Symbiosis

www.symbiosisonline.org
www.symbiosisonlinepublishing.com

Review Article | International Journal of Open Access Otolaryngology | Open Access

Post-Tonsillectomy Dysgeusia, an Underdiagnosed Entity?

A Narrative Review

Reis-Rego A [1*], Rosa F[1], Santos M[1], Feliciano T[1], Coutinho M[1] and Almeida C[1]

[1] *University Hospital Center of Porto – ENT department*

Received: May 18, 2017; Accepted: June 14, 2017; Published: June 21, 2017

***Corresponding author:** Dr. Angela Reis-Rego, University Hospital Center of Porto , Largo do Prof. Abel Salazar, 4099-001 Porto,Tel: + 351 22 207 7500; E-mail: angelareisrego@gmail.com*

Summary

Importance: Tonsillectomy is one of the most commonly performed otolaryngological procedures. Post-tonsillectomy dysgeusia (PTD), although not well characterized in the literature, is an important complaint in the short term follow-up and may remain chronic in up to 1% of patients, leading to important nutritional problems.

Observations: PTD is unpredictable and occurs even after uneventful tonsillectomy. Taste perception alterations are mostly manifested by a metallic or bitter taste. In the short term (from a few days to 3 months after the procedure), it affects nearly 33% of the patients. Persistent dysgeusia may last for 2 years or longer and retreat spontaneously. The cause of this complication is multifactorial 1) direct or indirect damage to the glossopharyngeal nerve or its lingual branch, 2) low zinc levels and 3) habitual drug intake. Dysgeusia has an important impact in the quality of life with important effects on food choice and intake and can lead to weight loss, malnutrition, impaired immunity, and a decline in health. Zinc supplementation is useful in patients with low serum levels.

Conclusions and Relevance: Before tonsillectomy, each patient must be informed about the risk of taste impairment and care should be taken during the procedure avoiding neural lesions. In the assessment of PTD, it is important to rule out low zinc levels and habitual drug intake. Dysgeusia must be formally explicit on each informed consent in tonsillectomy surgery. This narrative review mostly highlights case reports/case-series, so, larger sets are needed to the concrete determination of dysgeusia as an important tonsillectomy complication.

Keywords: Dysgeusia; tonsillectomy; zinc

Introduction

Tonsillectomy is one of the most commonly performed otolaryngological procedures. The most prevalent complications are pain and postoperative bleeding.[1] Taste disorders after tonsillectomy can be divided into 3 categories: transient and short lasting, transient and long lasting or permanent.[2] Transient and short lasting (from 3 weeks to 3 months) complaints are common, occurring in about 33% of the patients.[3] However, only 8% report taste discomfort 6 months after tonsillectomy, in a prospective study conducted by Heiser et al. In 2010, while in 2012 the same authors reported approximately 1% long-term dysgeusia (> 20 months after tonsillectomy).[2,4]

There are four basic types of taste: sweet, salty, bitter, sour and extra-fifth taste umami (the taste of glutamate).[5] Receptors of taste (taste buds) are mainly located on the tongue, soft palate, epiglottis, upper 1/3 of oesophagus, as well as on the lips, cheeks, and oral mucosa.[6] The taste stimulus is transformed into a nerve impulse and it is carried from the chemoreceptor's of taste buds afferences by three cranial nerves: the branch of facial nerve (VII) - special sensory fibres of chorda tympani, conducting sense of taste from the anterior 2/3 of the tongue; the glossophraygeal nerve (IX) - from the base of the tongue; and the vagus nerve (X) - from the soft palate, hypo pharynx and epiglottis.[7] The impulse is then transmitted progressively through the solitary tract, thalamus, insular cortex, posterior limb of the internal capsule, and, finally, to the primary gustatory cortex consisting of two substructures: the anterior insula on the insular lobe and the frontal operculum on the inferior frontal gyrus of the frontal lobe of the cerebral cortex.[8]

Dysgeusia is a general term describing taste disturbances. Quantitative taste disturbance include ageusia (total taste loss), hypergeusia (augmented taste) and hypogeusia (diminished taste); while qualitative taste impairment include cacogeusia (everything tastes bad), heterogeusia (inability to distinguish tastes), parageusia (distorted tastes) and phantogeusia (taste in the absence of stimulus).[9]

Methods

We searched pubmed English-language on 23th January 2017 for studies published for randomized clinical trials (rcts), meta-analyses, systematic reviews, and observational studies. Search details included ("dysgeusia"[mesh Terms] OR "dysgeusia"[All Fields]) AND ("tonsillectomy"[mesh Terms] OR "tonsillectomy"[All Fields]). All 14 studies were reviewed, including data from 1988 through 2015. We also manually

searched the references of selected articles, reviews, meta-analyses, and practice guidelines. Selected articles were mutually agreed upon by the authors.

