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Case Report Open Access

Goldenhar Syndrome - A Rare Case Report

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Abstract

Goldenhar syndrome or oculo-auriculovertebral (OAV) is a rare abnormality affecting the craniofacial region having extracranial manifestations as well. First described by Maurice Goldenhar, its etiology still remains uncertain. We describes a case of Goldenhar syndrome with craniofacial manifestations which makes it amenable to diagnosis by an oral physician.

Keywords: Goldenhar syndrome; Mandibular hypoplasia; Periauricular tags; Corneal opacities

Introduction

Franceschetti-Goldenhar syndrome or Goldenhar syndrome, also known as facioauriculovertebral spectrum (FAV), first and second branchial arch syndrome, or oculo-auriculovertebral (OAV) spectrum is a rare congenital malformation which encompasses various morphological and functional abnormalities. The syndrome was first recorded by German physician Carl Ferdinand Von Arlt in 1845, however, when Maurice Goldenhar described its various characteristic features in 1952, the credit of discovery went to him. In 1963, Gorlin named this syndrome as oculo auriculovertebral. It consists classically of the triad of (usually unilateral) maldevelopment of the first and second branchial arches, occular dermoids, and vertebral anomalies [1,2].

Reported incidence of this syndrome is 1:3500 to 1:5600 with a male to female ratio of 3:2 [1]. Although most cases are sporadic, autosomal dominance inheritance has also been described. There does not seem to be any geographic or racial predilection [2].

Though, the etiology of Goldenhar syndrome is not well established, it is thought to be due to exposure to various viruses or chemicals during pregnancy. Some researchers also suggested gestational diabetes mellitus as one of the cause. The MSX homeobox genes play a crucial role in the pathogenesis [2,3].

Various other clinical features have also been described like:

- Epibulbar dermoid or lipodermoid (mostly bilateral); colobomas of the upper eyelid, iris, chorioidea, and retina, or other eye anomalies (e.g. microphthalmia, anophthalmia, cataracts, astigmatism, antimongoloid obliquity of palpebral fissures, and blepharophimosis).
- Preauricular skin tags or blind fistulas; microtia, or other external ear malformations (dysplasias, asymmetries, aplasias, and atresias of the external meatus); middle and internal ear anomalies.
- Unilateral facial hypoplasia, prominent forehead, hypoplasia of the zygomatic area, and maxillar and mandibular hypoplasia.
- Neck: Branchial cartilage, branchial fistula, webbing, short neck, abnormalities of sternocleidomastoid muscle.
- Unilateral macrostomia (lateral facial cleft).
- Back: Pilonidal dimple, kyphoscoliosis, Sprengel's deformity
- Hands / Fingers: clubbing, polydactyly, clinodactyly, single palmar crease
- Vertebral column anomalies (atlas occipitalization, synostosis, hemivertebrae, fused vertebrae, scoliosis, and bifid spine) [4].

Principal deformities of the Goldenhar syndrome are often combined with various malformations, such as:

- Cleft lip and/or palate, tongue cleft, unilateral tongue hypoplasia, and parotid gland aplasia.
- Rib anomalies and anomalies of the extremities.
- Congenital heart disease (ventricular septal defects), anomalies of the urogenital and gastrointestinal system (ectopic kidneys, uretropelvic junction obstruction, and imperforate anus), anomalies of the central nervous system (occipital encephalocele), and anomalies of the larynx and lungs (tracheoesophageal fistula, esophageal atresia).
- Complex retardation of mental development.
- Venous anomalies- like infradiaphragmatic total anomalous pulmonary venous drainage, anomalous inferior and superior vena cavae, and a persistent left superior vena cava with azygos continuation of the inferior vena cava and portal vein cavernoma. In the arterial system, pulmonary trunk hypoplasia, an isolated left innominate artery, and absence of the internal carotid artery have been reported.
- With associated juvenile glaucoma in Turner's syndrome.
- Congenital Facial nerve palsy.
- Growth hormone deficiency [4].

We present a case in whom clinical and radiological features prompted us to make a diagnosis of Goldenhar syndrome.

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Case Report

A 25-year-old man reported to the Department of Oral Medicine and Radiology with the complaint of pain in his upper left back tooth. He was born to consanguineous parents and his elder brother who was mentally challenged died in young age. His younger sisters were normal. However, history revealed uncomplicated pregnancy of mother. He gave a history of impaired vision in left eye, sore throat and speech abnormality since childhood. He also gave history of surgery done in the facial region for some outgrowths.

General examination and review of systems was apparently normal with no detectable physical deformity.

On extra-oral examination, patient presented with a convex profile and incompetent lips. There was mid face retrusion with mandibular hypoplasia and steep mandibular angle bilaterally. His left eye showed corneal plaque (Figure 1). There were multiple tissue tags present near the tragus of the ear of both the sides (Figure 2). Surgical scar was presented on the forehead. He had difficulty in breathing with nasal discharge. He was also unable to completely extend or flex his neck.

