

## ORIGINAL RESEARCH

Medicine Science 2019;8(4):971-4

### Does tonsil hypertrophy occur as a result of colonization of actinomycosis?

Eren Altun, Nevzat Dogukan Erbek, Ihsan Ege Taner, Ali Haydar Colak, Gulay Turan

*Balikesir University School of medicine Department of Pathology, Balikesir, Turkey*

Received 07 May 2019; Accepted 13 June 2019  
Available online 06.09.2019 with doi:10.5455/medscience.2019.08.9075

Copyright © 2019 by authors and Medicine Science Publishing Inc.

#### Abstract

To determine the relationship between the presence of actinomycetes in adenoid/tonsillar tissue and hypertrophy, and to investigate seasonal changes in frequency of actinomycosis in adenoidectomy/tonsillectomy materials. In this retrospective study, the data of 175 patients who underwent adenoidectomy/tonsillectomy between January 2016 – December 2018 were examined. After the exclusion of patients with immunosuppression, malignancy or without adequate medical data, 158 patients were included to the study. Age, sex, adenoid/tonsil diameter and date of appointment were recorded. In our study, Actinomycosis was found in 44(28%) of 158 patients. Whilst there was no significant relationship between the presence of actinomycetes colonization and sex or date of appointment, increasing age was positively correlated with actinomycetes colonization. No relationship between actinomycetes colonization and hypertrophy was found. Besides, actinomycosis was found to be more prevalent in right and bilateral tonsillar tissues. Actinomycetes can be found in adenoid/tonsils independent of hypertrophy and sex, and it shows a positive correlation with increasing age. It tends to be found in the right tonsil or bilateral tonsils more frequently.

**Keywords:** Actinomycetes, tonsillectomy, adenoidectomy

#### Introduction

Actinomycetes species are gram-positive, facultative anaerobic, non-motile, non-spore-forming, filamentous rods [1]. While the most common cause of actinomycosis is *A. israelii* (%75); *A. gerencseriae*, *A. naeslundii*, *A. odontolyticus*, *A. viscosus*, and *A. meyeri* are other important agents that are responsible for actinomycosis [2]. Although *A. israelii* is related with actinomycosis, it is a part of normal flora that can also cause periodontal diseases [3].

Actinomycosis, a chronic infection which is characterized by abscess, fistula and tissue fibrosis, can be confused with many common diseases and may lead to ineffective treatment choices. Actinomycosis, an endogenous infection, is caused by the mucosal invasion of actinomycetes. While 50% of infections involve in the cervicofacial region; other common sites of involvement are thoracic and abdominopelvic regions, followed by central nervous system and skin [4].

Pharyngeal tonsil (adenoid), lymphatic tissue located on the posterior wall of the nasopharynx and covered by

pseudostratified epithelium, is a defense mechanism against the mucosal invasion of antigens, on its localization. Adenoid hypertrophy, which can cause symptoms such as sore throat, fever, and tonsillar inflammation, may predispose other pathologies such as secondarily hyponasal, snoring, obstructive sleep apnea syndrome (OSAS), acute otitis media, otitis media with effusion (OME), middle ear atelectasis, acute sinusitis [5,6]. As is known, adenoid hypertrophy can be caused by various bacterial and viral agents, and, the possible association between hypertrophy and actinomycosis has also been the subject of some recent studies. However, there is still no definite consensus that actinomycosis cause hypertrophy.

In this study, we investigated the incidence of actinomycosis in patients who underwent tonsillectomy/adenoidectomy, and possible relationships among actinomycetes colonization, hypertrophy, sex, age and date of appointment.

#### Material and Methods

A total of 175 Tonsillectomy / Adenoidectomy materials which were transported to Department of Pathology, Balikesir University Faculty of Medicine between January 2016 – December 2018 retrospectively studied, and patients with immunosuppression, suspected malignancy or without adequate medical data were not included to study. The remaining 158 cases were chosen, and they were evaluated in terms of age, gender, tonsil diameter, and

\*Corresponding Author: Eren Altun, Balikesir University School of medicine  
Department of Pathology, Balikesir, Turkey  
E-mail: [erenaltun@hotmail.com](mailto:erenaltun@hotmail.com)

the date of appointment. Hematoxylin and eosin stained slides of each patient were re-evaluated and photographed under the light microscope (Nikon Eclipse CI, Amsterdam, Netherlands) regarding the presence of actinomycetes colonization and sulfur granules. (Figure 1-2).

