

## ARAŞTIRMA / RESEARCH ARTICLE

# The rate of bacteremia during adenotonsillectomy

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### Adenotonsillektomi sırasında bakteriyemi oranı

**Amaç:** Adenotonsillektomi yapılanlarda bakteriyemi insidansını ve adenotonsillar kültür ile kan kültürü arasındaki olası bir ilişkiyi değerlendirmektir.

**Yöntem:** Tekrarlayan akut tonsillitli 67 hastaya tonsillektomi ve/veya adenoidektomi yapıldı (54 hastaya adenotonsillektomi ve 13'üne yalnızca tonsillektomi). Tonsillektomiden önce ve beş dakika sonra bütün hastalardan kan, tonsil yüzeyi ve tonsil doku kültürleri alındı.

**Bulgular:** Adenotonsillektomi yapılan hastaların beşinde kan kültüründe üreme oldu. Patojen bakterilerin yanı sıra *S. pneumoniae*, *H. influenzae* ve alfa hemolitik streptokok gibi orofaringeal flora bakterilerinin de bakteriyemiye neden olduğu görüldü.

**Sonuç:** Adenotonsillektomi sırasında geçici bakteriyemi oluştuğundan, riskli hastalarda antibiyotik profilaksisi yapılmalıdır.

**Anahtar Sözcükler:** Tonsillektomi, adenoidektomi, mikrobiyolojik inceleme, bakteriyemi.

### Abstract

**Objectives:** To investigate the incidence of bacteremia during adenotonsillectomy and evaluate the possible relation between adenotonsillar and blood cultures.

**Methods:** Sixty-seven consecutive patients were undergone tonsillectomy with or without adenoidectomy for recurrent acute tonsillitis (adenotonsillectomy in 54 and only tonsillectomy in 13). Blood cultures as well as tonsillar surface and deep tissue cultures were obtained from all patients before and five minutes after operation.

**Results:** The positive blood cultures were seen in five patients who had undergone only adenotonsillectomy. Besides pathogen bacteria including *S. pneumoniae* and *H. influenzae*; alpha-hemolytic streptococcus as an oropharyngeal flora bacterium has been found to cause bacteremia.

**Conclusion:** Antibiotic prophylaxis should be used in patients with risk factors due to the transient bacteremia.

**Key Words:** Tonsillectomy, adenoidectomy, microbiological examination, bacteremia.

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## Introduction

Despite the use of broad spectrum antibiotics, recurrent acute tonsillitis (RAT) is frequently observed in pediatric population.<sup>1</sup> Tonsillectomy is a common surgical modality for the treatment of the RAT. The dissection method is most frequently performed surgical technique. Since the wound surface remains open after adenotonsillectomy, bacte-

rial contamination may be expected to lead bacteremia with a rate of 25 to 38%.<sup>2-8</sup> There is a risk of bacteremia for different types of operations in differing rates.<sup>2,4,5</sup>

Herein our objective was to determine the incidence of bacteremia during adenotonsillectomy and evaluate the possible relation between adenotonsillar and blood cultures.

## Materials and Methods

Sixty-seven consecutive children who underwent elective tonsillectomy with or without adenoidectomy for RAT and adenoid hypertrophy were enrolled in this prospective study. The American Academy of Otolaryngology Head and Neck Surgery criteria for tonsillectomy were accepted for the selection of patients.<sup>9</sup> Following general anesthesia, samples were taken from both tonsillar and adenoid surfaces by swabs and inoculated in 5% sheep blood agar, chocolate agar (plus Thayer-Martin supplement II, Merck) and eosin methylene blue (EMB) in 37°C. Tonsil and adenoid deep samples were inoculated 5% sheep blood agar, chocolate agar (plus Thayer-Martin supplement II, Merck), EMB and thioglycolate broth. Cultures were incubated at 37°C in anaerobic atmosphere containing 5-10% CO<sub>2</sub> and evaluated at 24 and 48 hours after the inoculation. Under general anesthesia and aseptic condition, blood samples were taken preoperatively and 5 minutes after the removal of the second tonsil, were inoculated into the BACTEC plus + aerobic/F (for adults) pedplus/F (for children) (Becton Dickinson), has been followed up in the BACTEC 9050 (Becton Dickonson-microbiology system, USA) blood culture systems. Postoperatively, tonsils were washed in sterile conditions with povidone-iodine and physiological serum. After slicing adenotonsillar tissue, it was put into a sterile tube for the aerobic culture. Isolated microorganisms were identified by using conventional methods and API identification panels (Biomerieux). Antibiotic suscepti-

bilities were studied by disc diffusion methods based on the guidelines from Clinical and Laboratory Standard Institute (CLSI). All patients were treated with amoxicillin, paracetamol suspensions four hours after the operation for seven days, and observed one night for postoperative complications such as risk of bleeding, poor oral intake or vomiting and systemic fever.

