Case Report

Goldenhar syndrome

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Abstract

Goldenhar syndrome is a rare congenital defect characterised by ocular symptoms including (epibulbardermoids, microphthalmia, anophthalmia, cleft eyelid, exophthalmia, strabismus), auricular symptoms (dacryocystitis), preauricular appendages, preauricular fistulas, ear asymmetry, microtia, atresia of the external auditory canal), craniofacial deformities (cleft face, cleft lip, cleft palate, macrostomia, bifid tongue, hypoplasia of the mandible, hypoplasia of the maxilla, asymmetry of the mandible and maxilla, malocclusion, tooth discrepancies, agenesis of third molars and second premolars, supernumerary teeth, enamel and dentin malformations, delay in tooth development), and skeletal abnormalities (cleft spine, microcephaly, dolichocephaly, plagiocephaly, vertebral defects) or abnormalities of internal organs

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INTRODUCTION

Goldenhar syndrome (GS) is a rare congenital defect, also known as oculoauriculovertebral syndrome (OAVS), facioauriculovertebral syndrome, and Goldenhar-Gorlin syndrome. Sometimes, the GS term is used interchangeably with hemifacial microsomia; however, some authors emphasize that hemifacial microsomia should be restricted to patients without internal organ or vertebrae disruption. The condition was described in 1952 by Maurice Goldenhar on 3 patients with epibulbardermoids, preauricular appendages, and mandibular hypoplasia. Since that time, many articles have been written characterising the variety and variability of anomalies associated with GS. The occurrence of this defect differs among authors is assessed from 1:3500 or 1:5600 to 1:45000 live births. The abnormalities in GS can be divided into groups according to the region they affect. Ocular symptoms include epibulbardermoids, microphthalmia, anophthalmia, eyes asymmetry/dysmorphy, cleft eyelid, exophthalmia, and strabismus. Auricular symptoms are dacryocystitis, preauricular appendages, preauricular fistulas, ear asymmetry, microtia, and atresia of the external auditory canal. Among craniofacial deformities that occur are deformities of the first and second pharyngeal arches, cleft face, cleft lip, cleft palate, macrostomia, bifid tongue, hypoplasia of the mandible. hypoplasia of the maxilla, malocclusions, tooth discrepancies, agenesis of third molars and second premolars, supernumerary teeth, enamel and dentin malformations, and delay in tooth development. Skeletal abnormalities include cleft spine, microcephaly, dolichocephaly, plagiocephaly, and vertebral defects. Additional abnormalities of internal organs (that appear in 50% of the cases) involve the heart (atrial and ventricular septal defects, conotruncal defects, outflow tract abnormalities, persistent truncus arteriosus), kidneys (ectopic and/or fused kidneys, renal agenesis, multicystic kidney),and central nervous system (diffuse cerebral hypoplasia, dilated lateral cerebral ventricles or asymptomatic hydrocephalus, corpus callosum dysgenesis, frontal hypodensities, microcephaly,

asymmetrical lateral ventricles, hydrocephalus due to aqueduct of Sylvius stenosis, corpus callosum lipoma, absence of septum pellucidum, diffuse cerebral hypodensity, hypothalamic hamartoma).

CASE REPORT

A 3 and half months old female was brought to ophthalmology Out Patient Department with the chief complaints of painless, gradually growing tissue in left eye since birth. The child was born by normal vaginal delivery. Child's gestational age was 40 weeks. Child's birth weight was 2.4 kg. No history of Neonatal ICU admission in past. Child was first born of a non-consanguineous marriage and no other family member was previously affected. Child was immunised up to date. On general examination the weight of child was 4.1 kg and had an average built. On External Auricular examination, Preauricular tag was present over the left ear. On Ophthalmological Examination, child's visual acuity appears to be normal and was following light. On anterior segment examination, right eye was within normal limits and in left eye had a dermoid present at lower limbus from 4 o'clock to 6 o' clock position of 5 mm X 4 mm in size and yellowish brownpigmentation present over tissue.

