

A RARE CASE OF JARCHO-LEVIN SYNDROME

Sherin Naseer¹, Karthik R², Adarsh E³

¹Postgraduate Student, Department of Paediatrics, Rajarajeswari Medical College and Hospital, Bangalore.

²Professor, Department of Paediatrics, Rajarajeswari Medical College and Hospital, Bangalore.

³Professor and HOD, Department of Paediatrics, Rajarajeswari Medical College and Hospital, Bangalore.

ABSTRACT

BACKGROUND

Jarcho-Levin syndrome is a rare genetic disorder characterised by distinctive malformation of the bones of the vertebrae and the ribs, respiratory insufficiency and other abnormalities. They are prone to repeated respiratory infections that result in life threatening complications.⁽¹⁾ It may occur as an isolated entity or may coexist with other congenital malformations like cardiac anomalies, lung agenesis or hypoplasia, renal agenesis, hydronephrosis, vertebral anomalies like hemivertebra, fused vertebra, lumbar lordosis, kyphoscoliosis, genital anomalies, cleft lip and palate, congenital diaphragmatic hernia and chromosomal anomalies such as Trisomy 21, 18 or 13.⁽²⁾ Infants born with Jarcho-Levin Syndrome have short necks, limited neck motion due to abnormalities of the cervical vertebrae and short stature. Here we are reporting the case of a 1-year-6-month-old child with Jarcho-Levin Syndrome with vertebral and rib anomalies and no other associated anomalies.

KEYWORDS

Hypoplasia, Jarcho-Levin Syndrome, Dysostosis.

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BACKGROUND

Jarcho and Levin in 1938 described a pattern of vertebral and costal anomalies distinctly different from the well-known Klippel-Feil syndrome.^(3,4) Since then the eponym has been used for cases of this type. There are apparently 2 forms. The subtype spondylothoracic dysplasia (STD) suggests predominant vertebral defects which is inherited as autosomal recessive type. The second spondylocostal dysplasia (SCD) describes the variant with vertebral and intrinsic costal anomalies which is inherited as autosomal dominant fashion.⁽⁵⁾

DISCUSSION

Jarcho-Levin syndrome is a rare type of short trunk skeletal dysplasia with vertebral and rib anomalies.⁽⁶⁾ This syndrome is underdiagnosed, although it has distinctive clinical and radiological features. In a patient with multiple congenital vertebral and rib anomalies, the presence of a short-neck, short-trunk, normal length limbs and certain associated anomalies suggests a diagnosis of JLS.⁽⁷⁾ Airway abnormalities are also described in patients with JLS which can be an important factor contributing to respiratory failure often seen in affected infants.⁽⁸⁾

The Jarcho-Levin syndrome has been divided into two major subtypes, namely spondylothoracic dysostosis and spondylocostal dysostosis. These subtypes have different survival rates, associated anomalies, and inheritance patterns.^(5,6) Patients with spondylothoracic dysostosis (STD) have vertebral anomalies with a "fan-like" or "crab-like" rib configuration. Intrinsic rib abnormalities in this subtype are limited to a decrease in number and posterior fusion. They

have a higher incidence of neural tube defects and a higher mortality rate and inherit the disorder in an autosomal recessive manner. In STD, neonatal death or death in infancy may occur due to pneumonias, restrictive lung disease with its attendant pulmonary hypertension.

SCD is inherited in autosomal dominant form. Intrinsic rib anomalies like broadening, bifurcation and asymmetrical fusion are noted. The survival rate in SCD is high after the age of six months (56%).⁽⁹⁾ Almost all the patients have normal intelligence and neurological abnormalities are infrequent.⁽¹⁰⁾

The Vertebral anomalies present are-

- Hemivertebrae,
- Absent vertebrae,
- Fused vertebrae,
- Block/wedge vertebrae,
- Sickle shaped vertebrae,
- Costal defects noted are,
- Fan- like or crab like appearance of thorax due to crowded ribs,
- Posterior fusion of the ribs,
- Absent, irregular or bifid ribs.

The case reported here has characteristic clinicoradiological features of Jarcho-Levin syndrome. This case represents less severe form of the disorder.

Taking the centre stage now, as regards the academic advances in Jarcho-Levin syndrome is concerned, it is molecular genetics. Patients with SCD are known to have mutations in the delta-like 3 (DLL3) gene on chromosome 19.^(11,12) Patients with STD have no mutations in the DLL3 gene.

Other anomalies associated with Jarcho-Levin syndrome are minor facial dysmorphism, urogenital and anal anomalies, congenital heart disease, limb and digit anomalies and neurological anomalies (hydrocephalus, meningomyelocele etc.).

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Corresponding Author:

Dr. Adarsh E,

#150/C, 2nd Cross, BEML Layout,

Basaveshwaranagar, Bangalore.

E-mail: dradarsh@gmail.com



Prenatal diagnosis by ultrasound can be done as early as 16 weeks of gestation. The criteria for diagnosis are unpaired or poorly formed vertebrae, indistinct or fused posterior ribs, irregular short pebble like appearance of the spine, short trunk, protuberant abdomen, hernias, normal amniotic fluid, normal limb length, normal biparietal diameter. Exact clinicoradiological diagnosis with molecular diagnosis is essential for accurate genetic counselling of each individual case.⁽¹³⁾

Counselling the affected family is not a simple task because of the varied presentation and striking intrafamilial variability. The exact clinicoradiological diagnosis with molecular diagnosis is essential for accurate genetic counselling and prognostication of each individual case.

