

The Presence of *Actinomyces* spp. in Tonsillectomy Specimens

Tonsillektomi Materyallerinde *Actinomyces* spp. Varlığı

Asiye Şafak BULUT¹

¹ Department of Pathology, TOBB ETÜ Hospital, Ankara, Turkey

SUMMARY

Actinomyces are commensal organisms found in some locations in the body including the oral cavity. They are unable to penetrate healthy tissues unless there is a portal of entry. Their colonization on tonsillectomy specimens is mostly an incidental finding and rarely causes active disease. In this study, tonsillectomy specimens of 38 pediatric and 60 adult patients sent for histopathological evaluation over a five-year period (2006-2011) were examined histopathologically for the presence of *Actinomyces* colonies and active disease. There was no statistically significant age or gender difference between colonized and non-colonized patients. None of the patients showed histopathological signs of active disease. In conclusion, although *Actinomyces* colonies are generally found incidentally in tonsillectomy specimens, their presence must be carefully evaluated, especially when the host is immunosuppressed or the tissue is damaged.

Key words: Tonsillectomy; Actinomycosis; Actinomyces

ÖZET

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Asiye Şafak BULUT¹

¹ Özel TOBB ETÜ Hastanesi, Patoloji Bölümü, Ankara, Türkiye

Aktinomiçesler, ağız boşluğu dahil olmak üzere vücudun bazı bölgelerinde bulunan kommensal mikroorganizmalar olup, hasarlı bir alan bulunmadığı sürece sağlam dokuların içine giremezler. Tonsillektomi materyallerindeki kolonizasyonları ise genellikle rastlantısal bir durum olup nadiren aktif hastalığa neden olur. Bu çalışmada beş yıllık zaman aralığında (2006-2011) histopatolojik incelemeye gönderilen 38 çocuk, 60 yetişkin hastaya ait tonsillektomi materyali, aktinomiçes kolonilerinin varlığı ve aktif hastalık bulguları yönünden incelenmiştir. Çocuk hastaların 10'unun, erişkin hastaların 12'sinin bir veya iki tonsilinde aktinomiçes kolonileri tespit edilmiştir. Aktinomiçes kolonileri içeren ve içermeyen hastalar arasında yaş ve cinsiyet yönünden bir farklılık görülmemiş, hastaların hiçbirinde histopatolojik olarak aktif hastalık bulgusu saptanmamıştır. Sonuç olarak; tonsillektomi materyalinde aktinomiçes kolonizasyonu her ne kadar rastlantısal bir durum olsa da, özellikle immün sistemi baskılanmış hastalarda ve doku hasarının bulunduğu durumlarda varlıkları dikkatle araştırılmalıdır.

Anahtar Kelimeler: Tonsillektomi; Aktinomikoz; Aktinomiçes

INTRODUCTION

Actinomycosis and *Actinomyces* colonization in tissues are two different entities. Actinomycosis is a subacute-to-chronic disease characterized by abscess formation, draining sinus tracts, fistulae, and tissue fibrosis. The clinical frequency of the disease is said to be 1/300.000 per year in the United States. The cervicofacial form is the most frequent manifestation of the disease, but its true prevalence cannot be estimated, as most cases are misdiagnosed. On the other hand, *Actinomyces* colonization in tissues is an incidental finding and does not form an active disease. Its frequency in the crypts of tonsils was reported to be between 8% and 48% in pediatric and between 1.8% and 43% in adult patients^[1-8]. While reviewing the literature, we observed that the term "actinomycosis" was used for some cases having *Actinomyces* colonies on the tonsils without active disease^[1,9,10]. Thus, we herein aimed to evaluate the presence of *Actinomyces* colonies in tonsillectomy specimens and the relation with histopathological features of active disease.

