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Sacrifice of the chorda tympani nerve during middle-ear surgery can lead to resolution of dysgeusia

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Clinical Record

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Abstract

Background. Cholesteatoma often presents with persistent otorrhoea, conductive hearing loss or vestibular dysfunction. Rarely, cholesteatoma can cause dysgeusia if the lesion invades into the chorda tympani nerve. This paper presents an individual with cholesteatoma whose dysgeusia resolved following a mastoidectomy in which the chorda tympani was sacrificed. The current literature was reviewed for explanations behind this phenomenon.

Case report. A previously fit 57-year-old man presented with a 3-month history of persistent otorrhoea and the complaint of a metallic taste in the mouth, and was diagnosed with cholesteatoma. The patient underwent radical mastoidectomy and the chorda tympani nerve was sacrificed. On post-operative review, he reported complete resolution of dysgeusia.

Conclusion. The sense of taste is mediated by a complex neural network. It is possible that once the diseased chorda tympani is transected, compensation arises from other parts of the network. Sectioning of the chorda tympani could lead to a beneficial outcome in selected patients.

Introduction

Cholesteatoma is characterised by an abnormal growth of keratinising stratified squamous epithelium in the tympanic cavity or mastoid air cells. The lesion is locally destructive and can affect the chorda tympani. In rare cases, cholesteatoma has presented with dysgeusia, an altered sensation of taste, as the sole symptom.[1,2] Dysgeusia is also a recognised side effect in mastoidectomy following transection or instrumentation of the chorda tympani.[3]

We present an individual with cholesteatoma whose dysgeusia resolved following a mastoidectomy in which the chorda tympani was sacrificed; this phenomenon has not, to our knowledge, been reported previously.

Case report

A previously fit 57-year-old man presented with a 3-month history of persistent otorrhoea and the complaint of a metallic taste in the mouth. A computed tomography scan of the temporal bones showed total opacification of the right middle ear and mastoid antrum associated with minor erosion of the incus short process. He was clinically diagnosed with cholesteatoma.

The patient underwent exploration and radical mastoidectomy via an endaural approach. The chorda tympani was identified and seen to be passing through the cholesteatoma sac, which was partially eroding into the incus and malleus. Sacrifice of chorda tympani was therefore necessary. Complete clearance of the cholesteatoma was achieved using a potassium titanyl phosphate laser. On post-operative review, the patient reported complete resolution of dysgeusia.

Discussion

After entering the middle ear via the canaliculus of the chorda, the chorda tympani travels between the malleus and long process of incus before exiting through the petrotympanic fissure. Its close proximity to the tympanic membrane means that cholesteatoma arising from retraction pockets commonly involves the chorda tympani, resulting in chronic inflammation and causing dysfunction associated with the vascular degeneration of Schwann cells and disorganisation of axons.[4]

The sense of taste is mediated by a complex neural network. The chorda tympani and lingual branch of the glossopharyngeal nerve supply taste to the tongue, whereas the greater superficial petrosal nerve and pharyngeal plexus of the vagus nerve supply taste to the palate and epiglottis. Some have suggested that sectioning of the chorda tympani would cause disinhibition of the glossopharyngeal and greater petrosal nerves.[5] This theory is also supported by neurophysiological data in animal studies where a central disinhibition was seen from the nucleus of the solitary tract after chorda tympani anaesthesia.[6]

After chorda tympani sectioning, the selective attenuation of taste response from the intact side of the tongue is known to release local diffusible factors that contribute to an enhancement of taste sensation on the contralateral side of the tongue.[7] Therefore, unilateral chorda tympani damage causing a localised taste loss in one area can trigger a heightened taste response from other areas. It is possible that once the diseased chorda tympani was transected in our patient, there was a compensation from other parts of the neural network and the contralateral chorda tympani. Similarly, such a mechanism could also explain why patients are less likely to develop dysgeusia after middle-ear surgery on ears that are chronically inflamed,[8] as there is compensation for the gradually deteriorating chorda tympani function in these cases.

- Dysgeusia can be a symptom associated with middle-ear disease when the chorda tympani nerve is involved
- Manipulation of the chorda tympani nerve during middle-ear surgery can cause taste disturbances post-operatively
- This paper reports a case where sacrifice of the chorda tympani nerve resulted in resolution of dysgeusia
- Taste is mediated by a complex neural network, and sectioning of the chorda tympani nerve could be compensated for by other parts in the network
- There might be benefits to the sectioning of a pathological chorda tympani nerve

It is controversial whether an injured chorda tympani should be preserved or divided intra-operatively. Some have found that transection of the chorda tympani is more likely to lead to post-operative gustatory symptoms than a preserved chorda tympani.[9] Others have suggested that incomplete injury to the chorda tympani is more likely to cause taste disturbance than total division.[10]

In one study of 140 subjects, dysgeusia was observed in 57 per cent of patients whose chorda tympani nerve incurred a stretch injury, compared to 10 per cent whose nerve had been transected.[11] It is postulated that a stretched nerve will suffer neuropraxia, and the subsequent taste disturbances from the neuropraxic injury will not be compensated for by other parts of the taste network because of a lack of disinhibition.

Dysgeusia is a rare, perhaps underreported feature in cholesteatoma. In this report, a patient with cholesteatoma who presented with dysgeusia experienced symptom resolution after the diseased chorda tympani was sacrificed during mastoidectomy. It is possible that sectioning of the chorda tympani could lead to a beneficial outcome in patients.

Competing interests. None declared

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