Differential diagnosis of tonsillitis, tonsillar detritus accumulation, and tonsillar keratin cysts

Authors:

Nitek S MD, PhD[1,2]

Legatowicz-Koprowska M MD[3]

Szymański K[2]

Chmielik LP MD, PhD[2]

[1] Outpatient clinic at National Institute of Geriatrics, Rheumatology and Rehabilitation, Spartańskastreet 1, Warsaw, Poland

[2] Department of Pediatric Otorhinolaryngology, Marii Konopnickiejstreet 65, Dziekanów Leśny, Poland

[3] Department of Pathology at National Institute of Geriatrics, Rheumatology and Rehabilitation, Spartańskastreet 1, Warsaw, Poland

The authors have no funding, financial relationships, or conflicts of interest to disclose.

Send correspondence to:

Stanisław Nitek, MD, PhD, Department of Pediatric Otorhinolaryngology, Marii Konopnickiejstreet 65, 05-092 Dziekanów Leśny, Poland.

E-mail: stanislawnitek@wp.pl Phone: +48 533 336 456

Short running title:

Tonsillitis, detritus, tonsillar keratin cyst

Key words: Tonsillitis, Palatine Tonsil, Pharyngeal Diseases, Halitosis, Cysts

Abstract

Background: Despite being a relatively common condition, acute suppurative tonsillitis may be sometimes confused with other tonsillar disorders, including the equally common tonsillar detritus accumulation connected with halitosis or the less common tonsillar keratin cyst.

Aim: The purpose of this paper was to demonstrate the differences in gross and microscopic presentation between suppurative tonsillitis, tonsillar detritus accumulation, and tonsillar keratin cysts.

Material and methods. We documented these conditions photographically and conducted microscopic evaluations of the following samples: 1) tonsillar surface swab from 3 patients with suppurative tonsillitis, 2) detritus from tonsillar crypts in 8 patients, and 3) tonsillar keratin cyst contents extracted via cyst incision and drainage in a 63-year-old woman and 18-year-old man. Two patients had both acute suppurative tonsillitis and tonsillar detritus accumulation.

Results and discussion. In the case of acute suppurative tonsillitis, the surface of tissues with bacterial colonies is covered by a profuse exudate containing necrotic tissue and numerous neutrophils. In contrast, a microscopic examination of tonsillar detritus reveals necrotic homogeneous discharge, typically without any clear cells but with visible bacterial colonies which do not induce an inflammatory response. Tonsillar keratin cyst contents demonstrated the presence of superficial squamous epithelial cells and mononuclear inflammatory cells.

Conclusions. Gross and microscopic assessments may reveal significant differences between suppurative tonsillitis, detritus accumulation in tonsillar crypts, and tonsillar keratin cysts, all of which require different treatment methods.

1. Introduction

Despite being a relatively common condition, acute suppurative tonsillitis may be sometimes confused with other tonsillar disorders, including the equally common tonsillar detritus accumulation or the less common tonsillar keratin cyst. The presence of detritus (debris) accumulated in tonsillar crypts is a common finding, with 29% and 17% of children affected according to otorhinolaryngologists' and pediatricians' reports, respectively (van den Akker et all, 2003). Tonsillar detritus accumulation can also occur in adults; however, despite being relatively common, this condition presents diagnostic and therapeutic challenges. Detritus accumulated in tonsillar crypts is often misdiagnosed as purulent plugs or suppurative discharge accompanying acute tonsillitis. Some authors consider accumulated tonsillar detritus to be a manifestation of chronic tonsillitis. Admittedly, the appearance of tonsillar surface in both of these conditions may be very similar on cursory inspection. Another condition with a similar presentation on tonsillar inspection is a tonsillar keratin cyst.

The presence of tonsillar crypt detritus or tonsillar keratin cysts does not typically lead to any serious consequences. However, these conditions may pose diagnostic challenges and, in the case of detritus, patients' discomfort. Persistent antibiotic therapy in such cases is completely unwarranted, except for isolated cases of severe local inflammation.

