MVP Journal of Medical Sciences, *Vol 1(2), 97–100, July 2014*

Limbal Stem Cell Transplantation for Limbal Dermoid in a Case of Goldenhar Syndrome

Prachi Pawar[1*] and Saurabh Shah[2]

[1]Associate Professor, Department of Ophthalmology, Dr. Vasantrao Pawar Medical College Hospital and Research Centre, Nashik, India
[2]Resident, Department of Ophthalmology, Dr. Vasantrao Pawar Medical College Hospital and Research Centre, Nashik, India; drsns88@gmail.com

Abstract

Goldenhar Syndrome (known as Oculoauriculovertebral Syndrome (OAVS) or facioauriculovertebral dysplasia) is a rare congenital defect classically involving eye anomalies with or without anomalous development of the ear, nose, lips, soft palate, mandible and vertebra. It is a morphogenetic anomaly associated with the 1st and 2nd branchial arches.

We report a case of 9 months old male child presented with ocular abnormalities. On evaluation, he had the classical signs of this syndrome like limbal dermoids, eyelid coloboma, preauricular skin tags and hemi facial microsomia. This patient was first seen in January 2010 and has been followed and treated for the same. The patient underwent a surgery for right eye limbal dermoid at the age of 4 years.

The initial presentation with course of the disease and Post-Surgical outcome is described here. The Authors performed dermoid excision with autologous conjunctiva along with limbal stem cells transplantation and achieved a satisfactory surgical outcome.

Keywords: Limbal Dermoid, Limbal Stem Cell Transplantation, Goldenhar Syndrome

1. Introduction

Goldenhar syndrome (Facioauriculovertebral dysplasia) is a rare congenital anomaly associated with the anomalous development of structures originating from the first and second branchial arches during blastogenesis[1, 6, 7, 8, 9].

In 1845, Carl Ferdinand Von Arlt, the German physician, was first described this syndrome. Almost a century later, in 1952, the constellation of syndrome was further described in detail by Dr. Maurice Goldenhar[1,3], in a pair of monozygotic twins with a triad of accessory tragi, mandibular hypoplasia (hemifacial microsomia), and epibulbar dermoids so called as the goldenhar syndrome. Gorlin et al.[4] further described this syndrome oculo-auriculo-vertebral dysplasia due to the presence of additional vertebral anomalies.

It is a rare disorder, with reported incidence of 1:3500 to 1:5600, and male: female ratio of 3:2 [5]. The exact etiology is not fully understood. Most of the cases have been sporadic. Autosomal dominant, autosomal recessive and multifactorial modes of inheritance in combination with environmental factors have also been suggested[1,6]. In most cases (about 60%) typically one side, mostly the right side, more affected than the other (asymmetry). [1,6,10] and ocular anomalies especially dermoids (60% cases), vertebral anomalies (40% cases) and ear anomalies (40% cases) are seen[1, 6].

2. Case Report

A 9 months-old male child was referred to Paediatric Ophthalmology division of our hospital for evaluation of

*Author for correspondence

fleshy masses on lateral aspect of the cornea of right eye and an irregular left upper eyelid since birth. This patient was first seen in January of 2010 and has been followed up since that time.

The patient was born to non-consanguineous parents at full term normal delivery at home. Birth weight ~ 2kg and had cried immediately after birth. The antenatal, intranatal and postnatal periods were uneventful with normal achievement developmental milestones. No family history of facial abnormality or ocular conditions.

On Ocular Examination: Visual Acuity: follows the light and equally resists occlusion. The pupils were equally reactive. Full range of ocular movements was present. Limbal dermoids, 2 in number, hemispheric, located in the inferior temporal and superior nasal part of the cornea in Right Eye, not obscuring the visual axis (Figure 1). Eyelid coloboma on the Left upper lid (cornea was completely covered with lid closure). Posterior segment evaluation was unremarkable with normal cup:disc ratio and foveal region. Retinal atrophic patch in the peripheral.