Results and Discussion

Post-Tonsillectomy Dysgeusia: Pathophysiology

Glossopharyngeal nerve is prone to injury during tonsillectomy. Indeed, Ohtsuka et al. concluded that in almost 50% of the cases, the muscle lining the tonsillar bed was discontinuous leaving uncovered the lingual branch of the glossopharyngeal nerve (LBGN). Interestingly, the same authors report that the LBGN was firmly adherent to the tonsillar capsule in nearly 25%.[10] On the other hand, the distance between LBGN and the lower pole of the palatine tonsil has been reported to be only 2 – 4 mm.[11] Neuritis or cicatrisation during postoperative infection is considered to be another possible cause of the LBGN dysfunction and dysgeusia.[10].

Scinska et al. took into consideration the injury of the soft palate innervation: the tonsillar branch from the glossopharyngeal nerve, the palatine nerve (a branch from the maxillary nerve) or the petrosal nerve (a branch from the facial nerve) as a possible cause of dysgeusia after tonsillectomy.[12]

Zinc deficit has been also postulated to be involved in PTD. The possible mechanisms are: impaired protein synthesis in taste bud cells, reduced alkaline phosphatase activity in taste buds, an abnormality of the zinc-containing salivary protein, a blockage of pores in taste buds, or ionic imbalance of central nervous system. [13,14]

Interestingly, factors such as pain, operating time, anatomic variants, physiologic wound healing or haemostatic technique were not associated with the occurrence of PTD.[3]

Post-Tonsillectomy Dysgeusia: clinical presentation

PTD is unpredictable and occurs even after uneventful tonsillectomy. A metallic or bitter taste is the most frequently reported complaint in the short time, further, post-tonsillectomy taste disorders may be associated with non-taste symptoms, such as foreign body sensation, dysphagia, tongue and palate hyperesthesia or psychological fragility.[4].

The glossopharyngeal nerve is complex, with both sensory and motor functions. It also transmits general sensation from the tonsils, pharynx and middle ear and visceral sensation from the carotid bodies and sinus. It also supplies motor function to the stylopharyngeus, supplies parasympathetic fibres to the parotid gland via the otic ganglion and contributes to the pharyngeal plexus.[15] Therefore, besides dysgeusia, one can suspect of glossophraygeal nerve lesion if there is loss of pharyngeal reflex, dysphagia, referred otalgia, deviation of the uvula to the opposite side and phonation difficulties.[16]

People suffering dysgeusia are also forced to manage the impact the disorder has on their quality of life. An altered taste has effects on food choice and intake and can lead to weight loss, malnutrition, impaired immunity, and a decline in health. [17,18]

Assessment and Diagnosis of Post-Tonsillectomy Dysgeusia

Diagnosis of taste disturbances is widely based on thermal stimulation test, electro gustometry and chemical gustometry according to the innervation pattern. Although subjective, these methods proved to be accurate.[19,20] Intensive studies conducted lately are aimed at improving the methods of objective evaluation of gustatory evoked potentials and gustatory evoked magnetic fields.[21] Subjective diagnosis may be based on validated questionnaires; this is specially developed for chemotherapy-induced dysgeusia.[22] In rare circumstances, imaging studies (e.g. MRI, CT) are indicated [23]. Dysgeusia diagnosis also involves an accurate medical interview, including drug usage, as zinc deficiency in post-tonsillectomy may be caused by zinc-chelating medications, such as analgesics, opioids and antibiotics administered peri and postoperatively.[10,24] Besides, many other common chronic medications may directly cause taste disturbance.[25] (Table 1)

Table 1: Common drugs implicated in dysgeusia, data extracted from [25]

Medication	Incidence of dysgeusia , %
Acetazolamide	12-100
Maribavir	83
Cisplatin	77
Eszopiclone	16-32
Topiramate	8
Captopril	2-7
Lithium	5
Procainamide	3-4
Terbenafine	3
Amiodarone	1-3

Patients should be tested for zinc and copper levels (both serum and urinary levels) as zinc serum levels are inversely proportional to copper levels.[16] The serum Cu/Zn ratio is a good diagnostic marker for taste disorders and the value of 1.1 may be a threshold level for detecting taste disorders.[26] Levels of alkaline phosphatise, carboxypeptidase, or thymidine kinase, enzymes that are highly zinc dependent, may be depressed when a zinc serum level is low [14].

