**Case Report**

Bilateral cleft lip and palate, hypertelorism with agenesis of corpus callosum

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Agenesis of corpus callosum (ACC), an ORPHAN disease (www.orpha.net), is a rare, congenital anomaly that is often reported in males, either isolated or in combination with other central nervous system (CNS) or systemic malformations. The brain structure, Corpus callosum develops from the lamina reuniens in the telencephalon part of the brain by 10 weeks of gestation and continues to develop progressively until 17 weeks of Intrauterine Life. ACC has been described to occur sporadically and attributed to disturbance to CNS embryogenesis in the first trimester, most commonly trauma. The disorder previously was rarely been reported. With increasing use of MRI and increased antenatal surveillance, more cases of ACC are being reported.\(^1\) Currently, the US frequency rates of ACC occurrence is estimated as 0.07–5.3% of all live-birth. The disorder presents with additional clinical features such as seizures, feeding problems, developmental abnormalities, milestone delay, impaired hand-eye coordination, neuropsychiatric issues, impaired visual and auditory memory, and hydrocephalus.\(^2\)

The occurrence of orofacial abnormalities in ACC has been previously documented. The occurrence of midline abnormalities such as cleft lip, palate, hypertelorism, and meningocoele have been reported in large series of cases in Western literature.\(^3,4\) The present case report aims to present a case of a 1-year-old ACC affected infant who had developmental defects including bilateral clefting of lip and palate, spinal meningocoele, and hypertelorism. He was diagnosed with the condition since birth but had been referred from one center to other for the want of facilities and expertise to correct the deformities owing to his CNS condition.

**CASE REPORT**

Otherwise healthy, 1-year-old male child was brought to the author’s center for correction of the facial deformity. He was born to out of a nonconsanguineous marriage to rural living parents. No abnormality was reported in the prenatal and circum natal history. At birth, the hypertelorism, bilateral cleft lip and palate was noted. Later in the early postnatal period, the spinal meningocoele was noted [Figure 1a-d]. The milestones of the child were delayed. Owing to the medical conditions, the parents approached several centers in their vicinity for correction of cleft lip and palate as well as the developing hypertelorism. The centers were reluctant to post the case owing to the comorbid condition.

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Owing to fastly approaching schooling age, the cleft lip and palate needed correction as the child’s communication skills, speech formation, pronunciation, and the psychology of the child were quickly developing. There were four protruding anterior teeth in the premaxilla that were placed in a jetting manner that prevented the lips from closing. The aim was immediately to close the lip and palate. The surgical plan was to perform an early setback of the maxilla so that the communication skills, speech formation, pronunciation, and the psychology of the child are well coordinated and developed.

After adequate radiological, biochemical, and medical investigations along with pediatrician opinion, the child was taken for first stage rehabilitation of cleft lip under general anesthesia [Figures 2 and 3]. The traditional setback of the premaxilla was performed.

For correction of the cleft lip, a modified Millard’s technique was used. It was ensured that optimum tension is there while suturing. From the lateral aspect of the cleft, a C-flap incision was placed in a modified way toward the nasal sill. A part of the dissected tissue was later used to recreate the nasal floor or be a part of the M-flap to recreate the sulcus. The approach of the incision gives many advantages than the conventional Millard’s and other modified Millard’s approach—especially no multiple incisions or scars as seen in the regular alar base incision. The nasal floor is easily elevated and the vermilion stitch along the orbicularis marginate gives a perfect length, also prevents the notching of the vermilion border. The subcutaneous suturing aids in camouflaging the incision [Figure 4a-d]. Symmetry of the nasolabial angle was maintained as it gets more pronounced with growth and maintaining the lip roll continuity serves to be an important aspect of surgery with minimum scar on the philtral column.

Appropriate antibiotic and analgesics as per pediatrician advice were given. The patient was regularly monitored for first 48 h and discharged with appropriate instruction. The incision and the surgical closure was a success as envisaged. The patient is currently under regular follow-up [Figure 5]. The patient is under pedodontist as well as speech pathologist care currently. The second stage of palatal repair was planned at about 10–11 years along with the hypertelorism correction when the orbital bone and musculature are fully formed.

**DISCUSSION**

Corpus callosum is regarded as the largest cerebral commissure that connects the neocortical areas. The development results from neocortical commissural axon fasciculation and reflects the inter-hemispheric circuitry and successive steps of synaptogenesis. It is reported to a phylogenetically recently evolved structure and as such currently described as “not necessary for vital functions.” However, it has been attributed to learning, discrimination, sensory experience, memory and synchronicity of sleep.

In ACC, as a resultant of the aberration, either partially or fully, as in present case, the brain commissural fibers do not cross the midline instead thick bundles of intersecting fibers called Probst bundles which lie along the super medial aspect of the lateral ventricles and the third ventricle may sometimes be displaced upward. To compensate, in most cases there is a stable, nonprogressive dilatation of the caudal portion of lateral ventricles. This disorder for unknown reasons has been associated with aberrations of chromosomes 8, 11, 13–15, 18, and rarely chromosome 6.

ACC has been associated with several syndromes such as Andermann syndrome (peripheral neuropathy with corpus callosum agenesis). Aicardi syndrome (infantile spasms, ocular anomalies and ACC), Shapiro’s syndrome (paroxysmal hypothermia with ACC) and sporadically with Dandy Walker syndrome, fetal alcohol syndrome, Leigh’s syndrome, and Arnold Chiari II syndrome. It is been reported that in isolated fetal ACC, there is 85% of chance of normal course of development. Furthermore, a cleft surgical team needs to be aware of the overlap of cleft associated syndromes, especially with CNS abnormalities.
and co-morbidities. Newer disorders and syndromes are being increasingly reported. The case discussed here underlines the importance of the surgical teams, especially in remote areas being aware of the development of such newer entities and their potential implication on cleft rehabilitation.

In spite of such a wide supportive knowledge, this child was deferred regular surgical rehabilitation for cleft lip and

has been using feeding plates. As the child was entering schooling phase, the development of speech and social skills would be at its peak. The cleft lip and palate would be a huge deterrent for proper development of speech and psychological well-being. Hence, it is necessary that obvious defect such as cleft lip and palate be corrected. The orofacial rehabilitative community needs to be well educated about emerging ORPHA diseases and its ready cure available.

CONCLUSION

A staged correction of bilateral cleft lip and palate child with ACC and spinal meningocele is presented. With the community being called for rapid action for a multidisciplinary approach for rehabilitation of cleft affected children, co-morbidity such as ACC shall not be an impediment for regular surgical care and rehabilitation.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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