

Diagnostic challenges in Goldenhar syndrome – a case report

Paul Costin Pariza¹, Vlad Dima², Corina Grigoriu^{1,3}, Costin Berceanu⁴,
Tiberiu-Augustin Georgescu⁵, Bianca-Margareta Mihai², Consuela-Madalina Gheorghe⁶,
Roxana Elena Bohiltea^{1,2}

¹ Department of Obstetrics and Gynecology, “Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

² Filantropia Clinical Hospital, Bucharest, Romania

³ Department of Obstetrics and Gynecology, Emergency University Hospital, Bucharest, Romania

⁴ Department of Obstetrics and Gynecology, Craiova University of Medicine and Pharmacy, Craiova, Romania

⁵ Department of Pathology, “Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

⁶ Department of Marketing and Medical Technology, “Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

ABSTRACT

Goldenhar syndrome, also known as oculo-auriculo-vertebral syndrome, represents a rare congenital complex of anomalies, involving the development of the first and second brachial arches during the first embryonic stage. In addition to the craniofacial disorders, Goldenhar syndrome can include central nervous system, heart, skeleton or kidneys pathologies as well as vertebral defects. We present the case of a Goldenhar syndrome whose first pathologic sign was tetralogy of Fallot, with associated cardiovascular disorders (atrial septal defect type ostium secundum, and single umbilical artery) and bilateral microtia, with malformation of auditory canal, mandibular hypoplasia and a single epibulbar dermoid. The Goldenhar syndrome was diagnosed after birth, the article emphasizing the difficulties of prenatal diagnosis.

Keywords: Goldenhar syndrome, microtia, mandibular hypoplasia, tetralogy of Fallot, atrial septal defect

INTRODUCTION

First and second arch syndrome or oculo-auriculo-vertebral spectrum, first described in 1952 by the American doctor Goldenhar, represents a congenital malformation affecting the first and second branchial arches, associating vertebral and ocular abnormalities with wide variability in range of severity (1,2). The incidence is 1 in 5,500 live births (3), with a male:female ratio of 2:1. There were reported sporadic cases as well as autosomal-dominant inheritance, being a rare disorder (4,5). Clinical predominant unilateral features include orbital distortion, mandibular hypoplasia, accessory preauricular tags or pits, microtia, middle ear defects with

subsequent hearing impairment, facial muscles hypoplasia, profounder hypoplasia or lack of parotid gland or also of the masticatory muscles. Besides OMENS (orbit, mandible, ear, facial nerve, soft tissue) anomalies, Goldenhar syndrome may be accompanied by cardiac, respiratory, central nervous system, gastrointestinal, skeletal pathologies and renal deformities (6).

CASE PRESENTATION

A 24-year-old pregnant woman, with negative first and second trimester screening for aneuploidies, presents for the fetal anomalies scan at 19 gestational weeks, the fetus being diagnosed with te-

tralogy of Fallot (Figure 1), atrial septal defect type ostium secundum, and a single umbilical artery was noted with no additional structural abnormalities. After genetic counselling the couple consented to amniocentesis and the karyotype showed a normal female karyotype with no microdeletion for 22 q 11.2 (Di George syndrome). The couple decided to continue the pregnancy. The course of the pregnancy was uneventful until 32 gestational weeks when polyhydramnios was diagnosed. The pregnancy was closely monitored and a term 2,800 g female fetus was delivered by cesarean section. The clinical examination of the newborn revealed bilateral microtia (Figure 2) with malformation of auditory canal, mandibular hypoplasia (Figure 3) and a single epibulbar dermoid. The spinal X-ray revealed vertebral anomalies at the T6-T9 level, with ‘butterfly vertebrae’ (Figure 4). No lungs or kidneys abnormalities were noted. At the age of 7 months, the infant underwent heart defect correction surgery after which it was discharged and went home hemodynamically stable.

Between the age of 1 and 5 years-old, the infant benefited from ear anomalies correction surgery, a cochlear implant and multiple cosmetic surgeries for the mandibular and alveolar correction. The evolution of the infant has been favorable with no neurological or cognitive impairment. Two years after the infant with the Goldenhar syndrome was born, the couple had another baby, which was healthy and had no structural abnormalities.