The severity of taste disorders should be graded, as it reflects the risk of malnutrition. Six basic food groups – cereals, fruits, vegetables, meats, dairy products and miscellaneous (beverages and condiments) – compose the severity scale of dysgeusia, each one containing many singular items. This scale has been graded I to IV according to the number of items in each group perceived as abnormal [27,28]. (Table 2)

Table 2: severity of taste disorders and its nutritional implication, data extracted from [27,28]

Grade	Food items in groups involved	Nutritional consequences
I	Single food item	Negligible, normal caloric intake (2.000 Kcal/day), only vitamin C deficit reported.
II	Several food items but not all in any group	Negligible, normal caloric intake (2.000 Kcal/day), only vitamin C deficit reported.
III	All items in one to five groups	Caloric intake reduced to 1.500 Kcal/day, weight loss of 0.6 kg/week and several indices of malnutrition including deficiencies of vitamins A and C, zinc, calcium and meat protein.
IV	Global – all items in all groups	11% of global weight change; Caloric intake reduced to 1.500 Kcal/day, and several indices of malnutrition including deficiencies of vitamins A and C, zinc, calcium and meat protein.

Post-Tonsillectomy Dysgeusia treatment

Often, etiologic factors remain unknown resulting in limited treatment options. Long-lasting PTD might disappear spontaneously after 1 or 2 years, as the gustatory system has a great regeneration capacity.[16] Based on the idea that certain saliva proteins are zinc dependent and imbalance of these salivary components could lead to taste disorders; some authors defend the use of zinc supplementation. Doses of zinc supplementation are not well defined in PTD, being only described in case reports. [10,14,29] .

Patients may benefit from nonspecific measures such as chewing gum or ice chips or using mouth washed with sodium bicarbonate, artificial sweeteners, or local anaesthetics.[14]

On the other hand, almost 40% drug-free psychiatric patients with depression report the symptom of bad taste in mouth, therefore, psychiatric consultation should be requested to rule out psychogenic dysgeusia [30].

Although not directly related to post-tonsillectomy dysgeusia, other treatment methods have been used to improve taste sensation. These include transcranial magnetic stimulation, alpha lipoic acid, ginkgo biloba, pilocarpine and acupuncture. None proved to be consistently useful in the management of taste disturbances [31].

Lingual nerve compression during tonsillectomy may be prevented by ensuring that the tongue retractor is not fasten too tightly in the mouth, especially in cases where the mouth opening is naturally limited.[32,33] Meticulous dissection of tonsils and limited use of electrocautery may limit damage to the throat muscles and consequently reduce the risk of destruction of surrounding structures, including branches of nerves responsible for the taste sensation reception [32].

Prognosis

Except for direct surgical trauma, PTD is generally associated with a good prognosis. [34]

For prevention and better assessment of taste impairment after tonsillectomy, Tomita et al. Suggested measuring taste thresholds, zinc serum levels and registration of habitually intake of medications prior to tonsillectomy.[10] Recently, Somuk et al. showed a significant difference in the iron and zinc concentrations between the tonsillar hypertrophy and recurrent tonsillitis groups. The levels of iron and zinc were significantly lower in the recurrent tonsillitis group, augmenting the risk of dysgeusia in case of tonsillectomy. [35]

A better understanding of the neural gustatory and cortical mechanisms involved in a molecular level may promote development of an adequate treatment. Continued experimentation involving localized gustatory nerve anaesthesia, blocks and transection provides promising data in the future of taste distortions. [36]

Since quantitative taste deficiencies (ageusia, hypogeusia and hypergeusia) often go unnoticed by patients, the real incidence of taste disturbance after tonsillectomy remains largely unknown. [37]

Conclusion

Taste disturbance after tonsillectomy potentially leads to medicolegal issues and, therefore, patients should be warned about this risk and care should be taken to minimise it, especially when there is an additional pathology extending into the lower pole and low zinc serum levels.[38]