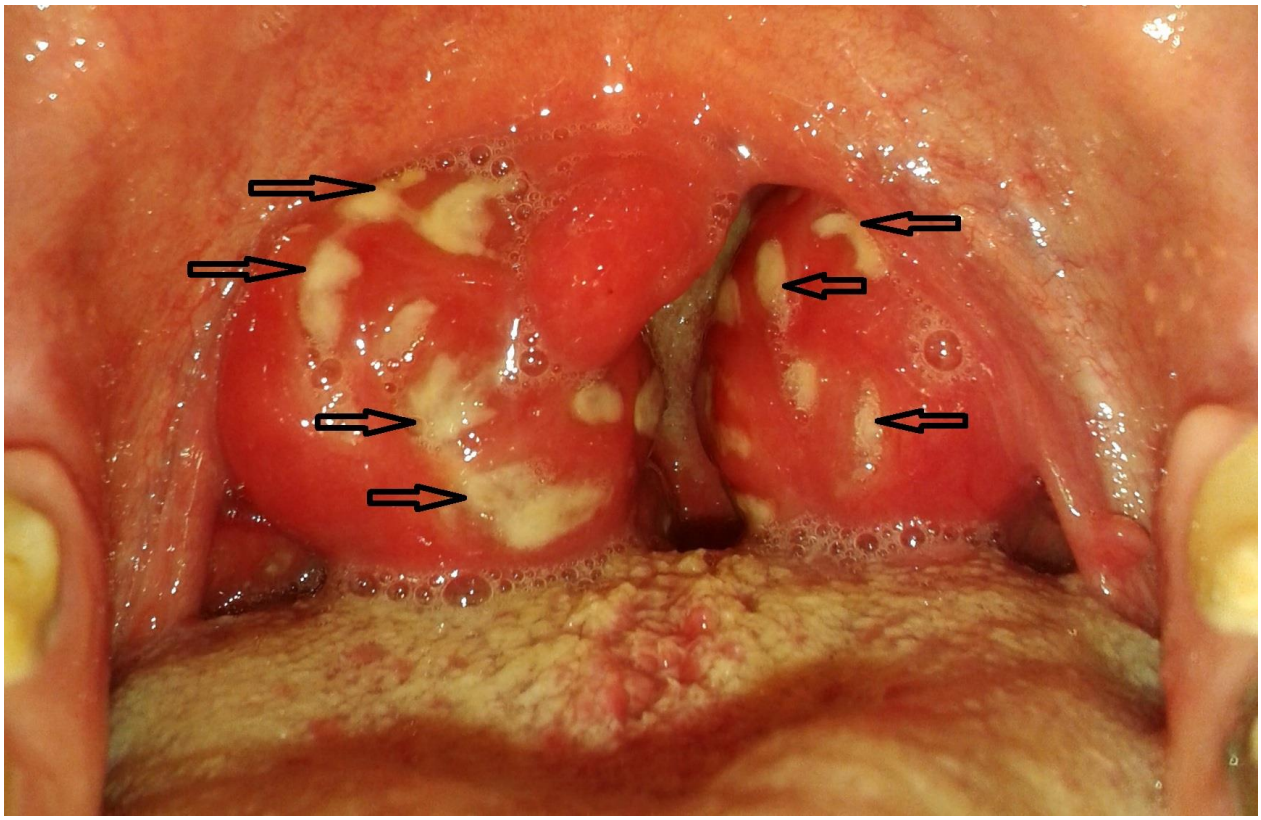

Figure 1. The throat in suppurative tonsillitis. Arrows – purulent plugs on tonsillar surface.

2. Material and methods.

In order to illustrate the differences between suppurative tonsillitis, tonsillar detritus accumulation, and a tonsillar keratin cyst, we documented these conditions photographically (Fig. 1, 2, and 3) and conducted microscopic evaluations of the following samples: 1) tonsillar surface swab from 1 man (aged 40) and 2 women (aged 30 and 37) with suppurative tonsillitis (Fig. 4), 2) detritus (debris) from tonsillar crypts extracted via compressing the affected tonsil with a tongue depressor in 6 men (aged 19–31) and 3 women (aged 32-42) (Fig. 5), and 3) tonsillar keratin cyst contents extracted via cyst incision and drainage (in a 63-year-old woman and 18-year-old man) (Fig. 6). A cyst content sample was collected from only two patients due to a relatively low prevalence of this condition. Two patients (one woman, 30, and one man, 26) whose samples were collected, had both acute suppurative tonsillitis and tonsillar detritus accumulation. The collected material was fixed in 10% formalin, processed, and paraffin-embedded in the usual manner. Then, sections were stained with hematoxylin and eosin. The histopathologist who microscopically examined the slides was blinded to the patients' clinical diagnoses.

Informed consent. The study was approved by the Local Ethics Committee and informed consent was obtained from all patients, in compliance with the Helsinki Declaration.

