Chanarin-Dorfman Syndrome with Absent Jordan's Anomaly

Sandeep Arora, Shuvendu Roy¹, Divya Arora, Chetan Patil, Arun Kumar Jain²

From the Department of Dermatology, Army College of Medical Sciences, Base Hospital, ¹Department of Paediatrics, Army Hospital Research and Referral, ²Department of Electron Microscopy, Environmental Toxicology and Bioinformatics, National Institute of Pathology, Indian Council of Medical Research, New Delhi, India.
E-mail: aroraderma@gmail.com

Indian J Dermatol 2017;62(5):549

Sir,
Chanarin-Dorfman syndrome (CDS) is a rare inherited disorder characterized by congenital ichthyosis, nonbullous ichthyosiform erythroderma, myopathy, and hepatic involvement with deposition of neutral lipids in skin, muscle, liver, central nervous system, and granulocytes. Variable skin and systemic involvement makes diagnosis difficult in some cases wherein an easy screening tool in the form of peripheral blood smear or buffy coat preparation reveals granulocytes with lipid-laden vacuoles (Jordan's anomaly).¹

An 8-year-old boy, born of a nonconsanguineous marriage with an uneventful antenatal and perinatal period, was brought to dermatology outpatient with a history of a partial membrane encasing the child at birth which gave way to generalized dryness of skin, scaling, and erythema over the next 4 weeks worsening for a few months and thereafter remitting except for winter exacerbations. Four months before presentation, he developed difficulty in getting up from sitting position and climbing of stairs with progressive increase in the bulk of calves.

There was no history of difficulty in feeding, icterus, dark-colored urine or clay-colored stools, seizure, loss of weight and appetite, difficulty in swallowing, photosensitivity, ocular complaints, hearing impairment, or history suggestive of mental retardation. No other family member had similar illness.

Examination revealed generalized scaling on a background of erythema with accentuation at flexures and palmar-plantar keratoderma [Figure 1]. Abdomen was distended with firm, nontender hepatomegaly; calf muscle bulk was increased bilaterally, with reduced tone and power of the proximal muscle of the thigh; plantar reflex was decreased, whereas other deep tendon reflexes were normal. Gower's sign was positive [Figure 2]. Ocular examination was normal. His height and weight were normal for his age.

 Investigations revealed normal hemogram, renal function tests, blood sugar levels, serum electrolytes, and lipid profile. Liver and muscle enzymes were elevated with alanine transaminase 390 IU/L, aspartate transaminase 442 IU/L, alkaline phosphatase 298 IU/L, creatinine kinase 1409 IU/L, creatinine kinase MB: 426.8 IU/L, and lactate dehydrogenase 785 IU/L. Peripheral blood smear done repeatedly including from buffy coat preparations, and bone marrow smears revealed no abnormality with the absence of lipid-laden cells on light microscopy.²

Electromyographic study showed early recruitment with complete interphase pattern suggestive of myopathic pattern. Abdominal ultrasonography showed mild hepatomegaly with mild fatty infiltration. Skin biopsy revealed hyperkeratosis, prominent granular layer, and mild lymphocytic infiltration. Electron microscopy of the skin revealed intracytoplasmic, extralysosomal, nonmembrane-bound neutral lipid vacuoles [Figure 3]. Screening of parents and elder sibs revealed no abnormality.

The child was placed on topical emollients and acitretin 10 mg daily, along with regular physiotherapy and followed...
The scaling and erythema reduced, muscle weakness is static. Liver enzymes after 3 months showed reduction, alanine transaminase 220 IU/L, aspartate transaminase 240 IU/L, alkaline phosphatase 202 IU/L, and creatinine kinase 1298 IU/L [Figure 4].