References

1. Seshamani M, Vogtmann E, Gatwood J, Gibson TB, Scanlon D. Prevalence of complications from adult tonsillectomy and impact on health care expenditures. Otolaryngol Head Neck Surg. 2014;150(4):574–581. Doi:10.1177/0194599813519972
2. Heiser C, Landis BN, Giger R, Cao Van H, Guinand N, Hörmann K, et al. Taste disorders after tonsillectomy: Along-term follow-up. Laryngoscope. 2012;122(6):1265–1266. Doi:10.1002/lary.23270
3. Windfuhr JP, Van HC, Landis BN. Recovery from long-lasting post-tonsillectomy dysgeusia. Oral Surgery. Oral Med Oral Pathol Oral Radiol Endodontology. 2010;109(1):e11–e14. Doi:10.1016/j.tripleo.2009.08.031
4. Heiser C, Landis BN, Giger R, Cao Van H, Guinand N, Hörmann K, et al. Taste disturbance following tonsillectomy-A prospective study. Laryngoscope 2010;120(10):2119–2124. Doi:10.1002/lary.20971
5. Kikut-Ligaj D, Trzcielinska-Lorych J. How taste works: cells, receptors and gustatory perception. Cell Mol Biol Lett 2015;20(5):699–716. Doi:10.1515/cmble-2015-0042
6. Konstantinidis I. The taste peripheral system. B-ENT 2009;5 Suppl 13:115–121
7 Gurvits GE, Tan A. Burning mouth syndrome. World J Gastroenterol 2013;19(5):665–672. Doi:10.3748/wjg.v19.i5.665
8. Veldhuizen MG, Albrecht J, Zelano C, Boesveldt S, Breslin P, Lundstrom JN. Identification of human gustatory cortex by activation likelihood estimation. Hum Brain Mapp 2011;32(12):2256–2266. doi:10.1002/