The purpose of this paper was to demonstrate the differences in gross and microscopic presentation between suppurative tonsillitis, tonsillar detritus (debris) accumulation, and tonsillar keratin cysts.

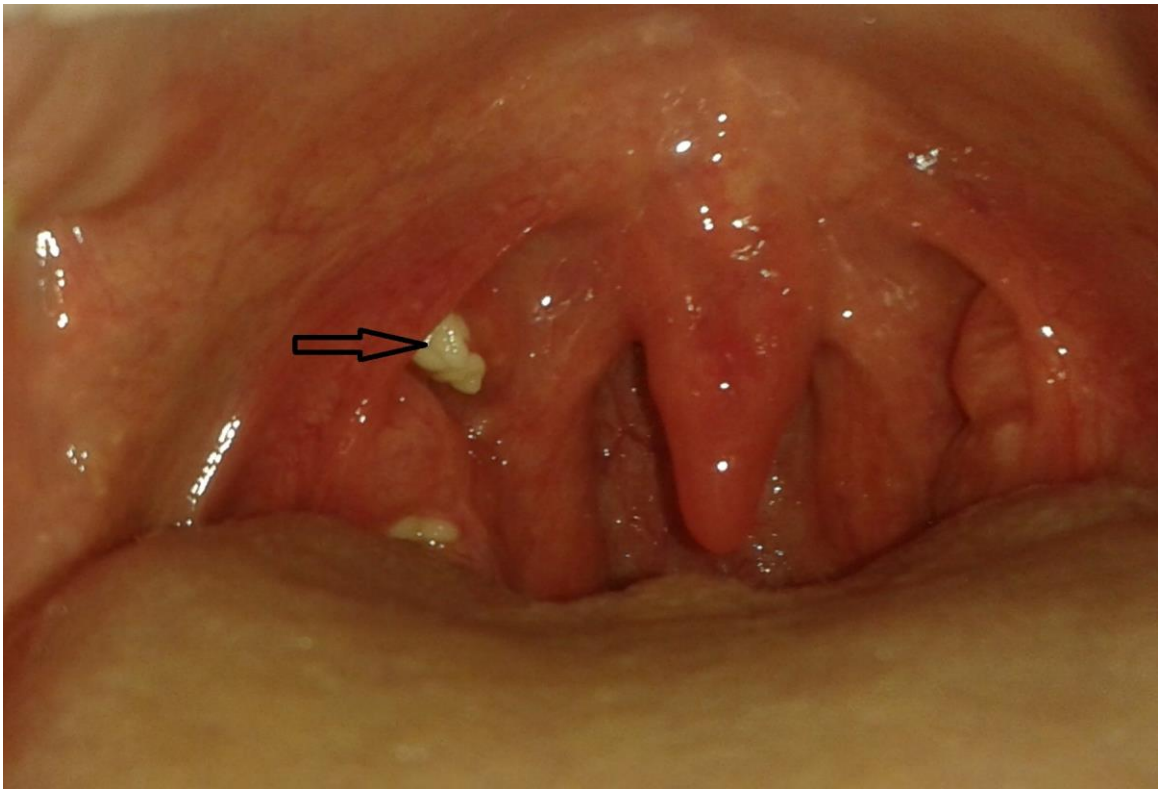

Figure 2. The throat in tonsillar detritus accumulation. Arrows – detritus-filled crypts.

