

Rhizomelic chondrodysplasia punctata (RCDP): A case report.

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Abstract

RCDP is a rare autosomal recessively inherited skeletal dysplasia characterized by rhizomelia, ichthyosis, seizures, repeated infections, congenital cataracts and joint contractures. Radiological features include epiphyseal stippling, metaphyseal abnormalities and clefts in vertebral bodies. We report a case of RCDP in a neonate because of its rarity.

Keywords: Rhizomelic chondrodysplasia punctata (RCDP), Autosomal recessive disorder, Congenital cataract, Ichthyosis.

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Introduction

Rhizomelic chondrodysplasia punctata (RCDP) is a rare autosomal recessive peroxisome disorder characterized by proximal shortening of the arms and legs, ichthyosis, seizures, repeated infections, congenital cataracts and joint contractures [1]. Radiological features of RCDP include punctate epiphyseal calcifications, metaphyseal abnormalities and coronal clefts in the vertebral bodies [1]. RCDP carries a poor prognosis with approximately 60% and 39% cases surviving the first and second year respectively; very few survive beyond 10 years [2]. We report a case of neonatal RCDP which was diagnosed based on the typical clinical and radiological features.

Case Report

A five day old female baby was brought for evaluation of short limbs and decreased length. He was delivered at term by spontaneous vaginal delivery to third degree consanguineous parents. There was no history of any maternal disease or teratogen exposure during the antenatal period. The physical examination showed a weight of 2.75 kg (~ 25th centile), a length of 42 cm (<10th centile), and a head circumference of 34 cm (~ 75th centile). His upper segment to lower segment ratio was 1.8:1. He was disproportionately short infant with no other acute problems. He had proximal shortening of both upper and lower limbs. He had frontal bossing, micrognathia, flat facial feature with depressed nasal bridge and anteverted nares (Fig. 1). Ophthalmic examination revealed cataract in both eyes. The pinnae were normally shaped and positioned. There were no skin lesions. He had a short neck and a barrel-shaped chest. His abdomen was soft with no organomegaly. A skeletal survey demonstrated multiple anomalies including rhizomelic shortening of the extremities. Bony stippling was noted in shoulder, elbow, wrist, hip and knee joints (Fig. 2). Metaphyseal flaring was noted in both humerus and femur. There was a cleft in the



Figure 1. Phenotypic features of RCDP



Figure 2: Upper limb radiograph showing metaphyseal changes

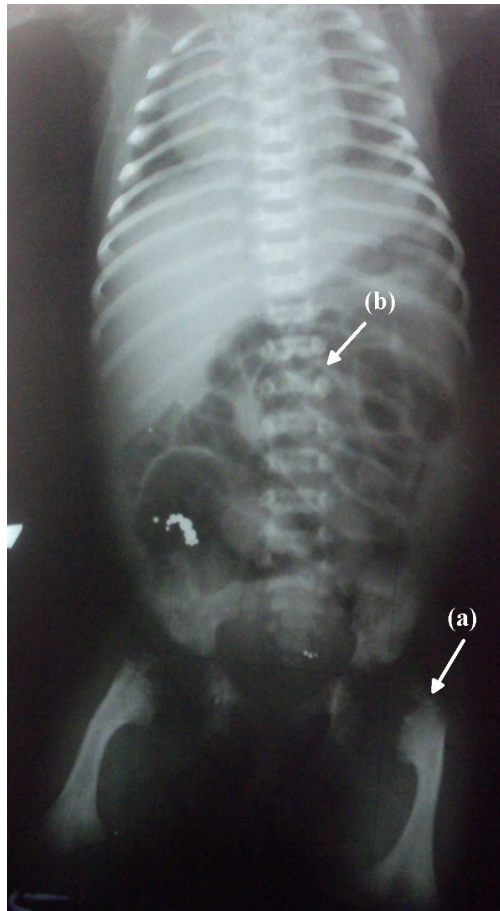


Figure 3: a) Epiphyseal stippling b) Cleft in first lumbar vertebrae

first lumbar vertebral body (Fig. 3). Cranial ultrasonography, echocardiography and abdominal ultrasonography were normal. Based on clinical and radiological findings, a diagnosis of rhizomelic chondrodysplasia punctata was made. Cataract extraction was done to improve the vision. Biochemical tests and genetic assay to identify the mutated gene was not undertaken owing to financial constraints. Genetic counseling was given to the parents. Child is receiving regular physiotherapy and currently under follow up.

