RESEARCH

POST TONSILLECTOMY BACTERIEMIA

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SUMMARY

Aim: To determine the transient bacteriemia ratios during the elective tonsillectomy and compare the bacteria detected with superficial/central tonsillar cultures. Methods: 46 patients were included in this study. Preoperative surface swab cultures, intraoperative tonsil central swab cultures, preoperative and postoperative blood culture samples were obtained. Antibiotic sensitivity tests were done for the detected pathogen bacteria. Results: Bacteriemia was detected in six patients (%13). In 5 of the patients (%83.3), isolated microorganism (S.aureus) in the blood culture was the same as the one in central swab cultures. In 5 of the 6 cases with bacteriemia (%83.3) resistance to penicillin was detected. Conclusion: Bacteriemia at the rate of 13% and resistance to penicillin at the rate of 83.3% warrants the necessity of antibiotic prophylaxis especially in risky patients. The similarity of the pathogens detected in the blood to the central tonsil pathogens at the rate of %83.3 (5/6) suggested that it was not appropriate to choose an antibiotic based on superficial tonsil cultures.

Keywords: bacteriemia, tonsillectomy, cultures

POST TONSİLLEKTOMİ BAKTERİEMİSİ

ÖZET

Amaç: Bu çalışma elektif tonsillektomi sırasında görülen geçici bakteremi oranlarının saptanması ve tespit edilen bakterilerin tonsil merkez/yüzeyel kültürleriyle karşılaştırılması amacıyla yapılmıştır. Metodlar: Çalışmaya 46 hasta alınmıştır. Preoperatif yüzeyel sürüntü kültürleri, intraoperatif tonsil merkez sürüntü kültürleri, preoperatif ve postoperatif kan kültür örnekleri incelenmiştir. Tespit edilen patojen bakteriler için antibiyotik duyarlılık testleri yapılmıştır. Sonuçlar: Bakteriemi altı hastada (%13) tespit edilmiştir. Bu hastaların beş tanesinde (%83.3) kan kültüründe ve merkez sürüntü kültürlerinde aynı bakteri (S. aureus) izole edilmiştir. Bakteriemi tespit edilen altı hastanın beşinde (%83.3) penisilinlere direnç tespit edilmiştir. Tartışma: % 13 oranında bakteriemi ve %83.3 oranında penisilinlere direnç tespit edilmiş olması özellikle riskli hasta grubunda antibiyotik profilaksisinin gerekliliğini göstermiştir. Kanda tespit edilen patojenlerin %833 (5/6) oranında merkez tonsil patojenleriyle korelasyon göstermesi, antibiyotik seçiminde yüzey tonsil kültürlerine göre karar vermenin uygun olmayacağını düşündürmüştür.

Anahtar Sözcükler: bakteriemi, tonsillektomi, kültür

INTRODUCTION

While transient bacteriemia due to tonsillectomy does not cause any problems in healthy individuals, it may cause high mortality in the risk group with congenital/acquired heart disease or orthopedic prosthesis despite antibiotic treatment[1,2]. To counter this probability antibiotic prophylaxis is being frequently administered in risky patients[3,4].

Bacteriemia observed during tonsillectomy may develop due to microorganisms in the central region of the tonsil or contaminated oropharyngeal secretions or due to local infections[5].

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It is known that tonsil surface cultures do not reflect central tonsil cultures[5]. Therefore, it may be wrong to make a decision about prophylactic antibiotic choice solely based on surface culture results. The identification of microorganisms observed during bacteriemia is significant in choosing an antibiotic especially for risky patients.

This study has been conducted with the aims of determining the transient bacteriemia ratios in tonsillectomy cases that underwent classical dissection and comparing the bacteria detected in bacteriemia with surface/central tonsil cultures.

MATERIAL AND METHODS

46 patients who underwent elective tonsillectomy with the diagnosis of chronic recurrent tonsillitis in our clinic between April 2002 and September 2002 were included in the study. 34 of the patients were male and 12 were female and their average age was 5.4. The indications for tonsillectomy were: not less than 5 attacks of

tonsillitis per year, persisting for at least 2 years; high fever, pain, tonsillar hypertrophy and hyperemia, cervical lymphadenopathy and persisting complaints despite recurring antibiotic treatment.