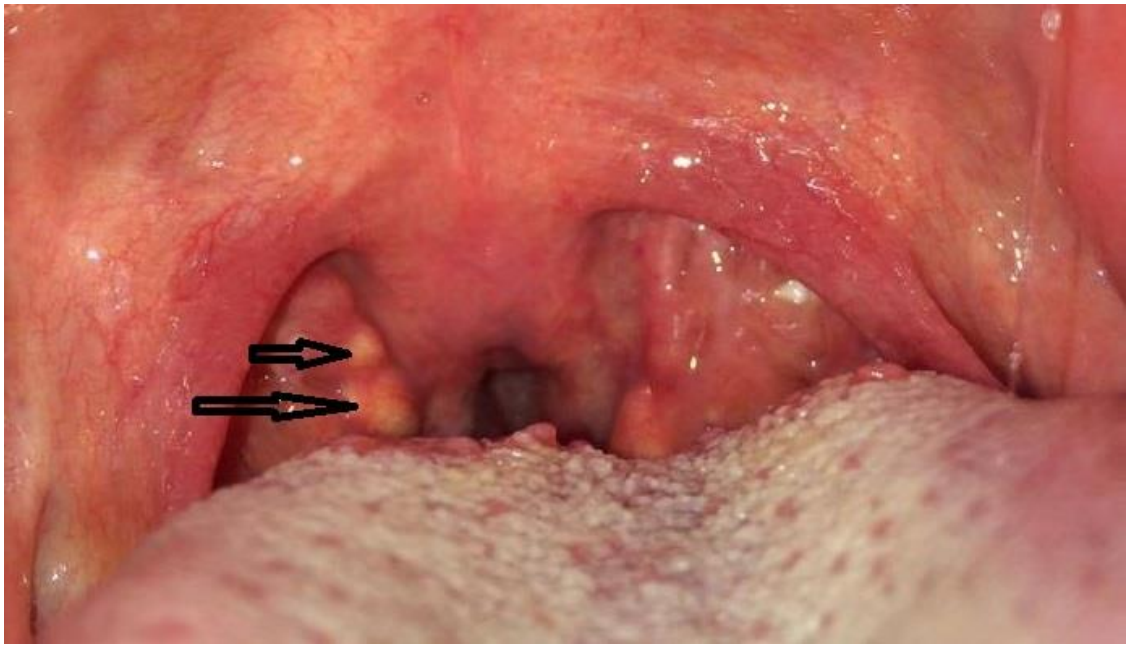

Figure 3. Multiple tonsillar keratin cysts (arrows) on the surface of the right tonsil.

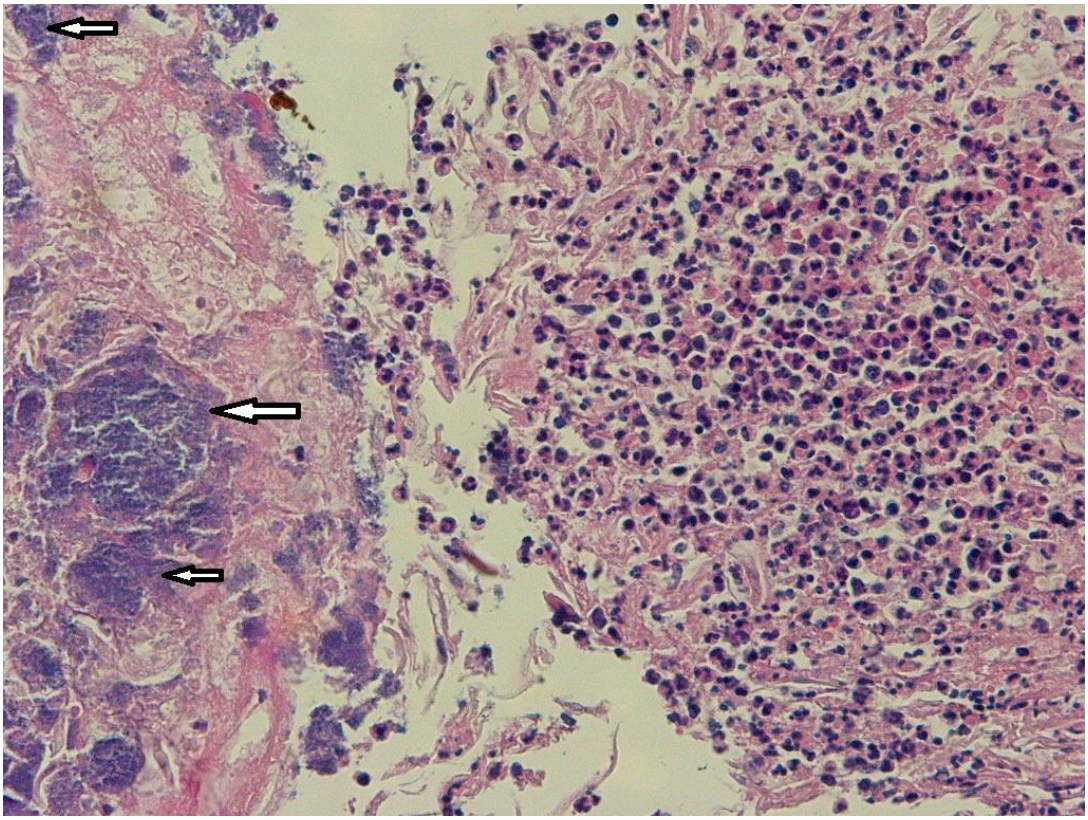

Figure 4. Suppurative tonsillitis – tonsillar crypt contents. The right part of the photograph shows purulent discharge containing numerous neutrophils. Arrows indicate bacterial colonies. H&E stain, 200x magnification.