MATERIALS and METHODS

As routine histopathological examination of tonsils removed for benign disease is clinically unnecessary, 98 tonsillectomy specimens of 580 patients that the surgeon decided to send for histopathological evaluation based on preoperative risk factors and perioperative gross examination were included in this retrospective study. Indications for tonsillectomy, retrieved from the patients' files and/or operation reports, were recurrent tonsillitis and/or tonsillar hypertrophy causing obstructive symptoms. All surgically removed tonsils were fixed in formalin, embedded in paraffin and stained with hematoxylin-eosin. 5 µm thick slides were evaluated under light microscopy for the presence of *Actinomyces* and histological features like follicular hyperplasia, invasion of sulfur granules inside the lymphoid follicles, infiltration of acute inflammatory cells, abscess, and chronic granuloma formations. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) for Windows version 12.

RESULTS

Thirty-eight of the patients were of pediatric age (< 16 years) and 60 were adults. In the pediatric group, 11 were female and 27 were male. In the adult

group, 33 were female and 27 were male. Ages ranged between 2 and 16 years (mean: 6.00 ± 2.88) in the pediatric group and between 17 and 57 years (mean: 32.71 ± 8.31) in the adult group. *Actinomyces* were recognized as superficial aggregates of filamentous basophilic microorganisms arranged in a radial fashion. *Actinomyces* colonization was observed in 10 (26.3%) pediatric and 12 (20%) adult patients. The mean age and gender of the patients did not show a significant difference between colonized and non-colonized patients in either group ($p > 0.05$). Although all patients except three with *Actinomyces* colonization showed follicular hyperplasia in their tonsils, no significant correlation between them was determined ($p > 0.05$). None of the patients showed invasion of sulfur granules inside the lymphoid follicles, infiltration of acute inflammatory cells, abscess, or chronic granuloma with fibrous stroma formation.

In the non-colonized group, patients showed chronic tonsillitis with or without follicular hyperplasia in their tonsils. Five of the adult patients had an additional pathology, including two inclusion cysts, one granulomatous tonsillitis, one squamous papilloma, and one tonsilloolith.

DISCUSSION

Actinomyces species are gram-positive, strict or facultative anaerobic bacteria that form fungus-like branched networks of hyphae (sulfur granules). They are opportunistic in humans, particularly in the oral cavity. They are able to recognize components of the proteinaceous layer coating the exposed surfaces in the oral cavity. This proteinaceous layer provides receptor sites for bacterial adhesion, and adhesion takes place through adhesins. Adhesins mediate the attachment of *Actinomyces* to host cells. After this initial adhesion, attachment can occur, which is an essential step for further colonization. Attachment of bacteria to one another (called coaggregation) also improves the attachment.

There are resistant factors against bacterial adhesion in the oral cavity, one of which is desquamation of the oral mucosa. While cells desquamate, bacteria adherent to them also desquamate. Mechanical friction by muscle activity is another factor.

Underlying diseases and interruption of mucocutaneous barriers predispose a person to actinomyco-

sis by providing a medium in which the endogenous microorganisms can invade, proliferate and disseminate. Poor dental hygiene, chronic mastoiditis, chronic otitis, and chronic tonsillitis can cause proliferation of *Actinomyces* on the tonsils. However, mucosal disruption of the tonsil is required for the bacteria to become infective. When damage occurs in the tissue, i.e. by oral surgery, dental caries, dental manipulations, or maxillofacial trauma, bacteria easily penetrate the tissue and form active disease.

Although *Actinomyces* colonization in the crypts of tonsils is an incidental finding, Ozgursoy and Paransky et al. suggested an association with lymphoid hyperplasia^[9,10]. Ozgursoy et al. showed that the number of subjectively quantitated total lymphoid follicles and small- and medium-sized lymphoid follicles of the palatine tonsil were significantly increased in patients demonstrating “sulfur granule” in their crypts. They also showed highly thick squamous metaplasia of the lymphoepithelium and dilatation of the crypts to be more prevalent in these tonsils^[9]. In our patients, patients with *Actinomyces* colonization showed follicular hyperplasia, but there were no histological signs of active disease.