Care was taken that the patients included in the study did not have any attacks of tonsillitis or upper respiratory tract infections 4 weeks prior to the operation and did not use antibiotics for any reason for at least 20 days before the operation. In the postoperative period oral amoxicillin clavulanic acid suspension was used for 5 days for prophylaxis.

Immediately after the induction of anesthesia, preoperative blood culture was taken for control purposes in accordance with the techniques of sterile blood collection from peripheral vein. Immediately before the operation, taking pains not to cause oropharyngeal contamination swab cultures were taken from both tonsils and planted beside the operation table. The tonsils which were removed with the dissection technique were kept in povidin-iodine (Batticon) solution for 35-45 seconds to prevent contamination from outer portions of the tonsils and then bathed in sterile physiological saline. Then after the tonsils were separated into two with the help of a sterile lancet, swab cultures were taken from the central regions with sterile cotton swabs. Immediately after the removal of the tonsils (in 2 minutes) blood culture was taken from the peripheral vein. The sample was plated onto aerob and anaerob blood culture media (BACTEC 9050; Becton, Dickinson and Company, Franklin Lakes, NJ). Surface swab and central swab culture samples were plated onto 5% bovine blood growing medium, chocolate agar and eosin-methylen blue agar (EMB) growing mediums. After incubation in a 5% CO2 containing environment at 35° C for 48 hours, the growths were assessed using standart microbiological methods. Microorganisms accepted as possibly pathogen that grow dominantly beside the polymicrobial normal throat flora in surface and central swab cultures were tested for antibiotic sensitivity in the Mueller-Hinton growing medium by the Kirby-Bauer disc-diffusion method.

RESULTS

No growth was identified in the preoperative blood culture samples. In postoperative blood culture samples bacteriemia was detected in 6 patients (13%). In five of the patients (83.3%), it was observed that the possible pathogen microorganism isolated in the blood culture was the same as the one in the central swab cultures. In one patient; although no pathogens were identified in surface and central cultures, bacteria that could be pathogen grew in blood culture (Table 1). No anaerobic bacteria were identified in postoperative blood cultures.

	Tonsil Surface Swab	Tonsil Central Swab	Blood Culture
1	NBF	NBF	MSSA
2	MSSA	MRSA	No bacterial growth
3	NBF	MRSA	No bacterial growth
4	MRSA	MRSA	No bacterial growth
5	Haemophilus spp.	Haemophilus spp.	No bacterial growth
6	NBF	NBF	No bacterial growth
7	NBF	NBF	No bacterial growth
8	NBF	NBF	No bacterial growth
9	GABHS	Haemophilus spp.	No bacterial growth
10	NBF	NBF	No bacterial growth
11	GABHS	GABHS	No bacterial growth
12	GABHS	Haemophilus spp.	No bacterial growth
13	NBF	NBF	No bacterial growth
14	NBF	NBF	No bacterial growth
15	GABHS	Haemophilus spp.	Haemophilus spp.
16	NBF	MRSA	No bacterial growth
17	NBF	NBF	No bacterial growth
18	NBF	NBF	No bacterial growth
19	NBF	NBF	No bacterial growth
20	NBF	Haemophilus spp.	No bacterial growth
21	MRSA	MRSA	No bacterial growth
22	MRSA	MRSA	No bacterial growth
23	MSSA	MRSA	No bacterial growth
24	NBF	MRSA	No bacterial growth
25	NBF	MSSA	No bacterial growth
26	MSSA	Haemophilus spp.	No bacterial growth
27	NBF	Haemophilus spp.	No bacterial growth
28	NBF	MSSA	MSSA
29	GABHS	GABHS	No bacterial growth
30	NBF	NBF	No bacterial growth
31	NBF	NBF	No bacterial growth
32	NBF	NBF	No bacterial growth
33	MSSA	MRSA	No bacterial growth
34	NBF	MRSA	No bacterial growth
35	NBF	NBF	No bacterial growth
36	MRSA	MRSA	No bacterial growth
37	NBF	MSSA	MSSA
38	GABHS	GABHS	No bacterial growth
39	NBF	NBF	No bacterial growth
40	NBF	MRSA	MRSA
41	NBF	NBF	No bacterial growth
42	NBF	NBF	No bacterial growth
43	NBF	NBF	No bacterial growth
44	NBF	GABHS	GABHS
45	MSSA	MSSA	No bacterial growth
46	*NBF*	NBF	No bacterial growth

