Bacteriological Study of Otorrhea in Chronic Otitis Media

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INTRODUCTION

It is generally accepted that some cases of chronic otitis media are often resistant to the medical treatments, because the pathogenes of the disease reveal no sensitivity to the drugs. Kawamura, et al (1962) reported that the gram negative bacilli were isolated in the proportion of 50 per cent among 1,005 cases of chronic otitis media, and they pointed out that pseudomonas and proteus groups were the important strains from the standpoint of the treatments because of their strong resistance to the drugs.

The purpose of this paper is to present kinds, frequencies and drug sensitivities of the pathogenes isolated from the otorrhea in chronic otitis media at our clinic.

MATERIAL AND METHOD

The subjects used in the present study are 96 individuals, 62 males and 34 females, with chronic otitis media who were patients of a three-year-duration (1961–1963) in the Department of Otolaryngology of Yamaguchi University Hospital. Otorrhea taken aseptically from the ear canals were sent to the Department of Clinical Pathology for the bacteriological examinations, such as culture and the drug sensitivity tests.

RESULT

1. Kinds and Frequencies of Bacteria isolated from Otorrhea:

One hundred and sixty strains are isolated from 96 individuals and are differentiated into 30 kinds of bacteria. These are shown in Table 1. The term "other bacteria" indicates the groups of candida, aspergillus, and etc. Staphylococci groups, pseudomonas aeruginosa and proteus groups are commonly encountered as the pathogenes in our materials. The gram negative bacilli are found more

Table 1. Kinds and Frequencies of Bacteria Isolated from Otorrhea in Chronic Otitis Media

	Number of Strains	
	mixed infection	pure infection
Staphylococcus aureus	20	11
Staphylococcus epidermidis	17	10
Pseudomonas aeruginosa*	8	17
Proteus mirabilis*	7	6
Proteus vulgalis*	0	2
Corynebacterium	15	0
Streptococcus hemolyticum α type	5	0
Streptococcus hemolyticum β type	1	0
Rettgerella*	6	0
Klebsiella*	5	0
Enterococcus	3	0
Escherichia coli*	3	0
Other bacteria	18	0
	114	46
Total Number of Strains	160	

* indicates gram negative bacilli

Table 2. Kinds and Frequencies of Bacteria Isolated from Persistent Otorrhea after Tympanoplasty

Staphylococcus aureus	4
Staphylococcus epidermidis	2
Pseudomonas aeruginosa	15
Proteus mirabilis	4
Klebsiella	3
Aspergillus	2
Citrobacter	1
Total Number of Strains	31

than 58.3 per cent. One-third or two-thirds of pseudomonas, staphylococci or proteus groups reveal the existence of only the same kind of bacteria in the culture mediums. In such cases the groups of the isolated bacteria should be considered to be the pathogenes of the chronic otitis media.

Table 2 indicates the kinds and frequencies of the pathogenes isolated from 17 individuals who were discharged from our clinic with the persistent otorrhea after the tympanoplasty, and it discloses that the pseudomonas group is found about 50 per cent in such cases.

2. Drug Sensitivity of Bacteria isolated from Otorrhea:

The results of the drug sensitivity tests of the bacteria isolated from the otorrhea are shown in Table 3, which discloses that the high percentages of the strains of the bacteria are non-sensitive to Sulfisomezole and Penicillin, and sensitive to Kanamycin and Streptomycin in vitro. Conclusively, the drug sensitivities of the pathogenes against the usual antibiotics weaken in the following order; Kanamycin, Streptomycin, Chloramphenicol, Erythromycin, Tetracyclin and Penicillin.

The percentages of the drug sensitivies about the common bacteria causing otitis media; e. g., staphlococcus aureus, staphylococcus epidermidis, pseudomonas aeruginosa and proteus groups are illustrated in Table 4. Generally, two staphyococci groups reveal strong sensitivity to Kanamycin, Erythromycin, Chloramphenicol and Streptomycin (as in order). Proteus groups are sensitive

Table 3. Result of Drug sensitivity Test of Bacteria Isolated from Otorrhea in Chronic Otitis Media

	sensitive %	non-sensitive %
Penicillin	20	80
Erythromycin	41	59
Streptomycin	52	48
Chloramphenicol	46	54
Tetracycline	38	62
Kanamycin	61	39
Salfisomezole	5	95

Table 4. Percentage of Drug Sentivity about Common Bacteria Causing Chronic Otitis Media