The occurrence of active disease depends on the interaction between the bacteria and the tonsillar tissue containing *Actinomyces* colonies. In some conditions like poor dental hygiene, chronic mastoiditis, chronic otitis, and chronic tonsillitis, pyogenic aerobic or anaerobic microorganisms diminish the oxidation-reduction potential, and *Actinomyces*, normally present in the tonsillar crypts, may proliferate or directly invade tonsillar tissue. Bhargava et al. observed the association of actinomycosis with sickle cell anemia, beta thalassemia and bronchial asthma^[8]. The presence of *Actinomyces* in this disease group was significantly higher than in the normal group. They explained this difference by the fact that these conditions diminish the oxidation-reduction potential. Poor dental hygiene in these patients was contributory. Although the absence of exact clinical knowledge for each patient limited the clinical and statistical assessment, it was thought that no clinical conditions causing the penetration of bacteria into the tonsillar tissue were present in our patients, owing to the fact that there were no signs of active disease histopathologically.

Actinomyces are saprophytes and not primary pathogens for tonsils in pediatric patients, as in

adults. Their presence must be carefully evaluated, especially when the host is immunosuppressed or the tissue is damaged, and in the absence of active disease, the term “*Actinomyces* colonization on tonsils” must be used instead of “tonsillar actinomycosis”.

REFERENCES

1. Van Lierop AC, Prescott CA, Sinclair Smith C. An investigation of the significance of Actinomycosis in tonsil disease. *Int J Pediatr Otorhinolaryngol* 2007;71:1883-8.
2. Papouliakas S, Kargos PG, Korres G, Karatzias G, Sastry A, Riga M. Comparison of clinical and histopathological evaluation of tonsils in pediatric and adult patients. *Eur Arch Otorhinolaryngol* 2009;266:1309-13.
3. Riffat F, Walker P. Prevalence of tonsillar actinomycosis in children undergoing tonsillectomy for sleep disordered breathing compared with recurrent tonsillitis. *Int J Pediatr Otorhinolaryngol* 2009;73:1111-3.
4. Melgarejo Moreno P, Hellin Meseguer D, Marco Garrido A, Galindo Ortego X, Ruiz Macia JA, Hostalet F. A correlation between age and *Actinomyces* in the adenotonsillar tissue of children. *B-ENT* 2006;2:95-7.
5. Yasan H, Çiriş M, Özel BF, Doğru H, Çandır Ö. The significance of histopathologic tonsillar actinomycosis in pediatric patients with recurrent acute tonsillitis. *KBB-Forum* 2006;5:1-4.
6. Slack J. The source of infection in actinomycosis. *J Bacteriol* 1942;43:193-209.
7. Mohamad I. *Actinomyces* in the tonsils: Hospital University Malaysia Experience. *Int J Otorhinolaryngol* 2009;8.
8. Bhargava D, Bhusnurmath B, Sundaram KR, Raman R, Al Okbi HM, Al Abri R, et al. Tonsillar actinomycosis: a clinicopathological study. *Acta Tropica* 2001;80:163-8.
9. Ozgursoy OB, Kemal O, Saatci MR, Tulunay O. Actinomycosis in the etiology of recurrent tonsillitis and obstructive tonsillar hypertrophy: answer from a histopathological point of view. *J Otolaryngol Head Neck Surg* 2008;37:865-9.
10. Paransky SM, Feldman JJ, Kearns DB, Seid AB, Billman GF. Actinomycosis in obstructive tonsillar hypertrophy and recurrent tonsillitis. *Arch Otolaryngol Head Neck Surg* 1991;117:883-5.

Yazışma Adresi/Address for Correspondence

Uzm. Dr. Asiye Şafak BULUT

Özel TOBB ETÜ Hastanesi

Yaşam Caddesi No: 5

Söğütözü, Ankara-Türkiye

E-posta: asafakbulut@yahoo.com