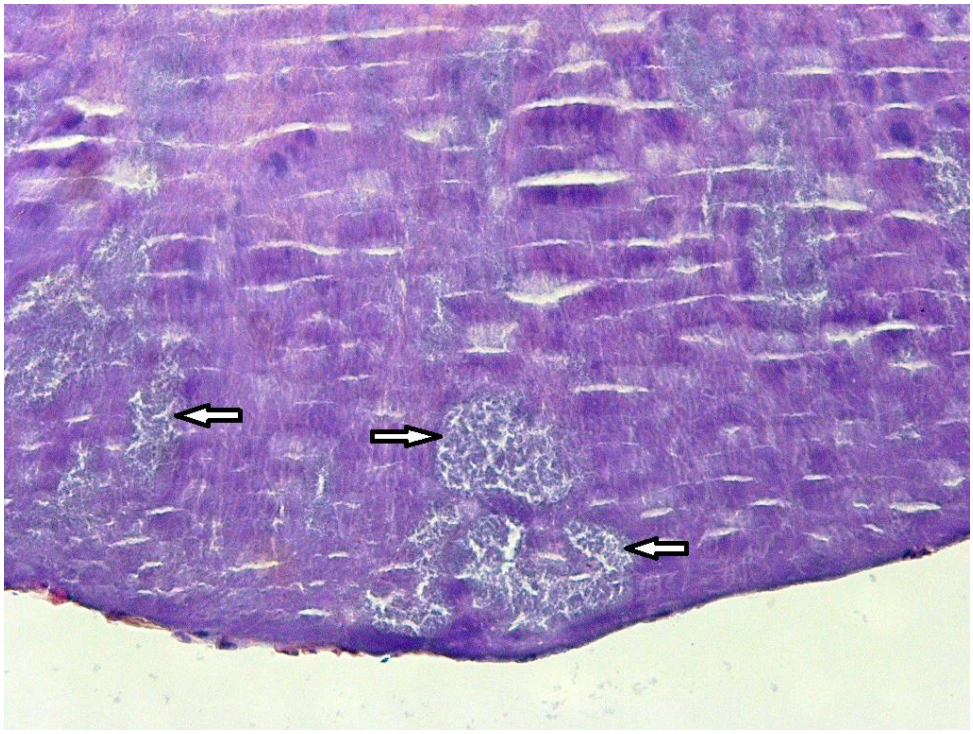

Figure 5. Tissue detritus (from tonsillar crypts). Arrows indicate bacterial colonies. No inflammatory response. H&E stain, 200x magnification.