Intra-orally he had marked deviation towards the left on opening the mouth. There was open bite in the anterior and left posterior region. Right side posterior teeth were in cross bite. He had a narrow palatal vault and crowding in his lower teeth with increased overjet (Figure 3). He also had fissured tongue. The tooth causing pain was upper left first molar which was grossly decayed. Other teeth decayed were 16, 26, 37 and 38. 22, 45 and 46 teeth were missing.

Posterior-anterior view showed asymmetry and left deviation of nasal septum. Panoramic view revealed bilateral mandibular hypoplasia (Figure 4). It showed marked coronoid hypoplasia, short ramus height and steep mandibular angle. Paranasal sinus view showed hypoplasia of right maxillary sinus. Lateral cephalogram showed steep mandibular plane and suggested a vertical grower. Also abnormality of first, second and third cervical vertebrae was noticed (Figure 5).

The patient was referred for treatment of dental complaints and also for an ENT evaluation. He was also advised for a cardiovascular assessment. Patient gave his consent for photography, clinical and radiographic examination. However, he refused consent for further laboratory investigations. Thereafter the patient was lost to follow up. Hence based on clinical and radiographic findings, a diagnosis of Goldenhar syndrome was made.

Figure 1: Frontal view of patient showing corneal plaque in left eye.

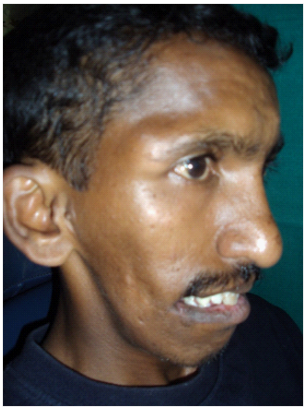

Figure 2: Oblique view showing tissue tags near the tragus of right ear.

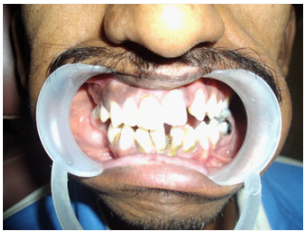

Figure 3: Intra-oral view showing crowding in lower teeth, open bite and malocclusion.

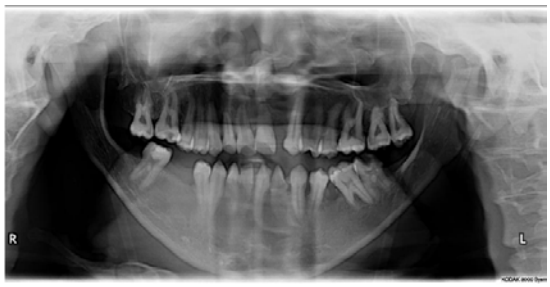

Figure 4: Panoramic view showing mandibular hypoplasia and steep mandibular angle.

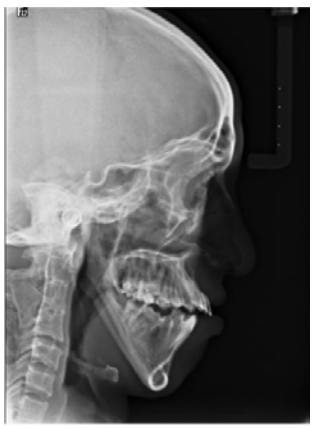

Figure 5: Lateral cephalogram showing steep mandibular plane.

Discussion

Goldenhar syndrome was classically described by Maurice Goldenhar as a triad of accessory tragic, mandibular hypoplasia and ocular dermoids [1]. Although the syndrome encompasses a range of other features, craniofacial features are highly characteristic and make an oral physician an important portal in the diagnosis of such syndromes.

A number of case reports of Goldenhar syndrome have been described in literature. In 1997, Araneta et al. described the occurrence of Goldenhar syndrome among children of Persian Gulf War veterans and found that 7 infants out of an estimated 75,414 infants had Goldenhar syndrome [5]. Rao et al. have reported a case Goldenhar sequence with associated juvenile glaucoma in Turner's syndrome. Genetic study of lymphocyte culture revealed a mosaic pattern of 46XX and 45XO [6]. Kokavec reported a case report of four children with clinical features suggestive of Goldenhar syndrome. All of them expressed normal male karyotype 46 and XY without chromosomal aberration with one of them having 14s variant (Table 1). Clinical features in all were highly suggestive of Goldenhar syndrome [4]. Most cases are sporadic but Tsai and Tsai reported a family in which seven members in three successive generations were diagnosed with Goldenhar syndrome [7].

Goldenhar syndrome has been seen in association with cranial anomalies. Anderson and David reported spinal anomaly in seven patients with wide range of abnormalities including butterfly vertebrae, hemivertebrae, kyphosis and rib anomalies [8]. Ozdemir et al. reported a case of 12-year-old male with postaxial polydactyly, congenital heart disease, vertebral anomaly and facial asymmetry [9]. Zaka-ur-Rab and Mittal reported a case where drusen of the optic nerve head was found in association with this syndrome [10]. Berker, Acaroglu, and Soykan reported a patient with congenital facial nerve paralysis in conjunction with Goldenhar syndrome [11]. Kumar et al. reported polydactyly and hydrocephalus as rare associations with Goldenhar syndrome [12].

