

Case Report

Pfeiffer Type Acrocephalosyndactyly with Hydrocephalus and Tracheomalacia

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ABSTRACT

Pfeiffer syndrome is a rare form of acrocephalosyndactyly. It is characterized by craniosynostosis involving one or more sutures resulting in abnormal skull shape and facial dysmorphism. Broad medially deviated distal phalanges of thumbs and big toes with soft tissue syndactyly are typical. Various multisystem

anomalies have been reported as infrequent associations of this syndrome. A case of an infant with the typical features along with the uncommon associations of hydrocephalus and tracheomalacia is reported. The literature is briefly reviewed for clinical features, classification, genetic basis and management.

KEYWORDS: acrocephalosyndactyly, craniosynostosis, hydrocephalus, Pfeiffer syndrome

INTRODUCTION

Pfeiffer syndrome (PS) is the least common among craniosynostosis syndromes. It belongs to the heterogenous group of acrocephalosyndactylies. Typical features include synostosis of skull sutures, facial dysmorphism and broad thumbs and toes. Hydrocephalus is infrequently encountered in such children and may require surgical management. Tracheomalacia is another occasional feature in PS and contributes to airway obstruction.

An infant with the characteristic features of PS, who also had associated hydrocephalus and tracheomalacia, is reported. This case is presented on account of the rarity of the condition and its infrequent associations.

CASE REPORT

An eight month old male infant presented with intermittent stridor since birth. He was born of a non-consanguineous marriage. Apart from a history of prolonged labor the perinatal period was uneventful. The physical growth parameters were normal and he had a head circumference of 44 cms. The developmental milestones were delayed and corresponded to five months. He had no history of seizures. Vision and hearing were apparently normal.

Stridor was noted in the first week of life. Since then it used to occur intermittently, with exacerbations during febrile illnesses. There was no variation with position. He also had a weak cry.

Physical examination revealed an active infant with dysmorphic features. He had a

turribrachycephaly with ridging of coronal and sagittal sutures. The facial anomalies included a full high forehead, bilateral proptosis, ocular hypertelorism, low nasal bridge and a narrow maxilla. Prominent dilated veins were visible on the scalp. The distal phalanges of the thumb and big toe were broad (Fig. 1, 2). There was clinodactyly of fifth fingers and a partial syndactyly of second, third and fourth toes with medially deviated big toe (Fig. 3). There were no focal neurological deficits. Bones and joints were normal. A systemic examination was unremarkable.

A CT scan of head showed dilated third and lateral ventricles and a normal brain parenchyma. A chest X-ray was non-contributory. Skeletal survey revealed hypoplastic middle phalanx of fifth fingers, symphalangism of index finger and broad terminal phalanges of thumb and big toe. Bronchial endoscopy showed loss of normal semicircular shape of tracheal lumen, forward ballooning of the posterior membranous wall and anteroposterior narrowing of the trachea.

With these findings he was diagnosed to have Pfeiffer type acrocephalosyndactyly with hydrocephalus and tracheomalacia. He is currently under follow up for assessment of neurodevelopmental status, monitoring for complications and possible surgical intervention when necessary.

DISCUSSION

Abnormal skull shape generally occurs because the bones of the skull have either fused (synostosis)

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Fig. 1: Profile view showing turribrachycephaly, proptosis, high forehead and a prominent dilated scalp vein



Fig. 3: Broad distal phalanx of big toe with medial deviation and syndactyly of second, third and fourth toes

or have been moved to an incorrect place without fusion (deformational). Acrocephalosyndactylies are a group of disorders characterized by craniosynostosis, various craniofacial abnormalities and soft tissue syndactyly. PS is one of the rare entities in this group. Since the first report by Pfeiffer in 1964, only about 30 cases have been reported in literature^[1].

Constant features in this syndrome are characteristic craniofacial anomalies and limb deformities. The former includes synostosis of coronal and/or sagittal sutures with full high forehead, hypertelorism, low nasal bridge and a narrow maxilla. The limb anomalies are broad distal phalanges of thumb and big toe, in addition to partial syndactyly of fingers and second, third and fourth toes^[1]. The infant reported here had all the typical features.

Various airway anomalies have been occasionally encountered in PS. These include choanal atresia, tracheal stenosis, cartilaginous trachea, tracheomalacia and laryngo-bronchomalacia^[2]. These anomalies result in varying grades of airway obstruction and intermittent stridor. In the present case, it was the prominent presenting complaint.



Fig. 2: High forehead, bilateral proptosis, hypertelorism, low nasal bridge and a narrow maxilla in an infant with Pfeiffer syndrome. Note the broad thumbs.

Hydrocephalus is an uncommon association of craniosynostosis syndromes^[3]. However, a few complex varieties including PS have been found to develop ventricular dilatation. Our patient did not have obvious clinical features of hydrocephalus except a few prominent scalp veins. Arnold-Chiari malformation and seizures are the other reported neurological complications.

Conventionally PS has been classified into three types. Type 1 is the classical phenotype with near normal intelligence. This type is compatible with life. Type 2 is characterized by severe proptosis, cloverleaf skull, joint deformities, visceral anomalies and severe neurological involvement^[4]. Such children usually have an early death. Type 3 PS is associated with severe proptosis in the absence of cloverleaf skull, shortness of anterior skull base, elbow ankylosis and neurological compromise^[1]. Early death is the rule. The infant in this report corresponds well with the Type 1 phenotype.

Several rare anomalies have inconsistently been reported in PS. These include visceral anomalies, deafness, and anorectal malformations, skeletal anomalies including achondroplasia, spinal anomalies, cryptorchidism and various ocular anomalies^[5-7]. These associations might add to the morbidity of this syndrome, which has a spectrum of clinical severity ranging from mild involvement to incompatibility with life^[8].

The inheritance is autosomal dominant in many cases, though sporadic mutations have been encountered particularly in types 2 and 3. In the present case, the absence of clinical features in family members suggests a sporadic mutation. The role of fibroblast growth factor receptor-1 gene (FGFR-1) located on chromosome 8p11.22-p12 in the causation of PS has been well delineated by recent studies^[9]. However, there is poor correlation between the genotypes and the clinical classification.

Multiple staged surgery is the general treatment plan for patients with PS^[10]. Early release of the synostotic sutures of the skull allows adequate brain growth and expansion. Cranio-maxillary surgery may reduce the exophthalmos. Although there is a significant malformation of the fingers and toes, usually these function adequately and do not require surgical intervention.

Hydrocephalus and tracheomalacia are two aspects of the disorder which are likely to require specific interventions. Awareness of these infrequent associations, a high index of clinical suspicion and the judicious use of investigative modalities help in their early identification. This report highlights the diverse clinical presentations of this rare entity. To the best of our knowledge this condition has not yet been reported from India.

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