## Results

There were 36 males, 31 females with the mean age of 6.7 (mean±SD; 6.7±2.9) years ranging from 2 to 14 years. Elective adenotonsillectomy and tonsillectomy were performed in 54 and 13 patients, respectively. There was no microorganism isolation in the blood cultures incubated in the preoperative period. For the postoperative period, bacteria were isolated from the blood cultures in five of 67 patients (7.4%). These patients belong to the adenotonsillectomy group. The distribution of bacteria was shown in Table 1 (Table 1). Anaerobic bacteria could not be isolated in any of the samples.

**Table 1.** The distribution of isolated bacteria from tonsil cultures (n=67).

Bacteria	Surface culture	Deep culture	Surface and deep cultures
<i>α</i> -hem. streptococcus	58 (87%)	48 (72%)	48 (72%)
<i>Neisseria spp</i>	32 (48%)	17 (25%)	17 (25%)
<i>S. aureus</i>	10 (15%)	17 (25%)	8 (12%)
<i>S. pneumoniae</i>	5 (7%)	4 (6%)	4 (6%)
<i>H. influenzae</i>	4 (6%)	7 (10%)	4 (6%)
<i>H. parainfluenzae</i>	1 (1%)	3 (4%)	1 (1%)
GABHS	4 (5.3%)	6 (8%)	4 (5.3%)

## Discussion

Bacteremia has been reported to occur after tonsillectomy, adenoidectomy, septoplasty and tympanomastoidectomy procedures.<sup>4,6</sup> Since the wound surface is open during tonsillectomy to the oropharyngeal cavity, pathogen bacteria may spread to the blood through the blood veins within tissues and

surface of wound.<sup>5,7</sup> The occurrence of bacteremia following dental extraction has received much attention than post-tonsillectomy bacteremia over the years. Soldado et al<sup>10</sup> speculated that the low incidence of endocarditis associated with tonsillectomy, as compared to dental extraction, has probably led to this lack of attention. In the present study, the bacteriae isolated from the blood cultures. This finding may be thought to support the idea that the bacteria localized on the optimum sampling for detection of bacteremia in children is 30 second<sup>11,12</sup> and its resolution occurs in the majority of cases between 10 and 60 minutes.<sup>4,5</sup> Although we obtained the blood cultures in five minutes postoperatively, the rate of bacteremia was lower than previous study. Although post-tonsillectomy bacteremia has not led to severe complication in our patients, it should be kept in mind that it may produce vital results. Bacteremia carries a risk for patients suffering from cardiovascular or valvular diseases. Antibiotic prophylaxis has been reported to reduce the postoperative tonsillectomy complication such as postoperative bleeding and pain.<sup>7-12</sup> However, another study revealed that the use of preoperative antibiotics did not show real benefits to prevent isolated immediate and/or delayed complications after adenoidectomy.<sup>12</sup>

During tonsillectomy, the incidence of bacteremia has been reported in different ratios (25-38%).<sup>5,13</sup> In the present study, bacteremia was seen in patients who underwent only adenotonsillectomy. Although the recent studies have shown that either tonsillectomy or adenoidectomy alone may give rise to bacteremia, our study revealed that only adenotonsillectomy caused bacteraemia.<sup>4,5</sup> This finding may be explained by the fairly broad surgical wound surface. Besides pathogen bacteria including *S. pneumoniae* and *H. influenzae*, alpha-hemolytic streptococcus as an oropharyngeal flora bacterium has been found to cause bacteremia. This bacterium has also been reported to lead to infec-

tive endocarditis during bacteremia.<sup>14</sup> Therefore, antibiotic administration may be suggested as a fundamental management modality for prophylaxis. This situation was reported also in previous studies.<sup>2,4,5</sup> Despite antibiotic treatments, *S. pyogenes* bacteremia is reported to cause endocarditis, arthritis, and osteomyelitis resulting in significant mortality.<sup>15,16</sup>

## Conclusion

During adenotonsillectomy, the surgical wound surface is broader than either adenoidectomy or tonsillectomy alone. Therefore, the risk of bacteremia may rise. Besides pathogen bacteria including *S. pneumoniae* and *H. influenzae*, alpha-hemolytic streptococcus as an oropharyngeal flora bacterium has been found to cause bacteremia. Therefore, antibiotic administration may be suggested as a fundamental management modality for prophylaxis.

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**Conflict of interest statement:**

*This article includes a part of the thesis of Dr. Kabal.*

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