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Case Report

Treacher Collins Syndrome: A Case Report and Review

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ABSTRACT

Treacher Collins syndrome is an autosomal dominant genetic disorder that results from improper development of the first and second pharyngeal arches. Disruption in the formation and migration of neural crest cells leads to facial malformation. Face shows a convex profile with hypoplastic malar bones as well as mandibular hypoplasia. Eyes typically have antimongoloid slant often with lower lid coloboma. External ear is deformed and patients often suffer from conductive deafness. Respiratory distress is common due to hypoplastic facial bones. Though intelligence remains unaffected, such patients are susceptible to depression. Management of these patients require multidisciplinary approach to ensure a decent quality of life.

Keywords: Malar Hypoplasia, Micrognathia, Downslanting Palpebral Fissure, Neural Crest Cells

INTRODUCTION

Treacher Collins Syndrome (TCS) which is also known as mandibulofacial dysostosis, is a relatively rare genetic disorder characterized by distinctive deformities of the craniofacial region. It is inherited as an autosomal dominant disorder which affects approximately 1 in 50,000 live births with vast majority of cases (60%) arising as new mutations[1]. TCS is primarily caused by mutations in the genes TCOF1, POLR1C, or POLR1D[2]. These genes have critical roles in the development of skeletal components and soft tissue structures of the face. The major structural defects are caused by anomalous development of first and second pharyngeal arches during histodifferentiation and morphogenesis between approximately the 20th day and the 12th week of intrauterine life[3]. Clinical manifestations are mostly symmetrical including external ear deformities like microtia or anotia usually with conductive hearing loss, down slanting palpebral fissures usually accompanied by coloboma of the of lower eyelids, hypoplasia of the cheek and jaw region(micrognathia) as well as random occurrence of palatal cleft and choanal atresia[4]. This syndrome has been outlined by several researchers from time to time like Thomson in 1846, Bercy in 1889, Treacher Collins in 1900 and Franceschetti and Klein in 1949[5]. Despite its rarity, the impact of TCS on affected persons and their families can be profound, necessitating a thorough understanding of its causes, symptoms, diagnosis, and treatment options.

CASE HISTORY

A six years old boy was admitted to the hospital for the treatment of lower respiratory tract infection. On physical examination, he was found to have facial deformity with distinctive hypoplasia of the malar region, with micrognathia and macrostomia (Figure-1). Eyes showed lateral downslanting of palpebral fissures (antimongoloid) with coloboma in the lower eyelids and scanty eyelashes (Figure-2).

The ears were malformed and low set with stenosed external auditory canals (Figure-3). Speech was absent and conductive deafness was present. The boy was otherwise found to have normal intellect. There was history of cleft palate repair at the age of three years. Parents were normal without any history of consanguineous marriage, maternal illness or drug intake during pregnancy. Patient had two brothers who were free from any congenital deformity. On systemic examination, wheeze and crepitations were detected in both lung fields. Radiograph of the head and neck area showed hypoplastic maxilla and zygomatic bones. Mandible was also hypoplastic with prominent antegonial notching (Figure-4) and downward deformity of symphyseal region. Malocclusion of teeth was noted. The boy was treated for chest infection but due to poor socioeconomic condition parents refused further treatment. The patient was finally discharged with the advice to attend maxillofacial surgery clinic, adopt hearing aids and to undergo speech therapy and karyotyping.

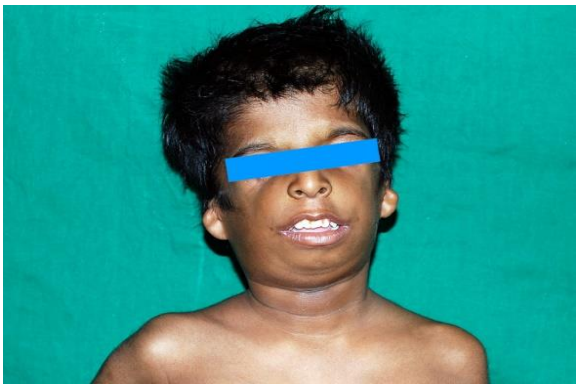

Figure-1: Face showing malar hypoplasia, micrognathia, macrostomia and low set ears

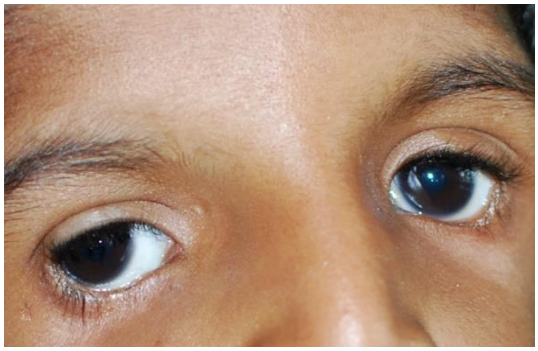

Figure-2: Both eyes showing downslanting palpebral fissures with coloboma in the lower eyelids and scanty eyelashes

