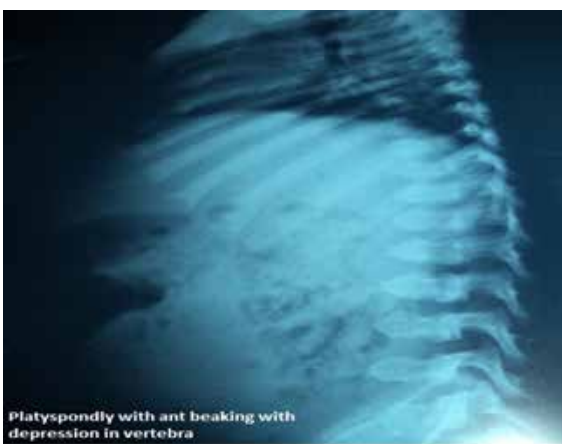

Fig-4 showing platyspondly

Discussion

The term spondyloepiphyseal dysplasia (SED) refers to a heterogeneous group of disorders characterised by shortening of the trunk and to a lesser extent, the limbs. The principal skeletal features are deformation of vertebrae together with distortion of the epiphyseal the extent of which corresponds to the clinical severity. SED is a rare genetic disorder with an incidence of 1-4 per Million populations and is prone to be confused with other conditions of short stature.The signs and symptoms of spondyloepiphyseal dysplasia are similar to, but milder than the related skeletal disorders achondrogenesis type 2 and hypochondrogenesis. These are severe types in the spectrum that are lethal in the perinatal period. The less severe ones include SED congenita and its variants, including Kniest dysplasia (which are apparent at birth and are usually nonlethal),

However in general the disease is divided into two major types, termed SED congenita and SED tarda tarda according to time at onset We discuss here in detail the two main types of SED.

SED Congenita

SED congenita is a rare genetic disorder with a prevalence of approximately 3.4 per million population and incidence rate of approximately 1 per million live births. Most cases result from sporadic mutation. SED congenita is transmitted as an autosomal dominant trait. Occasional cases of autosomal recessive forms have been identified. The gene for SED congenita has been mapped to the long arm of chromosome 12 (12q14.3). SED congenita is caused by mutations in COL2A1 on chromosome 12.

In SED congenita patients, the head and face are usually nor-

mal, but a cleft palate is common. Intelligence is usually unaffected. The neck is short, trunk is very short and the chest may be barrel shaped The hands and feet are of relatively normal size. The disproportionateness and shortening become progressively worse with age and adult heights range from 95 to 128 cms.

Spinal deformities such as thoracolumbar scoliosis, kyphosis, and kyphoscoliosis are common in these patients as is exaggeration of the normal lumbar lordosis. Coxa vara of varying severity is almost universal. A waddling gait may be apparent. clubfeet may be present in some patients Childhood complications including compromise are known to occur from spinal deformities and spinal cord compression due to cervicomedullary instability. Myopia is typical, adults are predisposed to retinal detachment. Other associated conditions include deafness and abdominal or inguinal hernia.

SED Tarda
The genetic modes for SED tarda are The X-linked form has been mapped to the Xp22 region.

In patients of SED tarda the development upto 5-10 years of age is usually normal after which mild disproportionate trunk condition remains unrecognized until the adolescent years, when hip pain or scoliosis develops. The major clinical characteristics of SED tarda are pain, stiffness and limitations to the movements of the lumbar spine and multiple joints combined with a waddling gait Progressive symptomatic osteoarthritis of the hips and knees may be seen.

Atlantoaxial instability may be present and patients may present with neurologic deficits Scoliosis or thoracic kyphosis with exaggerated lumbar lordosis may develop.

Radiographic evaluation in SED
The radiographic characteristics of SED include: A generalised delay occurs in the development of ossification centres. The femoral heads may not be apparent on radiographs until patients are aged 5 years. Irregularities are seen in the epiphyseal regions (when epiphyses appear) and metaphyseal regions in the long bones. Varying degrees of platyspondyly with anterior wedging & narrowing of the intervertebral disc spaces, scoliosis/kyphosis, and pelvic and hip dysplasia are seen.Retarded ossification of extremity bones like the femoral head and humerus is found. Pelvic radiographs show short and small iliac crests, horizontal acetabular roofs and delayed ossification of the pubis. Coxa vara is usually present. Odontoid hypoplasia or os odontoideum is common. MRI and CT scans may be used to confirm the diagnosis. In our patient the classical radiographic features of SED were apparent on spine and hip X-rays as Pathologic evaluation in SED

Diagnosis
Other conditions that can cause similar manifestations should be considered (we had considered in our case too) before making a definite diagnosis of spondyloepiphyseal dysplasia. The very close diffferantional diagnosis was morquio syndrome on basis of radiological findings. But on physical examination of patient there is no coarse facies, no corneal clouding,no oragenomegaly and short stubby hand like in morquio syndrome, also urine exam for GAG was normal.

Treatment and Prognosis
There are no specific medications or other treatment methods against the disease itself because of its heredity. SED is nonlethal and life expectancy is not reduced. However morbidity is increased. Serious deformities and dysfunctions may occur with advanced stage and correction procedures or artificial arthroplasty are therefore recommended in order to improve the patient's quality of life with a better appearance and functionality. With the development of genetics, positioning of SEDL gene has made it possible for preclinical diagnosis of SED and prenatal diagnosis of patient from high-risk family.

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