

## Case Report

# Neonatal Presentation of Two Siblings with Pena-Shokeir Syndrome

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**ABSTRACT**

Pena-Shokeir phenotype is an autosomal recessive inherited disorder resulting from fetal akinesia or hypokinesia. It is characterized by polyhydramnios, intrauterine growth retardation, neurogenic arthrogryposis, facial anomalies, short umbilical cord and pulmonary hypoplasia. In this lethal disorder a significant number of affected fetuses are born prematurely, 30% are still born and a majority die soon after birth. We report a case where consecutive siblings have been affected by this disorder, but the diagnosis could only be confirmed in

the second sibling. The facial anomalies, pulmonary hypoplasia and bony ankylosis were similar to that seen in the previous baby. This baby was ventilated soon after birth and skeletal survey, ultrasound, chromosomal analysis, dye studies and muscle biopsy could be done to prove the diagnosis. Since the clinical presentation closely mimics Potter syndrome and Trisomy 18, this condition could be easily confused with these two disorders. Prenatal diagnosis and counseling could be offered to such families with positive family history.

KEYWORDS: neurogenic arthrogryposis, Pena-Shokeir syndrome, pulmonary hypoplasia

**INTRODUCTION**

Pena-Shokeir syndrome is an autosomal recessive disorder with clinical presentation of fetal akinesia or hypokinesia sequence. This early lethal disorder involves multiple joint contractures, facial abnormalities and pulmonary hypoplasia. Such babies are usually misdiagnosed as either Trisomy 18 or Potter syndrome. Since most of them are still born or die soon after birth the definitive diagnosis cannot be confirmed. The case presented here is to highlight the recurrence of similar manifestations in two siblings - the first who died soon after birth was diagnosed as Potter syndrome and the present case that was ventilated and investigated. The diagnosis of Pena-Shokeir syndrome was proven by definite clinical findings and muscle biopsy

**CASE REPORT**

A full-term female 2.5 kg baby with a head circumference of 33 cms and length of 48 cms was born at Khoula Hospital, Muscat, Sultanate of Oman to a 19-year-old Gravida 4 Para 1 mother with two early abortions at 10-12 weeks gestation, and a history of consanguinity. Antenatal ultrasound of the mother during this pregnancy at 29 weeks and 38 weeks revealed polyhydramnios with no other gross congenital anomaly.

The previous full term baby had multiple bony ankylosis, pulmonary hypoplasia, deformed ears and died soon after birth. No investigations could be done and the baby was diagnosed as Potter syndrome on the basis of clinical findings.

This baby was born by spontaneous vaginal delivery with an APGAR score of 6 at one minute and 8 at five minutes. Since the baby had poor respiratory effort soon after birth she was put on intermittent positive pressure ventilation, inotropic support and monitoring in the special care baby unit. All the investigations were done during this period. The baby developed bilateral pneumothoraces which were treated by intercostal drains. The baby expired at 44 hours of life.

This baby was noted to have dysmorphic features such as depressed nasal bridge, hypertelorism, prominent eyes, epicanthic folds, high arched palate and micrognathia, posteriorly placed bilaterally atretic ears with no external auditory meatus, soft skull bones with widely separated sutures, short neck, narrowed thoracic cavity and multiple skeletal anomalies. Both the legs were upturned, full rotation of hip, genu recurvatum, bilateral talipes equinovarus, camptodactyly with ulnar deviation of hands and contractures of forearm (Fig. 1). There was absence

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Fig. 1: Neonate with ocular hypertelorism, short nose with depressed nasal bridge, micrognathia, deformed low set atretic ears, short neck and severe contractures of hip, elbow, knee and ankles



Fig. 2: Neonate with camptodactyly, ulnar deviation of hand and absence of flexion creases on finger and palms

of flexion creases on finger and palms and sparse dermal ridges (Fig. 2). The umbilical cord was thin, short and shriveled. The external genitalia was normal for female and no abdominal masses were felt. Auscultation of the heart did not reveal any cardiac murmur.

