

Bilateral Congenital Cholesteatoma of the Temporal Bone in Crouzon Syndrome

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SUMMARY

Introduction Crouzon syndrome is an autosomal dominant genetic disease characterized by bicoronal craniosynostosis, exorbitism with hypertelorism, and maxillary hypoplasia with mandibular prognathism. **Case Outline** We present the first reported case of Crouzon syndrome associated with a bilateral congenital cholesteatoma of the temporal bone and discuss about the potential pathogenesis.

Conclusion Early diagnosis and management are crucial to prevent complications and an otologist should be an integral part of the multidisciplinary team.

Keywords: Crouzon syndrome; bilateral congenital cholesteatoma; hearing loss

INTRODUCTION

In 1912 Louis Edouard Octave Crouzon [1] described a hereditary syndrome of craniofacial synostosis as a triad of skull deformities, facial anomalies and exophthalmos. Crouzon syndrome (CS) accounts for about 4.8% of all cases of craniosynostosis [2]. Dysplasias of the skeleton are caused by the malformations of the mesenchyme and ectoderm. Otolgic manifestation in CS involves hearing loss, which is mainly conductive, and indicates a deformity of the middle ear [3]. In general, bilateral congenital cholesteatoma (CC) of the temporal bone is extremely rare [4] and it has never been described in association with CS. Usually, CC is a silent disease and the first symptom is conductive hearing loss, but it could cause serous exocranial and endocranial complications so that early diagnosis is most important.

CASE REPORT

A 27-year-old female was referred to the Clinic of Otorhinolaryngology and Maxillofacial Surgery in Belgrade due to hearing loss, periodic dizziness and headaches without a history of ear infections. On general examination, the patient was of short stature with mild exophthalmos, maxillary hypoplasia (Figure 1) and pseudoprognathism of the mandible. Her parents were phenotypically normal and in non-consanguineous marriage. She had hearing loss from childhood which was rehabilitated using hearing aids on both ears. Otomicroscopic findings showed intact eardrums with bilateral whitish masses behind a translucent drum. Pure tonal audiometry showed severe bilateral mixed hearing loss. High resolution computed tomography (CT) demonstrated bilateral soft tissue masses in the antrum, attic

and middle ear. The findings were more extensive in the left ear (Figure 2). In previous history her parents and she refused imaging diagnostics and the first imaging was done during hospitalization. The patient was referred to a geneticist and FGFR2 mutation was detected. It was considered as a mutation *de novo* and the diagnosis of Crouzon syndrome was made. The patient underwent surgery and radical tympanomastoidectomy was performed on both ears in three months period. Intraoperative findings and pathohistologic analyses confirmed the diagnosis of congenital cholesteatoma of the middle ears with destruction of the left tegmen tympani and ossicles. She had the same hearing level on both sides as preoperatively and continued to use hearing aids. In the follow-up period of three years there were no relapses of cholesteatoma.

The manuscript was approved by the Ethics Committee of Clinical Centre of Serbia. Also, the patient consented to the publication of clinical photos.

DISCUSSION

CS is characterized as a rare genetic disorder which is autosomal dominant in transmission or appears as a mutation with variable phenotypic expression and complete penetrance [3]. It occurs in approximately 1 in 25,000 births worldwide [2]. Mutation of the gene (locus 10q26) for fibroblast growth factor receptor 2 (FGFR2) could be responsible for Crouzon syndrome [5]. More than 50% of patients with CS have FGFR2 mutations on molecular analysis. FGFR2 mutations are also observed in Apert syndrome, Pfeiffer syndrome and Jackson-Weiss syndrome [6]. Premature craniosynostosis commonly involves coronal and sagittal sutures resulting in a high prominent forehead.

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Figure 1. Patient's profile

Abnormal craniofacial skeletal development causes severe midface hypoplasia, and patients with CS have an exophthalmos with hypertelorism, maxillary hypoplasia with mandibular prognathism. The ear canals may be narrow or absent, and the middle ear may be deformed. In most cases it causes conductive hearing loss [3]. The parts of the ear originate from different germinative layers or tissues: the external ear from ectoderm, the middle ear from mesenchyme and the inner ear from endoderm. In CS dysplasias of the skeleton are caused by the malformations of the mesenchyme and ectoderm and it could be a connection between Crouzon's syndrome and congenital cholesteatoma (CC) of the middle ear. CC is thought to arise from embryonal inclusions or rests of epithelial cells [7]. Dysmorphogenesis of the middle ear is caused by aberrant differentiation of the second branchial arches and it is thought that the pathogenesis of CC is also due to this developmental abnormality.

Bilateral CC is extremely rare in general [4, 8], and only one case was associated with a syndrome. It was a

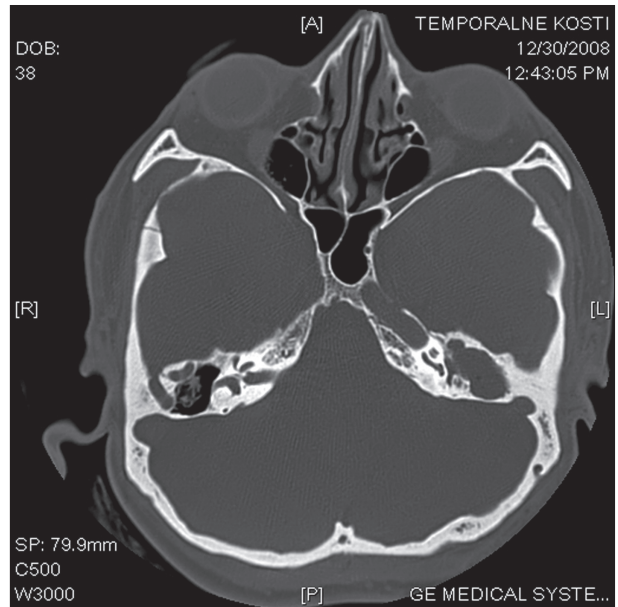


Figure 2. High resolution of CT scan of the temporal bone shows a bilateral soft tissue mass in the antrum, attic and middle ear. The process is more expansive in the left ear.

branchio-oto-renal syndrome [9]. An association between CS and CC has never been documented.

CC presents behind an intact tympanic membrane, without continuity to the external ear canal and in the absence of etiological factors such as tympanic membrane perforation and a history of ear infections or ear surgery. One of the first symptoms is hearing loss.

Early diagnosis of CC is essential to prevent delayed cases and serious complications.

The most important tools in the diagnosis are high resolution CT of temporal bones and MRI.

Crouzon's syndrome is a rare autosomal dominant condition and hearing impairment is common. This new association with congenital cholesteatoma suggests another potentially serious cause of hearing loss. Early diagnosis and management is crucial to prevent complications and an otologist should be an integral part of the multidisciplinary team.

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Обострани конгенитални холестеатом темпоралне кости код Крузоновог синдрома

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КРАТАК САДРЖАЈ

Увод Крузонов синдром је аутозомално доминантно генетско обољење које се одликује сужењем обима лобање, избоченом орбитом, слабо развијеном горњом вилицом и више развијеном и истуреном доњом вилицом.

Приказ болесника У раду је приказан први случај Крузоновог синдрома који је праћен обостраним холестеатомом

темпоралне кости. У раду се указало на потенцијалну патогенезу обољења.

Закључак Рана дијагноза и лечење су основа у превенцији компликација, а отолог је обавезно у саставу мултидисциплинарног тима лекара.

Кључне речи: Крузонов синдром; обострани холестеатом; губитак слуха

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