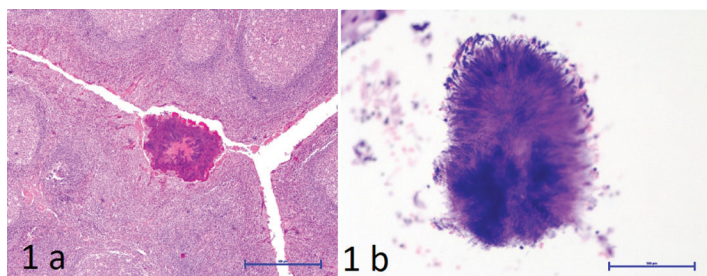


Figure 1. a, Lymphoid follicles with apparent germinal centers and actinomycetes colony settled on epithelium(40x H&E). b, Actinomycetes colony with classical sulfur granules (200x H&E).

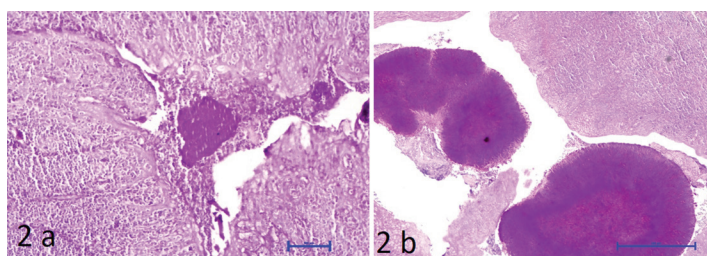


Figure 2. a and b, Periodic Acid-Schiff (positive) actinomycetes colonies on tonsillar tissue. (a 100x PAS, b 40x PAS)

### Statistical analysis

The all histopathological and demographical data obtained in this study were analyzed using the SPSS v.24.0 package program (SPSS Inc, Chicago, Illinois, USA). In all analysis,  $p < 0,05$  considered as the statistical significance level.

### Ethics Committee Approval

In this study, the investigation protocol was in accordance with the Helsinki committee requirement and was approved by the institutional Ethical Committee of The Balikesir University (Decision no: 21.11.2018/ 2018/185).

### Result

Among the 158 patients, 74 underwent the only adenoidectomy, 56 underwent bilateral tonsillectomy and adenoidectomy, 28 underwent only bilateral tonsillectomy. Actinomycetes colonization were detected in 44 (28%) patients. The mean age of the patients was 12 years. The mean age of patients with actinomycosis was 19 ( $\pm 16$ ), without actinomycosis was 9 ( $\pm 8$ ). There was a statistically significant relationship between the presence of actinomycosis and age, actinomycosis was more prevalent in older ages. (6 (5-9) vs 12.5 (6.3-30),  $p = 0.001$ ). Of the 158 patients, 80 (50.6%) were female and 78 (49.4%) were male. Actinomycosis incidence did not differ by sex ( $p = 0,798$ ). Regarding the hypertrophy of right, left and pharyngeal tonsil, there was no statistically significant difference among patients (respectively;  $p = 0,854$ ,  $p = 0,868$ ,  $p = 0,628$ ). Incidence of actinomycosis was not affected by the date of appointment ( $p = 0,498$ ) (Table 1). Actinomycetes colonization was detected more frequently in right tonsil and bilateral tonsils (Table 1).

Table 1. Comparison between presence of Actinomyces and other data

	Actinomyces		p	
	(+)	(-)		
Age	19(±16)	9(±8)	0.001	
Sex				
Female	23(52%)	57(50%)	0.798	
Male	21(48%)	57(50%)		
Macroscopic Largest Diameter of Right Tonsil (cm)	3.05	2.99	0.854	
Macroscopic Largest Diameter of Left Tonsil(cm)	2.99	2.98	0.868	
Macroscopic Largest Diameter of Adenoid (cm)	2.3	1.93	0.628	
Actinomyces Localization				
Right Tonsil	17 (39%)		0.498	
Left Tonsil	8(18%)			
Bilateral Tonsil	13(30%)			
Adenoid	5(11%)			
Bilateral tonsils + Adenoid	1(2%)			
Date of appointment				
January	4(9%)			
February	2(5%)			
March	3(6%)			
April	5(12%)			
May	3(6%)			
June	4(9%)			
July	6(15%)			
August	2(%5)			
September	7(16%)			
October	4(9%)			
November	1(2%)			
December	3(6%)			
Total	44	144		

### Discussion

Tonsillectomy/adenoidectomy materials of 158 patients operated in our hospital evaluated in terms of presence of actinomyces. While there was no statistically significant relationship between actinomycetes colonization and hypertrophy, sex or season, it is found that the incidence of actinomycosis was higher in older ages. The tendency of actinomyces to be found in the right tonsil or bilateral tonsils is also shown in this study.