	Staph. aureus		Staph. epidermidis		Pseudomonas aeruginosa		Proteus groups	
	(−)	(+)	(−)	(+)	(−)	(+)	(−)	(+)
Penicillin	66.6	33.4	30.7	69.3	100	0	100	0
Erythromycin	0	100	7.7	92.3	100	0	100	0
Streptomycin	53.3	46.7	23.0	77.0	57.8	42.2	70.0	30.0
Chloramphenicol	13.3	86.7	46.1	53.9	100	0	60.0	40.0
Tetracycline	46.7	53.3	46.1	53.9	100	0	100	0
Kanamycin	0	100	0	100	100	0	30.0	70.0
Sulfisomezole	100	0	100	0	100	0	90.0	10.0
	39.6	60.4	36.2	63.8	94.0	6.0	78.5	21.5

* (+) = Sensitive

(−) = Non-sensitive

to Kanmycin, Chloramphenicol and Streptomycin. Pseudomonas is sensitive only to Streptomycin. On the other hand, Sulfisomezole is non-effective to these four groups of the pathogenes.

The results of the sensitivity tests against the causative microbes obtaibed from the otorrhea during a three-year-duration are graphically illustrated in Figure I. It shows that Kanamycin is the most sensitive medicine and Sulfisomezole is non-sensitive against the pathogenes of chronic otitis media in each year.

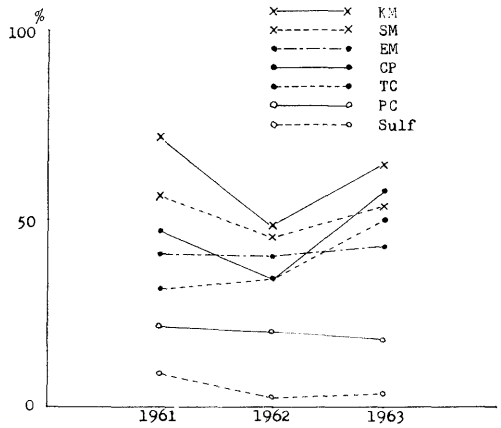

Fig. 1. Drug sensitivity (in percentage) anually

DISCUSSION

Goldstain and Daly (1955)[2] described that hemolytic staphylococcus aureus, proteus vulgaris and pseudomonas aeruginosa were the common pathgenes in chronic suppurative otitis media, and they stressed that proteus and pseudomonas groups were resistant to all antibiotics. Tasaka (1962)[3] reported that the kinds of bacteria isolated from the otorrhea before the tympanoplasty were consisted of staphylococcus aureus, pseudomonas aeruginosa, diphtheroid bacilli, micrococci, proteus vulgaris, and etc. He emphasized that staphylococcus aureus had completely disappeared after the operation, while pseudomonas aeruginosa, diplococcus pneumoniae and diphtheroid bacilli had essentially persisted. In our study the common pathogenes in chronic otitis media are staphylococcus aureus, staphylococcus epidermidis, pseudomonas aeruginosa, corynebacterium, proteus mirabilis, "other bacteria", and etc. From the standpoint of bacteriolgical view, 46 cases are classified into pure infections, and 50 cases are mixed in nature. The kinds of the bacteria isolated from the persistent otorrhea after the tympnaplasty in our clinic consist of pseudomonas aeruginosa, proteus mira-

bilis, staphylococcus aureus, and etc. Regarding the pseudomonas and proteus infections, Yow (1952)[4] stated that they had a tendency to increase in number, anually.

As already mentioned, Kanamycin is the most effective medicine against the pathogenes isolated from our cases, and Sulfisomezole is non-effective against almost of all kinds of the bacteria. Hence, when we treat the chronic otitis media without performing the drug sensitivity test, Kanamycin is of the first choice. Kawamura described that Chloramphenicol was the most effective antibiotics in the treatments of chronic otitis media, but he did not pay attention to the effect of Kanamycin.

It is noteworthy that pseudomonas is non-sensitive to Kanamycin and sensitive to Streptomycin only. Yow found that Polymixin B was effective against pseudomonas infections and it was less significant in the treatment of proteus infections. The same conclusions are obtained from our observations.

SUMMARY AND CONCLUSION

The bacteriological examinations of the otorrhea taken from 96 patients with chronic otitis media are performed and the following conclusions are obtained.

1. Staphylococcus aureus, staphylococcus epidermidis, pseudomonas aeruginosa and proteus groups are the common pathogenes of the chronic otitis media.
2. Both pseudomonas and proteus groups are often the causes of the mixed infection and are usually non-sensitive to any antibiotics.
3. The drug sensitivity of the pathogenes isolated from otorrhea seems to weaken in the following order; Kanamycin, Streptomycin, Chloramphenicol, Erythromycin, Tetracyclin, Penicillin and Sulfisomezole.

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