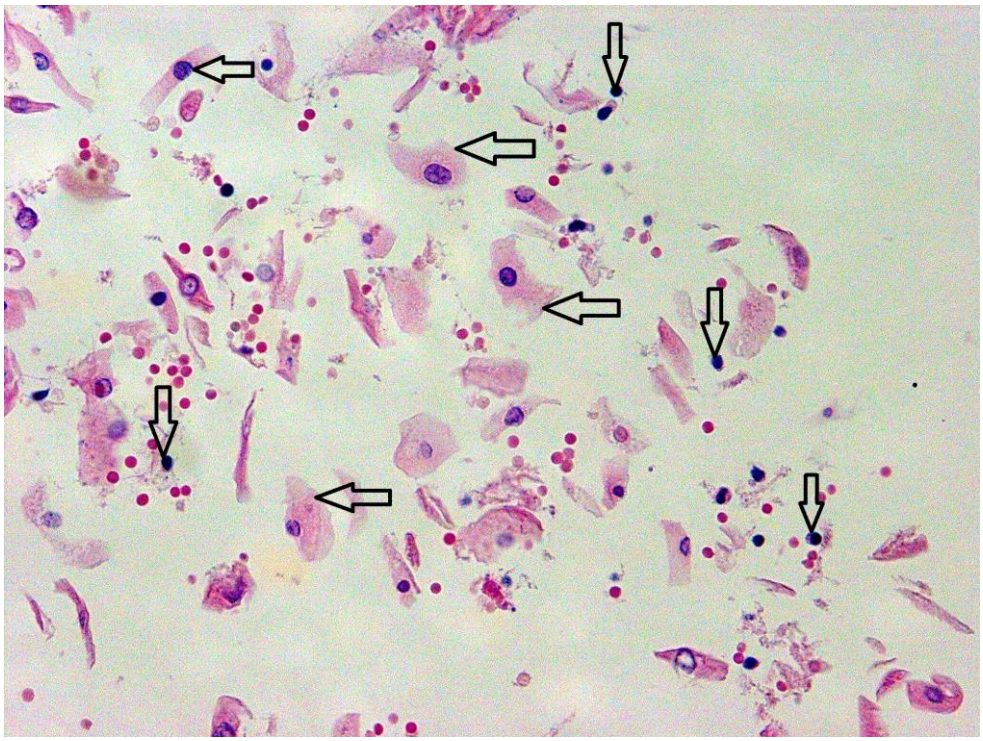

Figure 6. Tonsillar cysts contents. Arrows pointing left – epithelial cells; arrows pointing down – inflammatory cells. H&E stain, 100x magnification.

3. Results and discussion.

One distinct aspect of suppurative tonsillitis, distinguishing this condition from tonsillar detritus accumulation and a tonsillar keratin cyst, is a severely sore throat reported by the patient. Patients with accumulated tonsillar detritus report no pain or only slight discomfort. Moreover, cervical lymphadenopathy and fever (usually above 38°C [100.4°F]), which are typical signs of suppurative tonsillitis, are absent in the case of tonsillar detritus accumulation and tonsillar keratin cysts. A tonsillar keratin cyst is a thin-walled, translucent sack formed on the tonsillar surface, measuring anywhere from several to about a dozen millimeters and containing whitish-yellow liquid or semi-solid fluid (Fig. 3). This lesion may be misdiagnosed as tonsillitis, tonsillar abscess, Plaut-Vincent angina (the so-called trench mouth), or any of other, less common tonsillar pathologies. On physical examination, patients with suppurative tonsillitis reveal characteristic tonsillar findings: the tonsils are enlarged and speckled with hard to evacuate, semi-solid purulent plugs (Fig. 1). Tonsillar detritus presents as lumpy whitish-gray masses (Fig. 2), which are much easier to evacuate from crypts via tonsil compression in comparison to the plugs in suppurative tonsillitis. It is worth noting that tonsillar detritus accumulation may be accompanied by acute suppurative tonsillitis (as evidenced by 2 of the evaluated patients). Tonsillar debris accumulation is typically accompanied by bad breath (halitosis). In some cases, the accumulated detritus may even form a calculus (tonsillolith), which requires surgical removal via incision (Mesolella et all, 2004, Rio, Franchi-Teixeira & Nicola, 2008). Tonsillar detritus is nothing else but tonsillar discharge in the form of whitish-gray curd-like lumps. This phenomenon is relatively common, with approximately 29% and 17% of affected children according to otorhinolaryngologists' and pediatricians' reports, respectively (van den Akker et all, 2003). The estimated rates of tonsillar detritus in adults are similar.

The histopathologist was blinded to clinical diagnoses. Comparison of the findings revealed consistent clinical and histopathological diagnoses in 12 out of 13 cases (92%). In one case (8%) of a 30-year-old woman the microscopic examination confirmed the clinical diagnosis and revealed concomitant tonsillar detritus.

In the case of acute suppurative tonsillitis, the surface of tissues with bacterial colonies is covered by a profuse exudate containing necrotic tissue and numerous neutrophils (Fig. 4). In contrast, a microscopic examination of tonsillar detritus reveals necrotic homogeneous discharge, typically without any clear cells but with visible bacterial colonies which do not induce an inflammatory response, although a few neutrophils may be present (Fig. 5). This is due to the fact that detritus, although composed of exfoliated epithelial and non-epithelial cells, mainly lymphocytes, mononuclear phagocytes, plasma cells, as well as (to a lesser extent) erythrocytes, neutrophils and mast cells, contains only the disintegrated, necrotic remnants of these cells, which accumulate in tonsillar crypts in the form of an amorphous protein substance undergoing bacteria-induced decay; hence the bad breath (Howie, 1982). Accumulated detritus may also contain small quantities of food remnants. Our assessments indicate that detritus accumulated in tonsillar crypts is a natural product, composed mostly of dead epithelial cells, and occurs in all people, not unlike sebaceous gland secretions or earwax. However, only some people experience the discomfort associated with excessive production and/or ineffective spontaneous

evacuation of tonsillar detritus. Therefore, the management in patients with tonsillar detritus accumulation should involve tonsillar surface ablation intended to facilitate spontaneous evacuation of tonsillar detritus (Krespi &Kizhner, 2013). Another important mechanism potentially responsible for detritus accumulation may involve chronic cryptitis, with its excessive detritus production due to bacterial beta-lactamases and a greater accumulation of dendritic cells in crypts rather than on tonsillar surface (3:1) in comparison to that in unaffected individuals (1:1) (Brodsky, Frankel, Gorfien, Rossman & Noble, 1996, Gorfien, Noble & Brodsky, 2001, Noble, Gorfien, Frankel, Rossman & Brodsky, 1996).