Cohen, Rollnick and Kaye critically discussed the various nomenclature and clinical features of Goldenhar syndrome [13]. Stringer et al. reported portal vein cavernoma in association with Goldenhar syndrome. They presented 3 cases with Goldenhar syndrome and portal vein cavernoma [14]. Maan and others reported a case of two siblings with Goldenhar syndrome. They presented with clinical features suggestive of Goldenhar syndrome with no systemic abnormality [15]. Gajre et al. reported Goldenhar in association with agenesis of septum pellucidum [16]. Vinay and others reported Goldenhar syndrome based on clinical and radiographic findings with no systemic involvement [1].

Friedman and Saraclar presented a review of cardiac findings and revealed a high frequency of congenital heart disease [17]. Bayraktar et al. reported a case of 79-year-old patient of Goldenhar syndrome with multiple congenital anomalies [18]. Abe et al. described a case of Goldenhar syndrome associated with cardiac abnormalities such as single ventricle, atresia of pulmonary artery and patent ductus arteriosus [19]. Mahore et al. reported a case of Goldenhar syndrome with normal cardiovascular system but crossed ectopic kidneys in association with other clinical features [2].

Our patient was provisionally diagnosed as Goldenhar syndrome but a number of other first and second arch syndromes were considered in the differential diagnosis [20].

- Treacher-Collin syndrome- external ear deformities are extreme and there is anti-mongoloid slant of eyes with absence of zygoma in radiograph.
- Hallermann-Streiff syndrome (mandibulo-oculo-dyscephaly) - patient has stunted growth, characteristic facial appearance with beaked nose, small mouth, irregular dentition and microophthalmia.
- Cockayne's syndrome- photophobia and light sensitive skin are prominent features with cataracts, coarse skin and mental retardation.
- Seckel syndrome- has extreme microcephaly, short stature and beak nose.
- Delleman syndrome- includes orbital cysts or micro-ophthalmia, focal skin defects and central nervous system cysts and/or hydrocephalous [21].

Exact etiology remains unclear but genetic causes and vascular

Saxena and David	Mahore et al.[2]	Kokavec R[4]	Sharma et al.[3]	Vasudev et al.[6]
Mandibular hypoplasia, steep mandibular angle bilaterally, corneal plaque. Multiple tissue tags near the tragus of the ear. Inability to completely extend or flex neck. Deviation towards the left on opening the mouth. Open bite in the anterior and left posterior region. Right side posterior teeth were in cross bite. Narrow palatal vault and crowding in lower teeth and had fissured tongue.	Lower motor neuron facial nerve paresis, bilateral microtia, inferiorly situated ears, torticollis, left hemifacial hypoplasia. Ectopic kidneys,	Reported 4 cases : Face: plagiocephaly, facial asymmetry, mandibular hypoplasia, cleft lip and palate, multiple bilateral preauricular tags, epibulbar dermoids and upper eyelid coloboma, hypertelorism, and wide flat nose radix. • Extremities: bilateral megapollex and wide interdigital spaces. One patient showed peripheral facial nerve palsy. One patient also reported anomalies of the third and fourth thoracic vertebrae, scoliosis, and agenesis of the left second through fourth ribs and the pectoral muscle insertion. Abdomen showed hypoplasia of the left kidney.	Reported a patient with polydactyly hand, facial asymmetry; hypoplastic maxilla, LMN facial palsy, dysmorphic ear, slightly narrowed EAC, conductive hearing loss ear, short neck, shortened sternocleidomastoid ,divarication of recti, pilonidal dimple. Macrostomia was present. There was elevation of scapula and mild scoliosis. Presence of epicanthal folds and microophthalmia	Reported a case with juvenile glaucoma in Turner's syndrome, along with loss of vision in one eye, preauricular appendages, absence of uterus and right kidney,

Table1: Comparison of clinical features in various case reports.

changes are suggested by Soltan and Holmes [22]. There may also be fetal hemorrhage in the region of first and second arches at the time when the blood supply switches from stapedial artery to external carotid artery as suggested by Ryan et al. [23] Disturbance in neural crest development has been proposed by Källén et al. [24] Maternal diabetes, rubella and influenza have also been implicated[2,3].

Due to absence of genetic analysis and other advanced diagnostic aids we based our diagnosis on various clinical and radiological features and came to a conclusion of Goldenhar syndrome.

Treatment of Goldenhar syndrome remains speculative. It requires a multidisciplinary approach. Distraction osteogenesis along with functional orthodontics has been tried in growing age [25]. Plastic surgery to fix the jaw, cheeks, and ears, Microvascular free flaps for mandibular reconstruction has also been advocated [26].

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