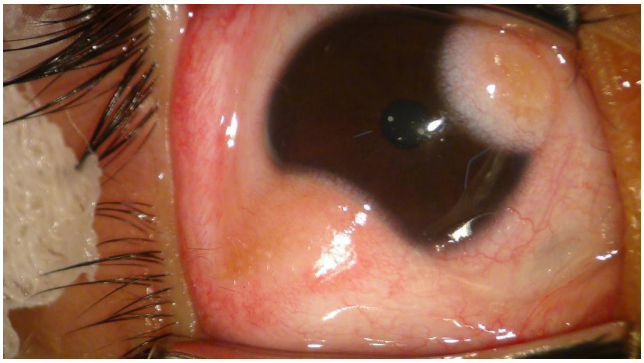

Figure 1. The Limbal Dermoids.

Preauricular skin tags were present on both side. Additional workup was done to evaluate the systemic association possible in the Oculo-Auriculo-Vertebral Spectrum (OAVS). Audiology tests, USG abdomen, ECG, 2D-ECHO and complete blood analysis was within normal limits. X-ray of spine and chest were normal. X-ray mandible revealed very subtle mandibular hypoplasia. Systemic Evaluation by a paediatrician did not reveal any abnormality.

As such, considering the patient's ocular condition, there was no need for urgent surgical intervention in the early weeks of life; cycloplegic refraction revealed significant astigmatism in right eye so to prevent amblyopia patients was given corrective spectacles with the occlusion therapy and followed up at every 6 months interval (Table 1). The patient continued to be Central, Steady, and Maintained (CSM) fixation in each eye independently.

Due to noncompliance with corrective spectacles, high irregular astigmatism, progressive enlargement of the mass reported by parents and foreign body sensation, removal of the limbal dermoid was suggested. Considering the options available, we excised the mass with a maximal depth of dissection and autologous conjunctiva along with limbal corneal stem cells transplantation was performed.

The histopathological evaluation of excised tissue - Fibro-lipoma showing proliferation of adipose and fibrous tissue with stratified squamous epithelium and no malignant growth.

On follow up visit (1 week): Normal behaviour without eye rubbing and no discomfort. No epithelial defect was evident. Corneal transparency continued to improve gradually in postoperative period (Figure 2).

Table 1. Refraction with Occlusions Therapy

AGE	Right eye Refraction With BCVA	Left Eye Refraction With BCVA	occlusion therapy
1 yr.	+2.00/-5.00x30°	+0.50 DS	20 mins daily.
2 yrs. (March 2011)	- 4.75 x 30°	Plano	1 hr. daily Regular
2.5 yr. (Dec 2011)	+2.00/-4.50 x30° (BCVA 6/36)	+0.25 6/6	3 hr. daily Regular
3.5 yr. (Nov 2012)	+8.00/-5.50 x40° (BCVA 6/24)	+1.00/-0.50 x140° 6/6	Irregular
4 yrs. (Aug 2013)	+8.00/-4.50 x40° (BCVA 6/24)	+0.50/-0.50 x180° 6/6	Non-compliance to glasses.

In second week: Conjunctival and corneal tissue had completely healed without retraction, neovascularization or scar and no signs of recurrence. The astigmatism reduced significantly from -5.50D to -2.00D at 1 month post-operatively but still there is significant astigmatism present due to superior nasal dermoid (Table 2). The Left lid coloboma will not require surgery as it does not result in corneal exposure.

Patient will continue with the eye patching treatment for RE amblyopia with the hope that vision may improve till 6-7 yrs. of age.

The surgical outcome with stem cells transplantation procedure is quite satisfactory, good recovery with prompt healing and minimal scar, the corneal curvature has stabilized and astigmatism is reduced by 3.00 D.

3. Discussion

According to medical literature, patients with Goldenhar syndrome may exhibit a wide range of anomalies including ocular changes such as micropthalmos, coloboma, strabismus, epibulbar dermoids and lipodermoids; aural features such as microtia, atresia, preauricular tragi or appendices, fistulas and hearing loss; craniofacial anomalies like facial asymmetry, cleft lip/cleft palate, developmental dental disturbances, Mandibular hypoplasia and vertebral anomalies like scoliosis, hemivertebrae and cervical fusion[1,6–9]. In addition, associated systemic features like skeletal, neurological(facial palsy, mental retardation), congenital heart anomalies (Tetralogy of Fallot, VSD), pulmonary, genitourinary anomalies, and/or gastrointestinal abnormalities(tracheoesophageal fistula, umbilical hernia, inguinal hernia) have been reported[1,6–10,13].