The microscopic composition of tonsillar keratin cyst contents differed dramatically from that found in the either of the two conditions presented above (Fig. 6). Tonsillar keratin cyst contents obtained via cyst incision and drainage demonstrated the presence of superficial squamous epithelial cells and mononuclear inflammatory cells. The mechanism behind the formation of such cysts has been described as a result of focal compression of the lumen of tonsillar crypts by enlarged lymphoid follicles or abscesses located near tonsillar surface (Altemani & Endo, 1996, Altemani, Endo, Chone & Idagawa, 1996).

Some Russian authors have described the accumulation of detritus in tonsillar crypts with the term ‘compensated’ chronic tonsillitis as opposed to the decompensated form of chronic tonsillitis with marked evidence of suppurative inflammation (Khorov, Aleshchik, Rakowa & Diurd’, 2009, Nesterova, Misen’kin, Makarova & Verimeevich, 2005, Ovchinnikov, Dobrotin, Klimova, Filimonov & Bakthadze, 2003, Psakhis, Gasymov & Parilov, 1990, Staroverova, Shul’diakov, Raigorodskii & Tatarenko, 2007, Zbyshko, 2007).

In its atypical presentation, suppurative tonsillitis should be also differentiated with infectious mononucleosis, scarlet fever, diphtheria, and systemic conditions such as leukemia, lymphomas, and, if lesions are unilateral, with Plaut-Vincent angina, cancer, and tonsillar tuberculosis.

Finally, we would like to emphasize a very simple, yet useful, technique in diagnosing tonsillar disorders, which involves compressing the palatoglossal arch with a tongue depressor. This simple technique helps differentiate suppurative tonsillitis from tonsillar detritus accumulation. Unlike in suppurative tonsillitis, in the case of detritus, the whitish-gray curd-like lumps on tonsillar surface can be easily evacuated via such compression. This simple technique is a valid complement to differential diagnosis methods employed in the case of tonsillar conditions, especially in combination with other signs and symptoms described above. Palatoglossal arch compression with a tongue depressor also helps diagnose chronic purulent tonsillitis (the decompensated form), where it yields a profuse evacuation of liquid purulent discharge (whereas detritus has a form of whitish-gray solid curds). Thus, omitting the use of this examination technique may easily lead to a misdiagnosis. As in the case of recurrent suppurative tonsillitis, ineffective conservative treatment of decompensated chronic purulent tonsillitis requires surgery (tonsillectomy) in order to prevent severe local and systemic complications, such as glomerular nephritis, autoimmune arthritis, and endocarditis.

4. Conclusions.

Gross and microscopic assessments may reveal significant differences between suppurative tonsillitis, detritus (debris) accumulation in tonsillar crypts, and tonsillar keratin cysts, all of which require different

treatment methods. Treatment of suppurative tonsillitis involves systemic antibiotic therapy; a tonsillar keratin cyst requires capsule incision and drainage, whereas in the case of detritus accumulation and the associated bad breath (halitosis) patients often decide to undergo either conservative or surgical treatment. A proposed new approach to the conservative treatment of patients with detritus accumulation involves the so-called hydrovacuumaspiration technique, with positive effects achieved in 85.6% of the patients (Khorov, Aleshchik, Rakowa & Diurd', 2009). Surgical treatment of halitosis associated with tonsillar detritus accumulation involves the relatively highly successful use of laser (Krespi &Kizhner, 2013, Ovchinnikov, Dobrotin, Klimova, Filimonov & Bakthadze, 2003, Staroverova, Shul'diakov, Raigorodskii & Tatarenko, 2007, Zbyshko, 2007, Ferguson, Aydin & Mickel, 2014, Finkelstein, Talmi, Ophir & Berger, 2004), radiosurgical (Ferguson, Aydin & Mickel, 2014, Ata, Ovet & Alatas, 2014) or cryosurgical (Psakhis, Gasymov & Parilov, 1990) cryptolysis or even tonsillectomy (Al-Abbasi, 2009).