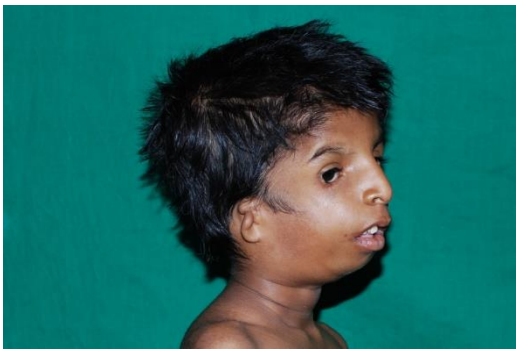

Figure-3: Malformed auricle with stenosed external acoustic meatus

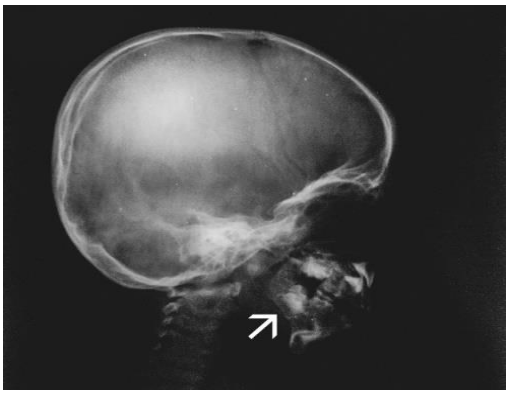

Figure-4: Radiograph showing prominent antegonial notch (arrow) in mandible

DISCUSSION

The commonly implicated gene in TCS is TCOF1, mutation of which accounts for 80-90% cases of TCS. TCOF1 encodes a nucleolar protein called Treacle which is expressed in the neural folds during the formation and migration of neural crest cells and also in the neural crest–derived mesenchyme of the first and second pharyngeal arches[6]. Sadler TW[1] mentioned that treacle is necessary for preventing apoptosis and maintaining proliferation of neural crest cells and any disruption in the formation of neural crest cells results in craniofacial malformations. Animal studies have revealed that exposure to teratogenic doses of retinoic acid can result in malformations consistent with TCS[1,7]. Marszałek-Kruk B.A et[4] al noted that apart from TCOF1, Treacher Collins syndrome has three other subtypes caused by variations in the genes POLR1D, POLR1C and POLR1B. Older paternal age has also been linked with increased occurrence of

TCS[8]. Patients with complete manifestation of TCS exhibit a convex facial profile in which dorsum of the nose is unduly prominent with a receding chin and lower jawline. The most characteristic feature is the hypoplasia of facial bones notably maxilla, zygomatic bone and mandible. Mandibular deformity involves hypoplasia of both ramus and body often accompanied by significant hypoplasia of the mandibular condyles. This can result in a high incidence of dysfunction and ankylosis of temporo-mandibular joint[9]. The mandible usually shows significant antegonial notching and the mandibular angle is often underdeveloped or absent altogether[10]. A good number of affected individuals (46%) suffer from respiratory distress as a result of obstructive sleep apnea caused by malar hypoplasia and micrognathia[11]. Another unwanted effect of facial bone hypoplasia is dental malocclusion and anterior open bite, which is a common finding in these patients[12]. Additionally, variable abnormality of soft-tissues can occasionally result in a Tessier 7 cleft (macrostomia)[13]. The palpebral fissures are almost universally described as having an antimongoloid slant, usually with defects of the lower lids and partial absence of eyelashes. Occasionally, eyes are directly affected resulting in vision loss (33%), squint (37%), developmental cataracts, and even microphthalmia or anophthalmia[14]. The external ears are frequently malformed showing microtia or anotia which varies in severity on both sides[9]. Conductive hearing loss is present in about 50% of cases due to variable degrees of stenosis or hypoplasia of the external acoustic meatus and middle ear ossicles[15]. On the contrary, sensorineural hearing loss and mixed hearing loss are rare in TCS and only reported incidentally. Cleft palate, with or without accompanying cleft lip and choanal atresia, are often present[16]. Chang CC et al[9] mentioned that cleft palate is present in one-third of cases of TCS and palatoplasty should be planned in the initial years of life itself to ensure proper feeding as well as development of speech. Antimongoloid slant of palpebral fissures and hypoplasia of the zygomatic arches have been considered as the minimum criteria for diagnosis of TCS[17]. However, in the present case, apart from the minimal criteria, many of the other reported features like micrognathia, large mouth with dental malocclusion, malformed ears with conductive type hearing loss have been encountered. As noted in the present case, most patients suffering from TCS exhibit normal intelligence and the condition can affect both genders equally[4]. Geirdal AO[18] in their study reported that individuals with TCS usually suffer from severe depression and poor quality of life. However, patients who had reconstructive surgery and were happy with their appearance and felt socially accepted, were able to complete education and gain employment[19].