hbm.21188

9. Hummel T, Landis BN, Hüttenbrink K-B. Smell and taste disorders. GMS Curr Top Otorhinolaryngol Head Neck Surg 2011;10. doi:10.3205/cto000077
10. Tomita H, Ohtuka K. Taste disturbance after tonsillectomy. Acta Otolaryngol Suppl 2002;(546)164–172
11. Ohtsuka K, Tomita H, Murakami G. [Anatomical study of the tonsillar bed: the topographical relationship between the palatine tonsil and the lingual branch of the glossopharyngeal nerve]. Nihon Jibiinkoka Gakkai Kaiho 1994;97(8):1481–1493
12. A., Scinska; A., Jodkowska; A. K, W., Kukwa, A.Korkosz; Sienkiewicz-Jarosz H. Post-tonsillectomy dysgeusia with weight loss: possible involvement of soft palate. J Laryngol Otol 2008;122(2):E5. Doi:10.1017/S002221510700117X
13. Seyedmajidi SA, Seyedmajidi M, Moghadamnia A, Khani Z, Zahedpasha S, Jenabian N, et al. Effect of Zinc-Deficient Diet on Oral Tissues and Periodontal Indices in Rats 2014;3(2):81-87
14. Bicknell JM, Wiggins R V. Taste disorder from zinc deficiency after tonsillectomy. West J Med 1988;149(4):457–460
15. Trinidade, A; Philpott C. Bilateral glossopharyngeal nerve palsy following tonsillectomy : a very rare and difficult complication of a common procedure. J Laryngol Otol 2015;129(4):392–394. Doi:10.1017/S0022215115000080
16. Windfuhr JP, Schl??ndorff G, Sesterhenn AM, Kremer B. From the expert's office: Localized neural lesions following tonsillectomy. Eur Arch Oto-Rhino-Laryngology 2009;266(10):1621–1640. doi:10.1007/s00405-009-0910-2
17. Bromley SM. Smell and taste disorders: a primary care approach. Am Fam Physician 2000;61(2):427–436,438
18. Bartoshuk LM, Catalanotto F, Hoffman H, Logan H, Snyder DJ. Taste damage (otitis media, tonsillectomy and head and neck cancer), oral sensations and BMI. Physiol Behav 2012;107(4):516–526. Doi:10.1016/j.physbeh.2012.06.013
19. Stillman JA, Morton RP, Hay KD, Ahmad Z, Goldsmith D. Electrogustometry: Strengths, weaknesses, and clinical evidence of stimulus boundaries. Clin Otolaryngol Allied Sci 2003;28(5):406–410. Doi:10.1046/j.1365-2273.2003.00729.x
20. Cruz a, Green BG. Thermal stimulation of taste. Nature 2000;403(6772):889–92. Doi:10.1038/35002581
21. Ikui A. A review of objective measures of gustatory function. Acta Otolaryngol Suppl 2002;(546)6489:60–68. Doi:10.1080/00016480260046427
22. Kano T, Kanda K. Development and validation of a chemotherapy-induced taste alteration scale. Oncol Nurs Forum 2013;40(2):E79-85. Doi:10.1188/13.ONF.E79-E85
23. Wrobel BB, Leopold DA. Clinical assessment of patients with smell and taste disorders. Otolaryngol Clin North Am 2004;37(6):1127–1142. Doi:10.1016/j.otc.2004.06.010
24. Ciubotariu D, Ghiciuc CM, Lupuşoru CE. Zinc involvement in opioid addiction and analgesia--should zinc supplementation be recommended for opioid-treated persons? Subst Abuse Treat Prev Policy 2015;10:29. Doi:10.1186/s13011-015-0025-2
25. Douglass R, Heckman GA. Drug-related taste disturbance: A contributing factor in geriatric syndromes. Can Fam Physician 2010;56(11):1142–1147
26. Yanagisawa H, Kawashima T, Miyazawa M, Ohshiro T. Validity of the copper/zinc ratio as a diagnostic marker for taste disorders associated with zinc deficiency. J Trace Elem Med Biol 2016;36:80–3. Doi:10.1016/j.jtemb.2016.04.012
27. Markley EJ, Mattes-Kulig DA, Henkin RI. A classification of dysgeusia. J Am Diet Assoc 1983;83(5):578–580
28. Mattes-Kulig DA, Henkin RI. Energy and nutrient consumption of patients with dysgeusia. J Am Diet Assoc 1985;85(7):822–826
29. Tomofuji S, Sakagami M, Kushida K, Terada T, Mori H, Kakibuchi M. Taste disturbance after tonsillectomy and laryngomicrosurgery. Auris Nasus Larynx 2005;32(4):381–386. Doi:10.1016/j.anl.2005.05.005
30. Miller SM, Naylor GJ. Unpleasant taste — a neglected symptom in depression. J Affect Disord 1989;17(3):291–293. Doi:http://dx.doi.org/10.1016/0165-0327(89)90013-X
31. S KN, Naresh S, Srinivas K, P RG, Shrestha A, Levenson D et al. Interventions for the management of taste disturbances (Review) SUMMARY OF FINDINGS FOR THE MAIN COMPARISON. Cochrane Database Syst Rev 2014;(11). Doi:10.1002/14651858.CD010470.pub2.www.cochranelibrary.com
32. Leong SCL, Karkos PD, Papouliakos SM, Apostolidou MT. Unusual complications of tonsillectomy: a systematic review. Am J Otolaryngol 2007;28(6):419–422. Doi:10.1016/j.amjoto.2006.10.016
33. Stathas T, Mallis A, Naxakis S, Mastronikolis NS, Gkiogkis G, Xenoudakis D, et al. Taste function evaluation after tonsillectomy: a prospective study of 60 patients. Eur Arch Otorhinolaryngol 2010;267(9):1403–1407. Doi:10.1007/s00405-010-1224-0
34. Collet S, Eloy P, Rombaux P, Bertrand B. Taste disorders after tonsillectomy: case report and literature review. Ann Otol Rhinol Laryngol2005;114(3):233–236. Doi:10.1177/000348940511400312
35. Somuk BT, Sapmaz E, Soyalıç H, Yamanoğlu M, Mendil D, Arici A, et al. Evaluation of iron and zinc levels in recurrent tonsillitis and tonsillar hypertrophy. Am J Otolaryngol 2016;37(2):116–119. Doi:http://dx.doi.org/10.1016/j.amjoto.2015.11.002
36. Goins MR, Pitovski DZ. Posttonsillectomy taste distortion: a significant complication. Laryngoscope 2004;114(7):1206–1213. Doi:10.1097/00005537-200407000-00015
37. Landis BN, Lacroix J. Postoperative / Posttraumatic Gustatory Dysfunction. Adv Otorhinolaryngol 2006;63:242–254
38. Uzun C, Adali MK, Karasalihoglu AR. Unusual complication of tonsillectomy: taste disturbance and the lingual branch of the glossopharyngeal nerve. J Laryngol Otol 2003;117(4):314–317. Doi:10.1258/00222150360600968