Acknowledgements

The authors contributed equally to this work.

Disclosure statement

No potential conflicts of interest were disclosed.

References:

1. Al-Abbasi AM. Tonsillectomy for the treatment of halitosis. Niger J Med. 2009 Jul-Sep;18(3):295-8

2. Altemani A, Endo LH. Histopathology of the palatine tonsil in the newborn infant. Acta Otolaryngol Suppl. 1996;523:12-3.

3. Altemani A, Endo LH, Chone C, Idagawa E. Histopathological concept of chronic tonsillitis in children. Acta Otolaryngol Suppl. 1996;523:14-6.

4. Ata N, Ovet G, Alataş N. Effectiveness of radiofrequency cryptolysis for the treatment of halitosis due to caseums. Am J Otolaryngol. 2014 Mar-Apr;35(2):93-8.

5. Brodsky L, Frankel S, Gorfien J, Rossman J, Noble B. The role of dendritic cells in the development of chronic tonsillar disease in children. Acta Otolaryngol Suppl. 1996; 523: 98-100.

6. Ferguson M, Aydin M, Mickel J. Halitosis and the Tonsils: A Review of Management. Otolaryngol Head Neck Surg. 2014 Oct;151(4):567-574.

7. Finkelstein Y, Talmi YP, Ophir D, Berger G. Laser cryptolysis for the treatment of halitosis. Otolaryngol Head Neck Surg. 2004 Oct; 131(4): 372-7.

8. Gorfien JL, Noble B, Brodsky L. Comparison of the microanatomical distributions of macrophages and dendritic cells in normal and diseasedtonsils. Ann Otol Rhinol Laryngol. 2001 Feb;110(2):173-82.

9. Howie AJ. The cells in tonsillar crypts. Clin Otolaryngol Allied Sci. 1982 Feb; 7(1):35-44.

10. Khorov OG, Aleshchik ICh, Rakova SN, Diurd' TI :[Efficiency of the hydrovacuumaspiration technique for the treatment of patients with chronic tonsillitis]. Vestn Otorinolaringol. 2009;(2):29-32.

11. Krespi YP, Kizhner V. Laser tonsil cryptolysis: in-office 500 cases review. Am J Otolaryngol. 2013 Sep-Oct;34(5):420-4.

12. Mesolella M, Cimmino M, Di Martino M, Criscuoli G, Albanese L, Galli V. Tonsillolith. Case report and review of the literature. Acta Otorhinolaryngol Ital. 2004 Oct;24(5):302-7.

13. Nesterova KI, Mishen'kin NV, Makarova LV, Verimeevich LI. [Conservative therapy of chronic tonsillitis: comparison of different methods]. Vestn Otorinolaringol. 2005; 2):43-6.

14. Noble B, Gorfien J, Frankel S, Rossman J, Brodsky L. Micro-anatomical distribution of dendritic cells in normal tonsils. Acta Otolaryngol Suppl. 1996;523:94-7.

15. Ovchinnikov IA, Dobrotin VE, Klimova LA, Filimonov GP, Bakhtadze MA. [On validity of intralacunar exposure to surgical laser beam in chronic tonsillitis (experimental study)]. Vestn Otorinolaringol. 2003;(2):20-1

16. Psakhis BI, Gasymov AV, Parilov VE. [Treatment of chronic tonsillitis by lacunar cryosurgery]. Vestn Otorinolaringol. 1990 May-Jun; (3):79. Russian.

17. Rio AC, Franchi-Teixeira AR, Nicola EM. Relationship between the presence of tonsilloliths and halitosis in patients with chronic caseous tonsillitis. Br Dent J. 2008 Jan 26;204(2):E4.

18. Staroverova TK, Shul'diakov VA, Raĭgorodskiĭ IuM, Tatarenko DA. [Endolacunar laser radiation of the tonsils in conservative treatment of chronic tonsillitis]. Vestn Otorinolaringol. 2007;(4):56-9. Russian.

19. van den Akker EH, Schilder AG, Kemps YJ, van Balen FA, Hordijk GJ, Hoes AW. Current indications for (adeno)tonsillectomy in children: a survey in The Netherlands. Int J Pediatr Otorhinolaryngol. 2003 Jun;67(6): 603-7.

20. Zbyshko YB. [Efficacy of CO2 laser in the treatment of patients with chronic tonsillitis]. Vestn Otorinolaringol. 2007;(5):57-9.