The presence of Actinomyces in the tonsils was first detected in 1896 [6]. In subsequent studies conducted on this subject, the occurrence rate of actinomyces in tonsils varies greatly [7,8]. The rate of actinomyces was found 6.7% and 40.7% respectively in the most comprehensive studies on this subject in terms of the number of patients which were made by Aydin et al. and Riffat et al. including 1820 and 1213 patients respectively [7,9]. It is suggested that the possible reasons of these great differences between results

may be the differences in laboratory techniques, differences in the indications for surgery and the differences in patients groups included in the studies [6,10].

Pransky et al. found that the histological examination detects the presence of actinomyces more accurately than microbiological culture, and assert followings as possible reasons; the presence of other microorganisms, preoperative prophylactic antibiotherapy and insufficient anaerobic conditions [11].

In many studies conducted on tonsillar actinomyces, the relationship between colonization and hypertrophy has been another popular study subject. Lord, in his study in 1910, isolated the actinomyces from tonsillar crypts and suggested that the toxins produced by actinomyces may be related to tonsillar hypertrophy [12]. Pransky et al. found an increased prevalence of actinomyces in patients who underwent adenotonsillectomy and suggested that actinomycetes colonization may be related to tonsillar hypertrophy and obstructive symptoms [11]. Bhargava et al. found the higher prevalence of actinomycosis in patients with OSAS (56.8%) than in patients with recurrent tonsillitis (10.3%) [6]. Aydin et al., in their case series, found the actinomyces colonization in 6.7% of 1820 patients but found no relationship between clinical diagnosis and presence of actinomyces [7]. Melgarejo et al. observed no significant relationship between actinomycetes colonization and hypertrophy or recurrent tonsillitis [13]. Toh et al. showed that tonsil size was not influenced by actinomyces [14]. Toh et al., in their study, also showed that actinomycetes colonization in patients with previous tonsillitis is less frequent than in patients without a history of recurrent tonsillitis and suggested that the reason for this may be the use of antibiotics prior to surgery in patients with recurrent tonsillitis in their study groups [14]. van Lierop found no significant correlation between actinomyces and OSAS or recurrent acute tonsillitis [15]. Ashraf et al. found no relationship between the presence of actinomyces and hypertrophy or recurrent tonsillitis [8]. Jones et al., in contrast to many previous studies, observed a negative correlation between tonsillar hypertrophy and actinomycetes colonization, and higher incidence in patients with recurrent tonsillitis than the patients with OSAS [16]. In our study, there was no significant relationship between actinomyces and hypertrophy.

Considering age factor, although earlier studies mostly reported that actinomycetes colonization is positively correlated with age, there are some studies reported different results from the general literature. Bhargava et al., Aydin et al., and Toh et al. found higher actinomyces rate in adults than in children; moreover, Toh et al. postulated that this higher rate may be related to poorer oral hygiene [6,7,14]. While Melgajero et al., found actinomycetes to be more prevalent in their study group consisting of children aged 2-16 years [13], van Lierop et al. also found a significant relationship between age and actinomyces incidence in their study group of 172 pediatric patients aged under [12,15]. Similarly, Ashraf observed a significant relationship between actinomycosis and older age [8]. Kansu et al., also found actinomycosis to be positively correlated with age in pediatric group, they reported a higher incidence in adults than in children additionally, but, they did not find a significant relationship between age and actinomycosis in adult group [17]. Kutluhan et al. found no relationship between actinomycetes colonization and age [18]. In our study, it was

revealed that actinomycosis was more common in older patients in accordance with the literature.

Despite there are some studies reporting a higher incidence in males, Yasan et al. and Erkilic et al. reported the opposite [19,20]. Bhargava et al., Gaffney et al., Toh et al., van Lierop et al. and Kutluhan et al. found no significant relationship between sex and actinomycosis [6,10,14,15,18]. In our study, there was no significant difference in terms of gender between patients with and without actinomycosis.

Yasan et al. found that the incidence of actinomycetes colonization was higher in tonsillectomy materials of patients operated in summer months [20]. In our study, there was no significant relationship between season and actinomycosis when the patients were evaluated according to the months of operation.

The limitation of this study is mainly the lack of data on previously studied factors such as preoperative antibiotic use, history of OSAS, and recurrent acute tonsillitis.

## Conclusions

In this study, actinomyces settled in tonsils and adenoid, its association with hypertrophy and its relationship with other factors were investigated in order to contribute the data of the previous studies conducted on this subject. As a result, while we found no significant association between actinomycetes colonization and hypertrophy, our data showed that incidence of actinomycosis is positively correlated with age and actinomyces tends to settle in right tonsil or bilateral tonsils.

