

*Research Article***Congenital duplication of mastoid segment of facial nerve in child candidate for Cochlear Implantation Surgery: a rare case report.**

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Abstract

Congenital duplication of facial nerve is a very rare anomaly commonly associated with inner and middle ear anomalies. There can be duplication of mastoid, tympanic, or labyrinthine segments. We describe duplication of mastoid segment of facial nerve in a child male who candidate for cochlear implantation surgery.

Keywords: Cochlear implantation, computed tomography, facial nerve, stylomastoid foramen.

Introduction

Duplication of the facial nerve is a very rare anomaly which is commonly associated with middle and inner ear anomalies. It can involve any segment of the intratemporal facial nerve. It is important to look for this anomaly in all patients with congenital deafness and ear anomalies. Preoperative evaluation of this anomalies especially in cochlear implantation surgery is important to avoid inadvertent nerve injury and also in recognizing associated middle and inner ear anomalies.

Case Report

A 2.5-year-old male child presented to the ENT department at Mansoura University Hospital, Egypt with a history of congenital bilateral sensorineural hearing loss. There was no history of otitis media, trauma, or ear surgery. Clinical examination showed well-formed pinna

with atresia of external auditory canal. No facial nerve abnormalities were detected. Audiometry study showed bilateral sensorineural hearing loss. High-resolution computed tomography (HRCT) of temporal bone was done.

HRCT temporal bone showed normal external auditory canal, middle ear ossicles, cochlea, vestibule, and semicircular canals. We traced the course of facial nerve and found duplication of mastoid segment of facial nerve with two stylomastoid foramina on the right side [Fig. 1]. Mastoid segment of the facial nerve divides into lateral and medial segments with larger lateral segment branch which carries enlarged chorda tympani branch and medial segment branch continues as tympanic branch of the facial nerve [Fig. 2]. There was no duplication of tympanic and labyrinthine segments of the facial nerve [Fig. 3].



Figure 1 (A, B,C)

(A),(B) sagittal CT sections and (C) axial section through temporal bones show bifurcation of mastoid segment of the facial nerve into medial and lateral segments. (red arrows).

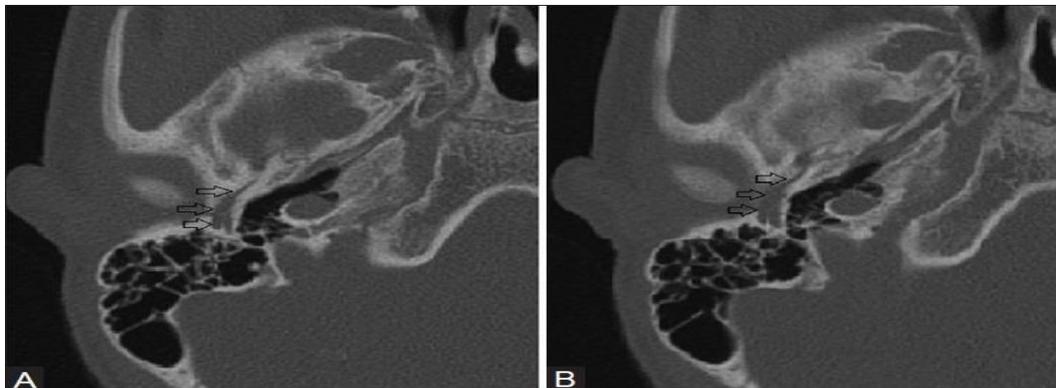


Figure 2 (A, B)

(A and B) Serial axial CT sections of the temporal bone show bifurcation of mastoid segment of the facial nerve into medial and lateral segments; the lateral segment carries enlarged chorda tympani branch (open arrows) and the medial segment carries rest of the tympanic segment of the facial nerve.

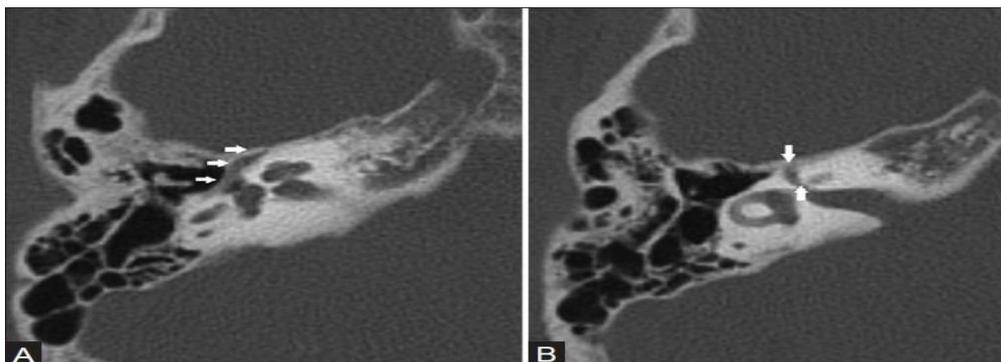


Figure 3 (A, B)

(A and B) Axial CT sections of temporal bone show normal tympanic and labyrinthine segments of the facial nerve.

Discussion

Facial nerve anomalies are commonly associated with ossicular chain anomalies. This is explained by the fact that ossicular structures develop from the first and second branchial arches and facial nerve develops from the second arch^[1,2]

Congenital dehiscence of tympanic segment of facial nerve is the most commonly seen anomaly of the facial nerve^[3].

Duplication of facial nerve is a very rare anomaly associated with middle and inner ear anomalies. Bifurcation of mastoid, tympanic, labyrinthine, and canalicular segments of facial nerve has been variously described in the literature^[4].

Bifurcation of tympanic segment is most frequently reported and can be associated with congenital stapes fixation and oval window atresia^[5].

Labyrinthine segment division is an extremely rare occurrence with a single case report in the literature^[4].

There are few isolated case reports describing bifurcation of mastoid segment of the facial nerve^[6,7].

In patients with external auditory canal atresia, often the facial nerve shows altered course with mastoid segment passing along or through the atretic bone plate resulting in increased risk of injury during surgical repair^[8].

Other variations in facial nerve course in this anomaly include anteriolateral displacement of stylomastoid foramen with extracranial course of facial nerve making it vulnerable for injury during surgery. Tympanic segment of facial nerve may be caudally displaced and overlying the oval window putting it at risk for injury during surgery^[8,9]

HRCT of temporal bone accurately depicts the facial nerve anatomy and its anomalies. Bifurcation of mastoid segment is shown on CT as division of facial nerve at the level of stylomastoid foramen with symmetric bifid facial nerve segments coursing in two stylomastoid foramina. The lateral foramen

contains the enlarged chorda tympani branch and courses in close relation to mastoid bone^[6,10]

It is important to recognize this anomaly as there is a risk of nerve injury during mastoidectomy or cochlear implant surgery^[11].

Bifurcation of tympanic segment of the facial nerve usually occurs adjacent to oval window, with reunion of bifid segments distal to stapes or at posterior genu. Bifid segment of the facial nerve courses over oval window with increased risk of injury during stapedectomy, and hence it is important to recognize this anomaly^[10]

Division of labyrinthine segment of the facial nerve is extremely rare and is associated with cochlear and vestibular anomalies^[4].

Bifurcation of intracanalicular part of the facial nerve with separate or no bony septa has been described^[12]

Conclusion

Facial nerve duplication is a rare anomaly which often associated with middle and inner ear anomalies. It is important for the radiologist to be aware of this entity and carefully look for this anomaly while reviewing CT of temporal bone. Major presurgical implication of this anomaly can avoid inadvertent injury to the facial nerve during surgery. Also, recognizing this anomaly should alert the radiologist to look for other anomalies.

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