FIGURE 2.
Bilateral microtia with malformation of the auditory canal



FIGURE 3.
Mandibular hypoplasia



FIGURE 1. 2D ultrasonography imaging of the tetralogy of Fallot



FIGURE 4. Spinal X-Ray with vertebral anomalies at the T6-T9 level, with ‘butterfly vertebrae’



FIGURE 5.
Epibulbar
dermoid (blue
arrow)

DISCUSSION

Goldenhar syndrome is a rare congenital syndrome that could endanger the newborn's life from the first few hours by the internal organs' complications, by airway obstruction or sleep apnea, due to craniofacial deformities (6). Regarding family history with cases of previously diagnosed Goldenhar syndrome, the couple should be advised to undergo a non-invasive prenatal testing and be counseled about the implications and management of this syndrome (7).

Having a wide range of aspects, the phenotype differs from one patient to another, so the ultrasonographic diagnosis is hard to be established. The fetus can present microtia, asymmetric mandibular hypoplasia in severe cases and preauricular skin tags; using 3D ultrasonography, severe cases can be identified (7,8).

The evolution of the infant is difficult to anticipate, implying multiple surgeries and care that might be a real burden for fetuses born in countries where no specific programs for this kind of syndromes or healthcare programs are available (9,10).

CONCLUSIONS

Due to a large variety of abnormalities and different severity degree of symptoms, patients with Goldenhar syndrome represent a challenge for clinicians both therapeutically and diagnostically. It requires an individual approach to every single patient and the involvement of a team of specialists in therapeutic planning and treatment. It is a complex, long lasting, multidisciplinary process and should be divided into stages according to the patient's age, necessities and also to the extent of anomalies, involving neonatologists, pediatricians, surgeons, as well as family support.

Conflict of interest: none declared
Financial support: none declared

REFERENCES

1. Strömmland K, Miller M, Sjögren L, Johansson M, Joelsson BM, Billstedt E, et al. Oculo-auriculo-vertebral spectrum: associated anomalies, functional deficits and possible developmental risk factors. *Am J Med Genet A*. 2007 Jun 15;143A(12):1317-25.
2. Tuna EB, Orino D, Ogawa K, Yildirim M, Seymen F, Gencay K, Maeda T. Craniofacial and dental characteristics of Goldenhar syndrome: a report of two cases. *J Oral Sci*. 2011 Mar;53(1):121-4.
3. Kelberman D, Tyson J, Chandler DC, McInerney AM, Slee J, et al. Hemifacial microsomia: progress in understanding the genetic basis of a complex malformation syndrome. *Hum Genet*. 2001 Dec; 109(6):638-45.
4. Ala-Mello S, Siggberg L, Knuutila S, von Koskull H, Taskinen M, Peippo M. Further evidence for a relationship between the 5p15 chromosome region and the oculoauriculovertrebral anomaly. *Am J Med Genet A*. 2008 Oct 1;146A(19):2490-4.
5. Tasse C, Majewski F, Böhringer S, Fischer S, Lüdecke HJ, Gillissen-Kaesbach G, Wiczorek D. A family with autosomal dominant oculo-auriculo-vertebral spectrum. *Clin Dysmorphol*. 2007 Jan;16(1):1-7.
6. Bogusiak K, Puch A, Arkuszewski P. Goldenhar syndrome: current perspectives. *World J Pediatr*. 2017 Oct;13(5):405-415.
7. Guzelmansur I, Ceylaner G, Ceylaner S, Ceylan N, Daplan T. Prenatal diagnosis of Goldenhar syndrome with unusual features by 3D ultrasonography. *Genet Couns*. 2013;24(3):319-25.
8. Pop-Trajković S, Antić V, Kopitović V. Invasive prenatal diagnosis. In: Choy R, eds. Prenatal diagnosis-morphology scan and invasive methods. Rijeka: InTech, 2012:1-26.
9. Wolford LM, Bourland TC, Rodrigues D, Perez DE, Limoeiro E. Successful reconstruction of nongrowing hemifacial microsomia patients with unilateral temporomandibular joint total joint prosthesis and orthognathic surgery. *J Oral Maxillofac Surg*. 2012 Dec;70(12):2835-53.
10. Wolford LM, Perez DE. Surgical management of congenital deformities with temporomandibular joint malformation. *Oral Maxillofac Surg Clin North Am*. 2015 Feb;27(1):137-54.