Table 1: Isolated bacteria (NBF: Normal throat flora, MSSA: Methycilline sensitive S.aureus, MRSA: Methycilline resistant S.aureus, GABHS: Group A beta hemolytic streptococcus)

Of the 6 patients in whom bacteriemia was detected, in 4 patients S.aureus and in 1 patient group

A beta hemolytic streptococcus (GSBHS) and Haemophilus spp. were cultivated. It was observed that pathogens growing in blood cultures were not compatible with surface cultures (Table1).

Microorganisms that could be pathogens (presumptive pathogens) were identified in 16 patients in surface swab cultures (34.78%) and in 27 patients in tonsil central swab cultures (58.69%). The most frequently encountered pathogens in surface cultures were respectively S.aureus, GABHS (group A beta hemolytic streptococcus = Streptococcus pyogenes) and Haemophilus spp. In tonsil central swab cultures, on the other hand, S.aureus, Haemophilus spp and GABHS were identified according to order of frequency (Table 1).

In superficial and central cultures, while the same pathogen was identified in 9 patients (19.56%), in 18 patients (39.13%) different pathogens were identified (Table 1). According to the antibiotic sensitivity test results; all bacteria except GABHS were identified as penicillin-resistant. The antibiotic sensitivities of bacteria isolated in blood cultures are shown in Table 2.

	Antibiotics					
Microorganisms	Penicilline	Amoxycilline-clavulanic A	Cefuroxime	Erythromycin	Trimethoprim-sulphametaxasol	Vancomycin
MSSA	Resistant	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive
MSSA	Resistant	Sensitive	Sensitive	Sensitive	Resistant	Sensitive
MSSA	Resistant	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive
MRSA	Resistant	Resistant	Resistant	Sensitive	Sensitive	Sensitive
GABHS	Sensitive	Sensitive	Sensitive	Sensitive	Resistant	Sensitive
H. influenza	Resistant	Sensitive	Sensitive	Sensitive	Sensitive	Sensitive

Table 2: Antibiotic sensitivity test results (MSSA: Methycilline sensitive S.aureus, MRSA: Methycilline resistant S.aureus, GABHS: Group A beta hemolytic streptococcus)

Including the ones having a positive blood culture none of our patients developed infective complications.

DISCUSSION

Theoretically, there is a risk of bacteriemia due to operation in regions where there is bacterial flora. Yet, bacteriemia ratios are differential depending upon the site of operation. In the septoplasty operation, although there is normally S.aureus colonization in the nasal mucosa, the risk of bacteriemia is very little[6]. Similarly, although there is a theoretical risk in cases with ventilation tube insertion, bacteriemia ratios have not been completely verified[6,7].

Transient bacteriemia may lead to serious complications in the risky patient group while causing no problems in healthy patients[5]. The effect of transient bacteriemia due to tonsillectomy especially on the development of endocarditis in patients with cardiovascular risks is very well known[8]. Therefore; there is a consensus on the use of prophylactic antibiotics especially in the risky patient group. It has also been reported that prophylactic antibiotic treatment reduces bleeding and postoperative pain and increases recovery[8,10].

Transient bacteriemia may develop as a result of bacterial diffusion through the veins in the tonsillary tissue or the pharyngeal mucosa and through the open wound margins[4]. The traction applied before starting the dissection may also have a role in bacterial diffusion[9]. The findings that in 5 of the 6 patients in whom we identified bacteriemia the bacteria growing in the blood were the same as the bacteria growing in the central tonsil culture and that the bacteria growing in superficial cultures were not identified in blood cultures have suggested that transient bacteriemia may originate from tonsil central bacteria. The traction and squeezing of the tonsil may have been effective in this result.