CDS described initially by Dorfman et al.[3] is an autosomal recessive inborn error of metabolism characterized by cytoplasmic accumulation of neutral lipids in cells of skin, muscles, liver, gastrointestinal tract, central nervous system, and various blood and bone marrow cell lines along with nonbullous congenital ichthyosiform erythroderma. It is caused by a mutation in the ABHD5 gene on chromosome 3p21 which acts as a cofactor for adipose triglyceride lipase involved in the catabolism of fat.[3,4] Ichthyosis and demonstration of these lipid droplets are consistent features while demonstration of lipid droplets in blood cells (Jordan’s anomaly) has served as a useful screening tool in CDS and other neutral lipid disorders. Serum lipids remain normal while muscle and hepatic enzymes are usually elevated.

Clinically these patients present as congenital ichthyosiform non-bullous erythroderma, along with variable multiorgan involvement such as growth retardation, ocular changes as cataract, nystagmus and retinal changes, neurological abnormalities with areflexia, hypotonia, proximal muscle weakness, ptosis, mental retardation and variable cranial nerve involvement. A protuberant abdomen with hepatic steatosis, portal hypertension, myopathy, and psychiatric disorders may also be present in some cases.

Management remains symptomatic. Restricted carbohydrates and medium-chain triglycerides in diet may be helpful if instituted early but difficult to enforce for long duration.[5] Acitretin shows a good response even in the presence of elevated liver enzymes.[6]

Our patient, an 8-year-old male, was diagnosed as a case of CDS based on history of a partial collodion, congenital nonbullous ichthyosiform erythroderma, with hepatic steatosis proximal myopathy, partial areflexia of plantar reflexes, and demonstration of lipid droplets on electron microscopy. Jordan’s anomaly a hitherto described screening test for this condition observed on light microscopy of peripheral cells of probands as well as heterozygous carriers[7] was negative in our case; however it is possible electron microscopy of peripheral cells may have revealed lipid droplets.[8] Electron microscopy of peripheral blood cells was not done. Parents were unwilling for mutation analysis. He showed a good response on acitretin and has been placed on follow-up.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

**References**

1. Jordans GH. The familial occurrence of fat containing vacuoles in the leukocytes diagnosed in two brothers suffering from dystrophia musculorum progressiva (ERB.). Acta Med Scand 1953;145:419-23.
2. Redaelli C, Coleman RA, Moro L, Dacou-Voutetakis C, Elayed SM, Prati D, et al. Clinical and genetic characterization of Chanarin-Dorfman syndrome patients: First report of large
deletions in the ABHD5 gene. Orphanet J Rare Dis 2010;5:33.

3. Dorfman ML, Hershko C, Eisenberg S, Sagher F. Ichthyosiform dermatosis with systemic lipidosis. Arch Dermatol 1974;110:261-6.

4. Tamhankar PM, Iyer S, Sanghavi S, Khopkar U. Chanarin-Dorfman syndrome: Clinical report and novel mutation in ABHD5 gene. J Postgrad Med 2014;60:332-4.

5. Kakourou T, Drogari E, Christomanou H, Giannoulia A, Dacou-Voutetakis C. Neutral lipid storage disease – Response to dietary intervention. Arch Dis Child 1997;77:184.

6. Israeli S, Pessach Y, Sarig O, Goldberg I, Sprecher E. Beneficial effect of acitretin in Chanarin-Dorfman syndrome. Clin Exp Dermatol 2012;37:31-3.

7. Gandhi V, Aggarwal P, Dhawan J, Singh UR, Bhattacharya SN. Dorfman-Chanarin syndrome. Indian J Dermatol Venereol Leprol 2007;73:36-9.

8. Tullu MS, Muranjan MN, Deshmukh CT. Comments on Jordans’ anomaly. Indian J Pediatr 2000;67:703.

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

Access this article online
Quick Response Code:
Website: www.e-ijd.org
DOI: 10.4103/ijd.IJD_613_16

How to cite this article: Arora S, Roy S, Arora D, Patil C, Jain AK. Chanarin-Dorfman syndrome with absent Jordan’s anomaly. Indian J Dermatol 2017;62:549.
Received: October, 2016. Accepted: August, 2017.