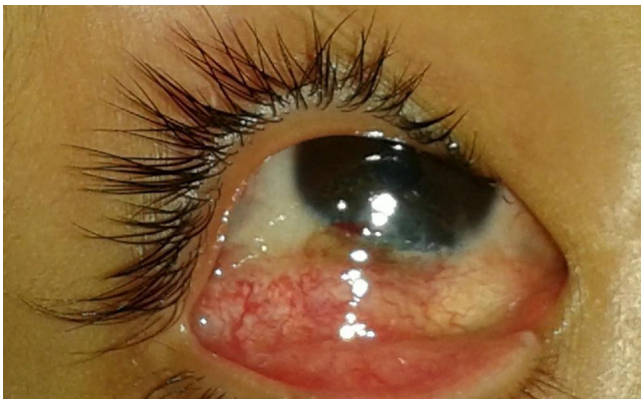

Figure 2. Right eye 2 weeks after removal of large limbal dermoid.

Management of Goldenhar syndrome varies according to the age and the severity of manifestation. As Ophthalmologists, the primary goal of treatment should be prevention of amblyopia by eliminating the strong amblyogenic risk factors like mass obscuring visual axis, severe astigmatism or strabismus; second is to prevent ocular exposure due to large lid coloboma or limbal dermoid preventing lid closure; and third at multidisciplinary approach for craniofacial anomalies such as madibular hypoplasia or Severe hemifacial microsomia, reconstruction can be done with bone grafts or by distraction osteogenesis. Systemic treatment may be required for cardiac, renal, or CNS malformations[12]. Prognosis is comparatively good in uncomplicated cases without any systemic associations.

Limbal dermoids are benign, congenital tumours containing choristomatous tissue, superficial well-circumscribed oval mass located most frequently at inferotemporal limbus; typically asymptomatic, but larger dermoids may cause cosmetic problems and visual impairment. Deep dermoids may require surgery such as a superficial lamellar sclerokeratectomy or even a penetrating keratoscleroplasty[14]. Here we used autologous conjunctiva along with limbal corneal stem cells transplantation instead of conventional methods i.e. simple excision / lamellar or penetrating keratoplasty/ amniotic membrane graft etc.

4. Conclusion

It is a milder form of Goldenhar syndrome[1–13] with limbal dermoids (Figure 3), eyelid coloboma, preauricular skin tags (Figure 4), hemi-facial microsomia (Figure 5) and no systemic involvement. Large limbal dermoid excision and autologous conjunctiva and corneal limbal stem-cell transplantation is the valid treatment option instead of conventional methods with successful post-operative results.

Table 2. Refraction at follow-up (1 month post-op)

Age	Unaided visual acuity		Cycloplegic refraction		BCVA	
	OD	OS	OD	OS	OD	OS
4.5 yr. (Nov 2013)	6/24	6/6	+4.00/ -2.00 x40˚	+.050/-.050 x180˚	6/12	6/6

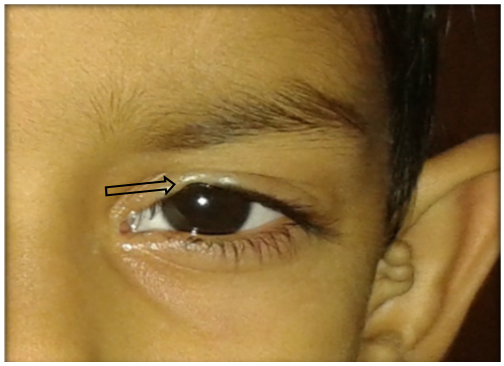

Figure 3. The lid coloboma (Left eye).