## Conflict of interest

*The authors declare that there are no conflicts of interest.*

## Financial Disclosure

*All authors declare no financial support.*

## Ethical approval

*This research was approved by Balikesir University. Ethics Committee by the decision dated (Decision no: 21.11.2018/ 2018/185).*

*Eren Altun ORCID: 0000-0001-9110-8364*

*Nevzat Dogukan Erbek ORCID: 0000-0002-7910-8756*

*Ihsan Ege Taner ORCID: 0000-0002-3689-3029*

*Ali Haydar Colak ORCID: 0000-0003-4920-1631*

*Gulay Turan ORCID: 0000-0002-3702-8811*

## References

1. Can Ş, Bayindir T, Kuzucu Ç, et al. Cervicofacial actinomycosis : a case report of acute suppurative clinical progress. *Bozok Tıp Derg.* 2014;1:12–8.
2. Greenwood D. Medical microbiology : a guide to microbial infections : pathogenesis, immunity, laboratory diagnosis and control. Churchill Livingstone/Elsevier; 2012. p. 233.
3. Cherry JD, James D, Harrison GJ, et al. Feigin and Cherry's textbook of pediatric infectious diseases. Philadelphia: WB Saunders, 1992;1:755-82.
4. Shilpa H AS, Mathew. A rare case of paediatric cervicofacial actinomycosis with obstructive adenotonsillar hypertrophy. *Glob J Res Anal.* 2018;7:43–5.
5. Szalmás A, Papp Z, Csomor P, et al. Microbiological profile of adenoid hypertrophy correlates to clinical diagnosis in children. *Biomed Res Int.* 2013;2013:629607.
6. Bhargava D, Bhusnurmath B, Sundaram KR, et al. Tonsillar actinomycosis: a clinicopathological study. *Acta Trop.* 2001;80:163–8.

7. Aydin A, Erkiliç S, Bayazit YA, et al. Relation between actinomycosis and histopathological and clinical features of the palatine tonsils: a comparative study between adult and pediatric patients. *Rev Laryngol Otol Rhinol (Bord)*. 2005;126:95–8.
8. Ashraf MJ, Azarpira N, Khademi B, et al. Relation between actinomycosis and histopathological and clinical features of the palatine tonsils: an iranian experience. *Iran Red Crescent Med J*. 2011;13:499–502.
9. Riffat F, Walker P. Prevalence of tonsillar Actinomyces in children undergoing tonsillectomy for sleep disordered breathing compared with recurrent tonsillitis. *Int J Pediatr Otorhinolaryngol*. 2009;73:1111–3.
10. Gaffney R, Harrison M, Walsh M, et al. The incidence and role of actinomyces in recurrent acute tonsillitis. *Clin Otolaryngol Allied Sci*. 1993;18:268–71.
11. Pransky SM, Feldman JI, Kearns DB, et al. Actinomycosis in obstructive tonsillar hypertrophy and recurrent tonsillitis. *Arch Otolaryngol Head Neck Surg*. 1991;117:883–5.
12. Lord FT. The etiology of actinomycosis the presence of actinomycetes in the contents of carious teeth and the tonsillar crypts of patients without actinomycosis. *JAMA*. 1910;55:1261.
13. Melgarejo Moreno P, Hellin Meseguer D, Marco Garrido A, et al. A correlation between age and Actinomyces in the adenotonsillar tissue of children. *B-ENT*. 2006;2:95–7.
14. Toh ST, Yuen HW, Goh Y-H. Actinomycetes colonization of tonsils: a comparative study between patients with and without recurrent tonsillitis. *J Laryngol Otol*. 2007;121:775–8.
15. van Lierop AC, Prescott CAJ, Sinclair-Smith CC. An investigation of the significance of Actinomycosis in tonsil disease. *Int J Pediatr Otorhinolaryngol*. 2007;71:1883–8.
16. Jones GH, Burnside G, McPartland J, et al. Is tonsillectomy mandatory for asymmetric tonsils in children? A review of our diagnostic tonsillectomy practice and the literature. *Int J Pediatr Otorhinolaryngol*. 2018;110:57–60.
17. Kansu L. Relation of actinomyces with tonsillar hypertrophy and antibiotic use. *Turk Arch Otolaryngol*. 2017;55:17–21.
18. Kutluhan A, Şalvız M, Yalçın G, et al. The role of the actinomyces in obstructive tonsillar hypertrophy and recurrent tonsillitis in pediatric population. *Int J Pediatr Otorhinolaryngol*. 2011;75:391–4.
19. Erkiliç S, Nek AA. Tonsilla palatinanın benign histopatolojik lezyonları: 1220 olgunun retrospektif incelenmesi. *Turk J Pathol*. 2008;18:20–1.
20. Yasan H, Çiriş M, Özel B, et al. The significance of histopathologic tonsillar actinomycosis in pediatric patients with recurrent acute tonsillitis. *KBB-forum*. 2006;5:1–4.