Discussion:

Chondrodysplasia punctata (CDP) is a heterogeneous group of disorders characterized by punctate calcifications in epiphyseal cartilage. CDP is classified into four main types, the autosomal dominant (Conradi-Huernermann's type), autosomal recessive (rhizomelic type), the X-linked dominant form (Happle) and the X-linked recessive form.

Rhizomelic chondrodysplasia punctata (RCDP) is a peroxisome biogenesis disorder characterized by rhizomelic proximal shortening of the humerus and femur, ich-

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thyosis, cataracts, restricted joint mobility, micrognathia, flattened nasal bridge, bulbous nose and flattened face appearance [1]. Patients may subsequently develop seizures and severe psychomotor delay. Radiological features of RCDP include epiphyseal stippling, metaphyseal abnormalities and clefts in vertebral bodies. All these classical radiological findings were present in our case. Most of the affected children develop repeated infections and die within first two years. Other malformations observed in individuals with RCDP1 include cleft palate, congenital heart disease and ureteropelvic junction (UPJ) obstruction.

There are three types of RCDP. RCDP Type 1 involves mutations in the PEX7 gene, which encodes enzymes responsible for peroxisome function [3]. RCDP Types 2 and 3 are phenotypically similar to RCDP Type 1, but result from deficiencies of the specific peroxisomal enzymes dihydroxyacetone phosphate acyltransferase and alkyl-dihydroxyacetone phosphate synthase respectively [1]. The differential diagnosis of RCDP includes other peroxisome biogenesis disorders, maternal SLE, and teratogen exposures (Warfarin embryopathy) [4].

The diagnosis of RCDP1 is based on clinical findings and confirmed by biochemical or molecular genetic testing. The abnormal biochemical profile characterized by red blood cell plasmalogen deficiency, increased plasma phytanic acid, deficiency of the enzyme dihydroxyacetone phosphate acyltransferase, and normal concentrations of very-long-chain fatty acids (VLCFAs) [1]. Gene sequencing can be performed to detect the PEX7 gene mutation. RCDP Types 2 and 3 and their specific enzyme defect are diagnosed based on deficient enzyme activity in fibroblasts.

MRI of brain will show areas with abnormal signal hyperintensity on T2-weighted images or hypointensity on T1-weighted images in the subcortical white matter. MR spectroscopy of the brain will reveal the increased levels of mobile lipids and myo-inositol and reduced levels of choline [5]. Foramen magnum stenosis causing spinal cord compression has also been reported [6].

Management of these babies is mainly supportive and limited by the multiple anomalies present at birth and poor outcome. Cataract extraction may restore vision in some cases. Physiotherapy is recommended to improve contractures and orthopedic procedures may improve function in some cases. Genetic counseling may be necessary for individuals who have been determined to be carriers. Monitoring growth and development, regular assessment for seizure control, vision, hearing, contractures, and orthopedic complications are required in these children on follow up.

References

1. Braverman NE, Moser AB, Steinberg SJ. Rhizomelic Chondrodysplasia Punctata Type 1. In: Pagon RA, Bird TD, Dolan CR, Stephens K, editors. GeneReviews [Internet]. University of Washington, Seattle; 2001 Nov 16 [updated 2010 Mar 02] [cited 14 Oct 2011].

2. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK1270/>
3. Moser A, Moser H, Kreiter N, Raymond G. Life expectancy in rhizomelic chondrodysplasia punctata. *Am J Hum Genet* 1996; 59: 99.
4. Phadke SR, Gupta N, Girisha KM, Kabra M, Maeda M, Vidal E et al. Rhizomelic chondrodysplasia punctata type 1: report of mutations in 3 children from India. *J Appl Genet* 2010; 51: 107-10.
5. Shanske AL, Bernstein L, Herzog R. Chondrodysplasia punctata and maternal autoimmune disease: a new case and review of the literature. *Pediatrics* 2007; 120: e436-41.
6. Viola A, Confort-Gouny S, Ranjeva JP, Chabrol B, Raybaud C, Vintila F et al. MR imaging and MR spectroscopy in rhizomelic chondrodysplasia punctata. *Am J Neuroradiol* 2002; 23: 480-3.
7. Yalin CT, Bayrak IK, Danaci M, Incesu L. Case report: Rhizomelic chondrodysplasia punctata and foramen magnum stenosis in a newborn. *Tani Girisim Radyol* 2003; 9: 100-3.

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