Case Report

A 1-year-6-month-old female child was brought to paediatric OPD with complaints of chest deformity. Mother gave history of recurrent respiratory tract infections. She was first order by birth, born to non-consanguineous couple. She was delivered vaginally after fullterm gestation. Father was 29 years and mother was 25 years old. Her birth weight was 2600 g. There was no history of birth asphyxia.

On examination, her weight was 10 kg (50th centile) and length 76 cm (< 3rd centile). Both neck and thorax were short and there was obvious kyphoscoliosis. Vitals were stable. There was no respiratory distress or neurological deficit. There was no facial dysmorphism or gross evidence of any neural tube defects. No dimpling or deficiencies in the spine.

Skeletal survey showed anomalies of the thoracic vertebrae and rib anomalies were more pronounced on the left side. These included missing rib, posterior fusion of ribs and thoracic kyphoscoliosis. Cranial ultrasound was normal and abdominal sonography showed normal kidneys. Echocardiography was normal. CT thorax was done which showed similar findings.

Blood biochemistry showed normal renal function and normal blood gases.

The child had a mild form of the disease with only skeletal anomalies. She was admitted and treated with antibiotics and nebulisation. It subsided in 5 days.

Parents were counselled regarding the nature of illness and requirement of prompt management in the event of respiratory infections. Genetic counselling was done but due to financial constraints further evaluation was not done.

The child is being followed up and managed by paediatrician (for recurrent respiratory tract infection) and orthopaedician (for thoracic kyphoscoliosis).

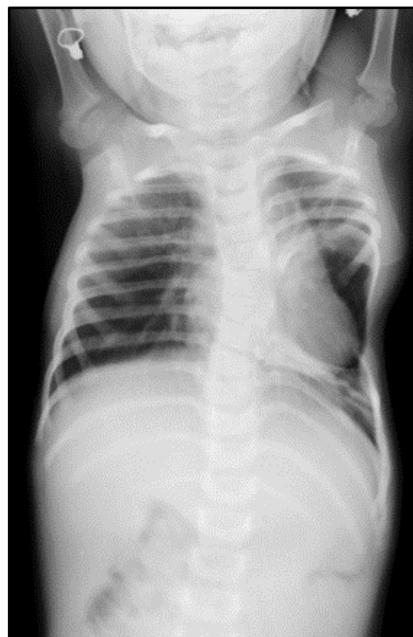


Figure 1. A-P (Antero-Posterior) radiograph showing formation defects (Malsegmentation) of mid thoracic vertebrae with scoliosis and fan like configuration of the deformed (fused and hypoplastic) ribs predominantly on the left side

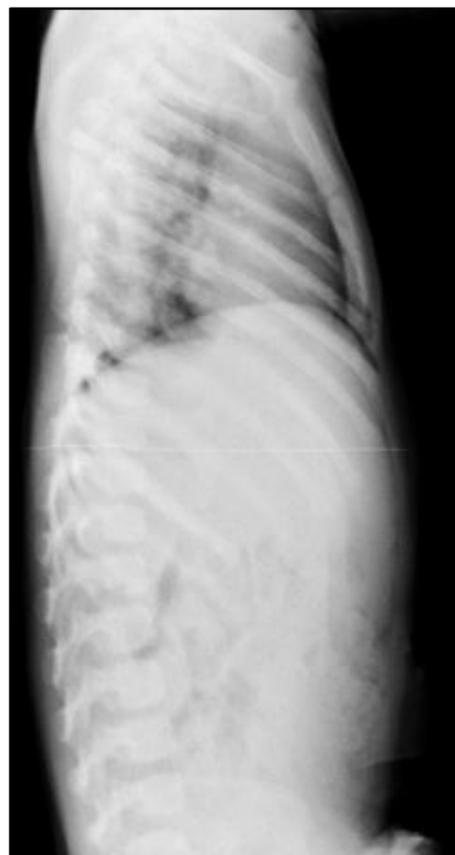


Figure 2. Lateral radiograph showing vertebral formation defects with deformed and broadened ribs



Figure 3. CT Axial section in bone window shows poorly formed vertebrae and ribs. Ribs are malaligned with crowding of ribs on the left side compared to the right side

CONCLUSION

Our aim in presenting this case of Jarcho-Levin syndrome is to make paediatricians aware of this disorder, its associated anomalies, its two subtypes and the prognosis based on classification into subtypes. These disorders can be diagnosed antenatally by high-resolution foetal scans at 18-23 weeks of gestation.^(14,15) A correct diagnosis made in a previously affected child can help in genetic counselling of the couple at risk and in establishing the diagnosis prenatally in a subsequent pregnancy. Any case with such complaints should be thoroughly examined and evaluated for other associated anomalies. Treatment of severe forms of JLS is sympathetic and supportive. Some cases require orthopaedic correction using various surgical and non-surgical methods. Since these children are prone for repeated respiratory tract infection leading to respiratory failure, any such episodes should be dealt with proper care. In spite of all these measures JLS has a very high mortality in children especially the severe forms.

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