CONCLUSIONS

Treacher Collins syndrome is a congenital illness resulting in varying degree of craniofacial malformation. Though rare, it presents significant challenges for afflicted individuals as well as their families. These patients require multidisciplinary care including ophthalmological, otorhinolaryngological, dental, surgical, and psychological help from birth right upto adulthood.

Meticulous treatment planning, counseling and reconstructive surgical techniques are indispensable for improving quality of life for these patients. With continued research and advancements in medical science, there is hope for improved outcomes for those living with TCS.

REFERENCES

1. Sadler TW. Langman's medical embryology. 2nd ed. New York: Churchill Livingstone; 1997. p. 77–78.

2. Kolsi N, Boudaya F, Ben Thabet A, et al. Treacher Collins syndrome: A case report and review of literature. Clin Case Rep. 2022;10

3. Gorlin RJ, Cohen MM Jr, Levin LS. Syndromes of the head and neck. 3rd ed. New York: Oxford; 1990. p. 649-51.

4. Marszałek-Kruk BA, Wójcicki P, Dowgierd K, Śmigiel R. Treacher Collins Syndrome: Genetics, Clinical Features and Management. Genes. 2021;12(1392).

5. Cannistra C, Barbet JP, Houtte A, et al. Mandibulo-facial dysostosis: comparison study of a neonate with mandibulo-facial dyostosis and a normal neonate. J Craniomaxillofac Surg. 1998;26:92–7.

6. Schoenwolf GC. Larsen's human embryology. 5th ed. Philadelphia: Churchill Livingstone; 2015. p. 429-72.

7. Sulik KK, Johnston MC, Smiley SJ, Speight HS, Jarvis BE. Mandibulofacial dysostosis (Treacher Collins syndrome): a new proposal for its pathogenesis. Am J Med Genet. 1987 Jun;27(2):359-72.

8. Jones KL, Smith DW, Harvey MAS, Hall BD, Quan L. Older paternal age and fresh gene mutation: data on additional disorders. J Pediatr. 1975;86:84-88.

9. Chang CC, Steinbacher DM. Treacher Collins syndrome. Semin Plast Surg. 2012 May;26(2):83-90.

10. Chong DK, Murray DJ, Britto JA, Tompson B, Forrest CR, Phillips JH. A cephalometric analysis of maxillary and mandibular parameters in Treacher Collins syndrome. Plast Reconstr Surg. 2008 Mar;121(3):77e-84e.

11. Plomp RG, van Lieshout MJS, Joosten KFM, Wolvius EB, van der Schroeff MP, Versnel SL, Poublon RML, Mathijssen IMJ. Treacher Collins Syndrome: A Systematic Review of Evidence-Based Treatment and Recommendations. Plast Reconstr Surg. 2016 Jan;137(1):191-204.

12. Trainor PA, Dixon J, Dixon MJ. Treacher Collins syndrome: etiology, pathogenesis and prevention. Eur J Hum Genet. 2009 Mar;17(3):275-83.

13. McElrath AD, Winters R. Mandibulofacial Dysostosis. [Updated 2023 Jul 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan.

14. Hertle RW, Ziylan S, Katowitz JA. Ophthalmic features and visual prognosis in the Treacher-Collins syndrome. Br J Ophthalmol. 1993;77(10):642–645.

15. Marres HA. Hearing loss in the Treacher-Collins syndrome. Adv Otorhinolaryngol. 2002;61:209-215.

16. Posnick JC. Treacher Collins syndrome: perspectives in evaluation and treatment. J Oral Maxillofac Surg. 1997 Oct;55(10):1120-1133.

17. Mohan RP, Verma S, Agarwal N, Singh U. Treacher Collins syndrome: a case report. BMJ Case Rep. 2013 May 24;2013

18. Geirdal AØ, Saltnes SS, Storhaug K, Åsten P, Nordgarden H, Jensen JL. Living with orofacial conditions: psychological distress and quality of life in adults affected with Treacher Collins syndrome, cherubism, or oligodontia/ectodermal dysplasia—a comparative study. Qual Life Res. 2015 Apr;24(4):927-935.

19. Thompson JT, Anderson PJ, David DJ. Treacher Collins syndrome: protocol management from birth to maturity. J Craniofac Surg. 2009 Nov;20(6):2028-2035.

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