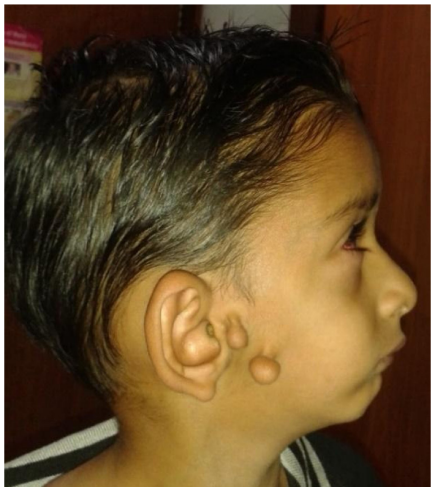

Figure 4. Preauricular skin tag (Right ear).

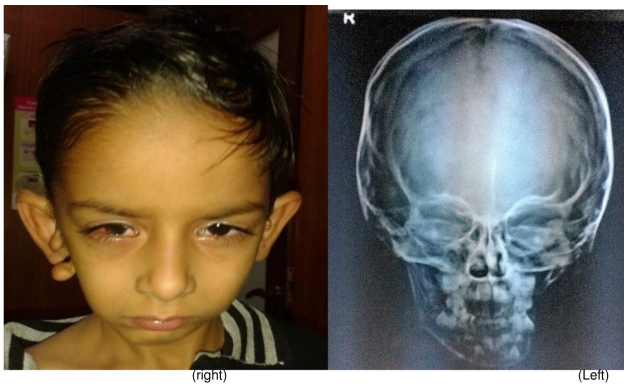

Figure 5. Hemi-facial microsomia (right) and mandibular hypoplasia on x-ray (Left).

5. References

1. Kulkarni V, Shah MD, Parikh A. Goldenhar syndrome (a case report). J Postgrad Med. 1985 Jul; 31(3):177–9.
2. Gorlin R, Cohen MM, Levin LS. Syndromes of the head and neck. NewYork: Oxford University Press; 1990.
3. Goldenhar M. Associations malformatives de l'oeil etl'oreille, en particulier le syndrome dermoideépibul-baire-appendices auriculaires-fistula auriscongenita et ses relations avec la dysostosemandibulo-faciale. J Genet Hum. 1952; 1:243–82.
4. Gorlin R, Pindborg J. Oculoauriculovertebral dysplasia. Syndromes of the Head and Neck. New York: McGraw-Hill; 1964.
5. Grabb WC. The first and second brachial arch syndromes. Plast Reconstr Surg. 1965; 36:485–508.
6. Mehta B, Nayak C, Savant S, Amladi S. Goldenhar syndrome with unusual features. Indian J Dermatol Venereol Leprol. 2008; 74:254-6.
7. Reddy M, Reddy P, Rani PU, Bindu LH. Facio-auricular vertebral syndrome-a case report.Indian J Hum Genet. 2005; 11:156–58.
8. Vinay C, Reddy R, Uloopi K, Madhuri V, Sekhar R. Craniofacial features in Goldenharsyndrome. J Indian Soc Pedod Prev Dent. 2009; 27:121-24.
9. Jaison S, Batra N. Goldenhar syndrome with multiple additional anomalies. Indian J Ophthalmol. 1996; 44:42-4.
10. Sharma J, Pippal S, Raghuvanshi S, Shitij A. Goldenhar-Gorlin's syndrome: A case report. Indian J Otolaryngol Head Neck Surg. 2006; 58:97-101.
11. Smith DW. Recognizable patterns of human malformations. Major Problems in Clinical Paediatrics. Philadelphia: W. B. Saunders Company; 1982.
12. Graff J, Bhola R, Olson R. Goldenhar Syndrome (Oculo-Auriculo-Vertebral Spectrum): 6 day-old male with limbal dermoids. Eyerounds.org. 2006 31 Mar. Available from: http://www.EyeRounds.org/cases/55GoldenharSyndromeLimbalDermoidColoboma.htm
13. Touliatou V, Fryssira H, Mavrou A, Kanavakis E, Kitsiou-Tzeli S. Clinicalmanifestations in 17 Greek patients with Goldenhar syndrome. Genet Couns. 2006; 17(3):359–70.
14. Hong S, Kim EJ, Seong GJ, Seo KY,'Limbal Stem Cell Transplantation for LimbalDermoid'. Ophthalmic Surg Lasers Imaging. 2010 Mar 9;1-2.