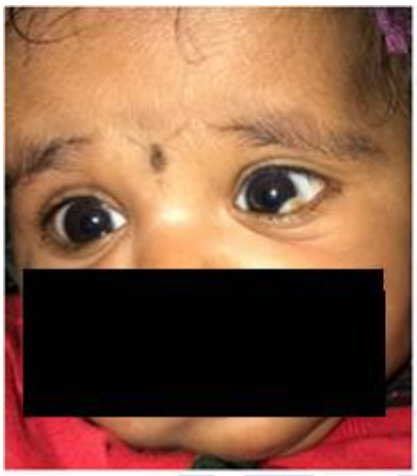

Figure 1:

Figure 2:

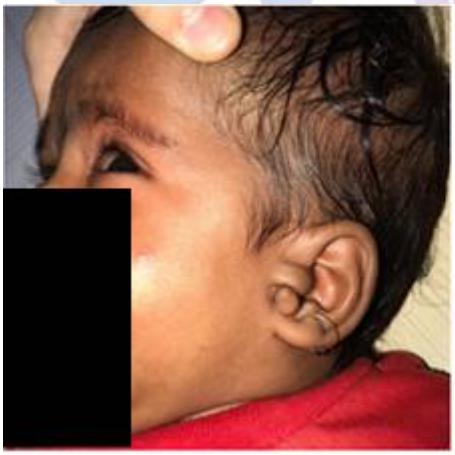

Figure 3:

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DISCUSSION

History: Goldenhar syndrome was first described in 1952 by ophthalmologist Maurice Goldenhar in his reports of patients with epibulbardermoids, preauricular appendages, and fistulas[2,6]. In 1963, Gorlin *et al.* suggested that Goldenhar syndrome be considered a variant of a broader diagnosis termed oculoauricular-vertebral dysplasia, which included epibulbardermoids and/or lip dermoids, auricular appendages and pretragal blind-ended auricular fistulas, and vertebral anomalies[3,7]. In 1976, due to the significant overlap in symptoms of hemifacial microsomia, oculo-auricular-vertebral dysplasia, and Goldenhar syndrome, Gorlin and his colleagues concluded that they should be considered a

continuous spectrum rather than separate disorders. The term oculo-auriculovertebral spectrum was given to be more inclusive and to describe a spectrum of clinical manifestations that vary from mild to severe; although GS is still the term most often used[8]. Many authors believe hemifacial microsomia should only be used to describe patients with aural, oral, and mandibular anomalies but without internal organ or vertebral defects. When the latter are present, Goldenhar syndrome should be used[9,10]. As a result of the various clinical symptoms and unknown etiology, other eponyms of Goldenhar syndrome that have been used in the literature include lateral facial dysplasia, fascio-auriculo-vertebral spectrum/sequence, first and second branchial arch syndrome, unilateral craniofacial microsomia, otomandibulardystosis, auriculo-branchiogenic dysplasia, and craniofacial microsomia[5].

Etiology: Goldenhar syndrome affects the development of tissues that arise from the first and second branchial arches during the first 6 weeks of gestation. First branchial arch structures include the maxilla, zygoma, squamous part of the temporal bone, mandible, malleus, incus, and some muscles of the face and neck. Second branchial arch structures include the stapes, styloid process of the temporal bone, part of the hyoid bone, and several additional muscles of the face and neck. The blood vessels that supply these arches are known as the first and second aortic arches. One theory to describe the etiology of GS is the vascular disruption hypothesis, in which the blood supply to the first and second branchial arches is compromised leading to hypoplasia of many of these structures[4]. Neurocristopathy, which is the defective development of the embryonic neural crest cells giving rise to craniofacial cartilage and bone (among other tissue types), may be involved in the process or independently be the cause[3].

Prenatal risk factors: Many prenatal risk factors for GS have been identified and are associated with the vascular disruption theory of etiology. Vasoactive medications taken in the first trimester, especially in combination with smoking, increases the risk of GS. Maternal diabetes, multiple gestations, second trimester bleeding, and artificial reproductive techniques also increase the risk[4,5,11,12,18,19].

Screening and diagnosis: There is major discrepancy in the literature on the incidence of GS. Some report an incidence as low as 1/3,500 and some as high as 1/26,550[3,5,8]. The discrepancy may be due to the lack of information on fetal deaths and terminated

Clinical features: The clinical features of GS show a high degree of phenotypic variance. a classical triad of GS includes ear and or eye, craniofacial, and vertebral anomalies[5,8]. Unlike other facial dysostoses. such as Treacher Collins syndrome, GS is bilateral in only 10–33 % of cases[28]. In addition to craniofacial and vertebral defects, patients often have associated anomalies in other systems.

Ocular anomalies: The primary ocular anomaly seen in about 30–60 % of patients with GS is epibulbarchoristoma. In GS, this is usually a dermoid or lipodermoidtumor on the inferotemproal or supratemporal part of the limbus, which may lead to serious ophthalmologic complications, such as secondary amblyopia, astigmatism, and strabismus, if not diagnosed and treated early[33]. While rare, it is possible for the tumor to invade the cornea and sclera and cause astigmatism and consequent amblyopia. Other ocular abnormalities seen in GS include microphthalmia, anopthalmia, eyelid colobomas, and palpebral ptosis, which can occur in combination with each other and with dermoids[8,34].