Hemoglobin, WBC counts, platelets and electrolytes were within normal limits. Skeletal survey done showed skull with soft thick swelling in the parietal regions, poorly formed bones and the base of the skull looked dense. Chest X-ray revealed pulmonary hypoplasia with emphysematous bullae in left upper lobe. X-ray of the spine showed spina bifida at the level of T5-T6.

Ultrasound of abdomen revealed poor visualisation of both kidneys. A dye study was done which confirmed normal sized properly functioning kidneys. Muscle biopsy revealed small individual muscle fibers with hyperchromatic dense nuclei - features suggestive of neurogenic atrophy of muscle. The chromosomes were normal 46XX.

## DISCUSSION

This syndrome of neurogenic arthrogyriposis with pulmonary hypoplasia and hypertelorism described by Pena and Shokeir in 1974 is an autosomal recessive disorder with a frequency of 1:1200 births<sup>[1]</sup>. The prediction of recurrence risk is imprecise due to multi-factorial etiology and varies from 5-25%<sup>[2]</sup>. Familial recurrences have been described earlier by Paldini *et al*<sup>[3]</sup> who reported consecutive three pregnancies with Pena-Shokeir syndrome. Erdl *et al* reported two siblings with Pena-Shokeir syndrome who had broad range of deformities with associated cerebral malformations<sup>[4]</sup>.

Some of these babies are born prematurely and those born at term are small for gestational age. About 30% are still born and a majority of live born die of complications due to pulmonary hypoplasia

in first week of life.

Fetal movements were studied between 15-35 weeks of gestation by Mulder *et al*<sup>[5]</sup> and were found to be quantitatively and qualitatively abnormal in babies affected by Pena-Shokeir syndrome.

This prenatal onset degenerative disorder of neurons leading to neurogenic muscular atrophy with subsequent impairment of joint movement leads to neurogenic arthrogyriposis multiplex congenita resulting in decreased fetal activity. Due to failure of normal deglutition there is polyhydramnios and neuromuscular deficiency in diaphragmatic and intercostal muscle function leads to pulmonary hypoplasia<sup>[6]</sup>. Termination of pregnancy can be offered before viability. For those who survive, supportive treatment and joint mobilization can be done.

This neonate had all the clinical features of bony ankylosis along with pulmonary hypoplasia, malformed ears, micrognathia and a thin shriveled umbilical cord. The previous sibling was clinically diagnosed as Potter syndrome as he died soon after birth and the diagnosis could not be confirmed. This baby was ventilated and subsequently all the investigations were done. Ultrasound confirmed the normal size of kidneys and dye studies showed properly functioning kidneys, thus excluding the diagnosis of Potter syndrome.

Chromosomes revealed 46XX excluding Trisomy 18 which could be easily confused with Pena-Shokeir syndrome. The diagnosis was confirmed by muscle biopsy which showed features consistent with neurogenic atrophy of the muscle. Muscle biopsy has been found to be abnormal in 15 out of 17 babies with Pena-Shokeir syndrome. Also spinal cord histology is abnormal in five out of eight babies and cerebral abnormality seen in 11 out of 16 babies<sup>[6]</sup>. Since autopsy could not be done in our case we could not confirm these abnormalities.

## CONCLUSION

Fetal akinesia sequence presents as neurogenic arthrogryposis multiplex congenita and as most of them are either still-born or die soon after birth, the definite diagnosis cannot be confirmed. This case reports of consecutive pregnancies with Pena-Shokeir syndrome where the diagnosis could not be proven in the first baby and was proven in the subsequent baby by chromosomal analysis, ultrasound and muscle biopsy. At present only ultrasound guided paucity of fetal movement can give a clue to the diagnosis. Prenatal diagnosis in those with positive family history and treatment may alter the management of Pena-Shokeir syndrome in future.

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