While post tonsillectomy transient bacteriemia ratios were given as 22%[13], 25%[12], 41%[8] in the literature, in our series this ratio was found as 13% (6/46). The differences among bacteriemia ratios may be attributed to different blood culture methods and blood culture collection times[2]. It has been reported that transient bacteriemia occurs within a one-hour time period[14]. There are different approaches regarding the timing of culture collection such as: immediately after removing the first or second tonsil[15], within the first 5 minutes after tonsillectomy[16], immediately after the completion of the operation[17], 2 minutes after the removal of the second tonsil[2,18], during tonsillectomy[5], in the postoperative period[12]. In our study the blood culture was taken within 2 minutes following the completion of the tonsillectomy operation.

Post-tonsillectomy bacteriemia ratios may also depend on the surgical technique. Gaffney et al. reported that bacteriemia ratios were lower in tonsillectomies performed with the guillotine method compared to those performed with the dissection method and that this could be due to the guillotine's compression on the tonsillar blood vessels[18]. Conversely, Olina et al. reported a 60% rate of bacteriemia with the guillotine technique while detecting only a 19% rate of bacteriemia with the

dissection technique[19]. Walsh et al., on the other hand, found no statistically significant differences between the two techniques with respect to the incidence of bacteriemia[2].

Streptococcus pyogenes (GABHS) is stated to be responsible in the etiology of endocarditis, arteritis, and osteomyelitis and it is also reported to be capable of leading to serious mortality in patients with cardiovascular risk factors despite antibiotic treatment[20]. In the series of Rhoads et al. comprised of 68 patients, Streptococcus pyogenes (GABHS) was cultivated in the blood cultures of 4 patients[17]. In our series we identified Streptococcus pyogenes in one patient (1/46).

Another microorganism responsible in the aetiology of endocarditis is the alpha hemolytic streptococcus[21]. Kaygusuz et al. identified alpha hemolytic streptococcus in one case[12]. In this series no alpha hemolytic streptococci were identified.

H. İnfluenza serotype b may cause invasive bacterial infections in children under 3 years of age[22,23]. In our case series, in central swab cultures Haemophilus spp. were cultivated in 7 (7/46) cases. In postoperative blood cultures on the other hand Haemophilus spp. was identified in one out 6 patients in whom growth was identified.

In the 32 case series of Francois et al. anaerobe bacteria were not cultivated in blood cultures[5]. Kaygusuz et al. reported anaerob bacteria growth in one case.12 In our case series there wasno anaerobic growth.

S.aureus may lead to serious systemic infections such as pneumonia, osteomyelitis, acute endocarditis, pericarditis, meningitis through bacteriemia besides causing local infections[24]. It is worth noticing that in our case series we identified S.aureus in 4 of the 6 patients detected to have bacteriemia (4/6) and that these showed similarities to the central cultures. 3 out of 4 S.aureus cultivated samples were of the type sensitive to methycilline (MSSA) and 1 was of the type resistant to methycilline (MRSA). With respect to their sensitivities to methycilline, detection of similarities with central swab cultures supports the idea that bacteriemia originates from tonsil central bacteria.

None of our patients, including those with a positive blood culture, developed any infective complications. This finding suggested that the number of bacteria seen in the blood during bacteriemia was below 10CFUs/mL; therefore, it can be stated that risk of metastatic infection isextremely low in healthy children[25].

CONCLUSION

The growth of the same pathogen bacteria in blood and central swab cultures in 5 patients detected to have bacteriemia suggested that the bacteriemia could originate from tonsil central bacteria. Our detection of bacteriemia at the rate of 13% revealed the necessity of antibiotic prophylaxis especially in risky patients. In order to determine the antibiotic of choice in prophylaxis we think that studies adopting larger case series which reflect the microbiological profile of the Turkish people are warranted.

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