Auricular anomalies: Auricular abnormalities are seen in nearly every patient with GS. These anomalies range from mild to severe and include preauricular pits/sinus, anotia, accessory auricle, the absence of the auricle, atresia/stenosis of the external auditory canal, preauricular skin tags, and microtia/misshapened/dysplastic/ rudimentary ear5. Malformation of the external ear may be bilateral or unilateral. Malformation of the middle ear is less common. but when present it is commonly seen as fusion of the malleus and incus with reduced middle ear cavity size[34]. Additionally, there may be an unusual form of the ossicular chain, opacification of the tympanic cavity, opacification of the mastoid antrum, chronic otitis media with effusion, and rarely, the absence of ossicles[6,35]. Malformations of the inner ear are least common and range in severity from vestibular dysplasia to cochlear hypoplasia and common cavity. Additionally, there may be changes in the semicircular canals and enlargement or narrowing of the internal auditory canal. Hearing loss in patients with GS is usually conductive. However, sensorineural hearing loss can also occur with or without an inner ear anomaly[6].

Vertebral defects: In GS, failure of segmentation was the most common anomaly in the neck, and failure of formation was the most common anomaly in the upper thoracic spine[27]. Torticollis is a common anomaly seen in GS patients. Also, hemivertebrae are common and often cause scoliosis, most often in the cervico-thoracic region. Less common is kyphosis due to the fusion of anterior vertebral elements. Least common is kyphoscoliosis. Additionally, wedge vertebrae, butterfly vertebrae, fusion of posterior elements, and spina bifida occulta may be the underlying vertebral anomalies[10,34]. When the vertebral defect is unilateral, it is frequently correlated with the same side as the microtia or microsomia[10,27]. Rib

abnormalities occur in GS, such as the presence of a cervical rib and fusion of two or more ribs. Fusion is associated with failure of segmentation. Rib absence may be present in association with contralateral hemivertebra[27].

Craniofacial and dental anomalies: Mandibular hypoplasia frequently presents in GS patients resulting in facial asymmetry[8,36]. Patients may show mandibular ramus asymmetry, maxillary hypoplasia, zygomatic hypoplasia, temporomandibular joint abnormalities, and micrognathia[8,36,37]. Skull abnormalities include microcephaly, dolichocephaly, and plagiocephaly[9,34]. In OAVS, facial weakness is developmental and may be due to hypoplasia of embryologic mesenchyme and or the neuroectoderm resulting in underdeveloped facial musculature or facial nerve, respectively. It has been suggested that the severity of both auricular deformity and mandibular hypoplasia increase the severity of facial paresis.The severity of auricular deformity is associated with temporal bone hypoplasia, which leads to an abnormal middle ear, atypical facial nerve pathway, and fallopian canal atresia[29]. Microsomia was observed more frequently than macrosomia, cleft lip and/or palate, bifid uvula, and malformed epiglottic fold. Malocclusions of the teeth have been reported as over jet, protruded jaw, and scissors bite. These malformations may lead to early feeding problems and speech impairment[38]. Other dentofacial anomalies include gingival hypertrophy, supernumerary teeth, enamel and dentin malformations, agenesis of premolars, and delayed tooth development[37].

Other anomalies: Patients with GS have a high frequency of associated anomalies in other organ systems. They may present with clubbing, polydactyly, clinodactyly, camptodactyly, or single palmar crease[34,36] Septal and conotruncal defects appear to be the most common. Renal defects may include hypoplasia, agenesis, cysts, lobulated bladder, megaureter, and double collecting system. Genital malformation may be seen as hypospadias, cryptorchidism, undescended testes, or abnormal testes size[36]. Gastrointestinal anomalies may include tracheo-esophageal fistula and anal anomalies[36]. Most GS patients have normal intellectual and longitudinal development, but cognitive disability occurs in 8–25 % of patients. Language delay may be present and facial nerve function may be compromised[34,36]. GS is also associated with the occurrence of structural and functional anomalies of the pharynx and larynx,[40].

CONCLUSION

Goldenhar syndrome is a congenital disorder complex in its etiology and clinical presentation. Neurological development is normal in most cases. Surgical treatment is important in severe cases in which vital functions are compromised and proper psychological and social development is at risk. Since there is great pheotypic variation, treatment should be individualized while maintaining long-term follow up based on severity of the case. Life threatening anomalies should be assessed and treated in infancy followed by any necessary ophthalmologic intervention, vertebral corrections, auricular reconstructions, and jaw surgeries. Patients with Goldenhar syndrome require an early diagnosis, a skilled multidisciplinary approach to treatment, and counseling for the best chance of a successful long-term outcome.

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