Bull Yamaguchi Med Sch 33 : 39—44, 1986

Sudden Hearing Loss Accompanied by Mycoplasmal Infection

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(Received September 2, 1986)

Abstract Mycoplasma pneumonia followed by a sudden loss of hearing was reported in a 31-year-old female. Acute otitis media characterized by moderate inflammation and bleeding of the tympanic membrane was found in the left ear before the onset of sudden sensorineural hearing loss. When treated with hydrocortizone and erythromycine, hearing at the high frequency level recoverd, however, hearing at the low frequency level remained impaired. The diagnosis of mycoplasmal infection was confirmed serologically, however, confirmation of the Mycoplasma culture by means of pharyngeal swab was unsuccessful.

Key Words : Mycoplasma pneumoniae, Sensorineural hearing loss, Sudden deafness, Otitis media, Bullous myringitis

Introduction

Mycoplasma pneumoniae is a common causative agent of respiratory disease, such as rhinitis, pharyngitis, tracheobronchitis and pneumonia. Tracheobronchitis has been found to be more common than pneumonia and asymptomatic infection has been found to be frequent[1]. Incidence of infection with Mycoplasma pneumoniae is less frequent among patients below five years and above 40 years of age[2]. Involvement of the nervous system has been observed in about 4.0 % of mycoplasmal pneumonia cases in Japan : [3] notably, meningitis, encephalitis, polyradiculoneuritis, myelitis, acute cerebellar ataxia, Fisher's syndrome and polyneuritis as reported by Tanaka et al.[4]. In the auditory system, acute otitis media, bullous myringitis and sensorineural hearing loss are all complications due to Mycoplasma pneumoniae infection[5-8]. However, sensorineural hearing loss is less frequent. The clinical picture of sensorineural hearing loss resembles that of sudden deafness. It may be unilateral or bilateral with signs of recruitment. A diagnosis of Mycoplasmal infection by the rise in the complement fixation titer or phytohemagglutinin (PHA) titer between the acute and convalescent phase sera should be made. Cold agglutinins are also useful, but they are present in about 50 % and may

be positive in other conditions as well.

Case Report

A 31-year-old housewife was admitted to our hospital for sudden hearing loss in her left ear. A high-grade fever (38.0℃), sore throat, headache, cough and mild general malaise developed 16 days prior to admission . Three days after the onset, these symptoms subsided except for a continuous non-productive cough. She was examined by a general practitioner who then referred her to the Internal Medicine department at our hospital for further examination due to an abnormal shadow which appeared on her chest x-ray. With the diagnosis of acute bronchitis, she was then treated with oral antibiotics (cefalexin 1500 mg/day) and with a cough remedy. Nine days after the initial onset of the symptoms, she noticed that she had trouble hearing in her left ear. The following days, the Internal Medicine department referred her to our clinic.

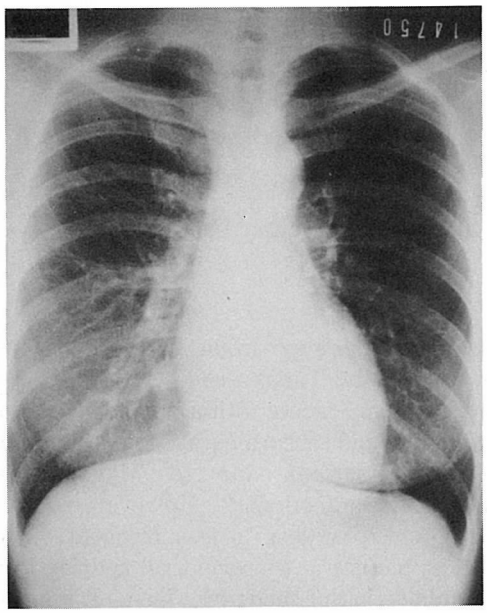


Fig. 1 Chest x-ray examination on admission

In the first examination, she was diagnosed with acute otitis media. Physical examination revealed nothing unusual, except that her left eardrum was moderately to severely hyperemic with slight bleeding. Four days after this first examination, she was given an audiological test because of her continuing hearing loss. By this time, her eardrums had already improved. The audiogram indicated a moderate sensorineural hearing loss and she was admitted to our hospital on suspicion of sudden deafness on September 16, 1980. Upon admission, the left tympanic membrane was no longer hyperemic and appeared normal, and physical examination did not indicate any abnormalities.

Subsequent examination of chest x-ray, however, revealed an abnormal shadow in the right lower lung field (Fig. 1). Auscultation did not reveal any abnormal sound. Blood examination and laboratory findings showed the white blood cell count to be whithin the normal range (7300/mm³) and with a left shift (Table 1). Proteinuria was found, but renal function tests were normal. The audiogram showed moderate sensor-

Table I Laboratory findings

W. B. C.	7300 /mm³
N. band	6.2 %
N. seg.	77.6 %
Lymphocyte	12.9 %
C. R. P.	(−)
Serum protein	7.9 g/dl
A/G	0.68
Complement	28 CH50
ASLO titer	166
Triglycerides	53 mg/dl
RA	(−)
Antinuclear antibody	(−)
Proteinuria	+～++

ineural hearing loss in a type of low tone deafness (Fig. 2). The electrocochleogram showed an almost normal pattern (Fig. 3), and the cochlear microphonics were also normal. Bekesy's audiogram showed a positive recruitment in the left ear and Jerger's type was type II. In the vestibular function test, caloric stimulation showed no hypoactivity of the left labyrinth, however, positional nystagmus was found to the right side (Fig. 4). CT-scan and tomography of the ear x-ray examination were normal.

Finally, serological studies confirmed the infection of Mycoplasma pneumoniae, showing changes in the phytohemagglutinin (PHA) antibody titer from 1 : 20480 to 1 : 640 over periods

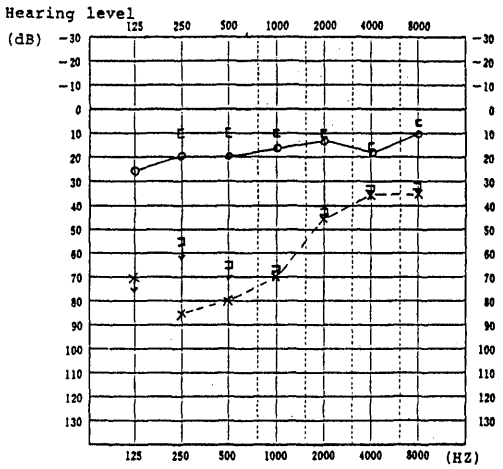


Fig. 2 Audiogram on admission

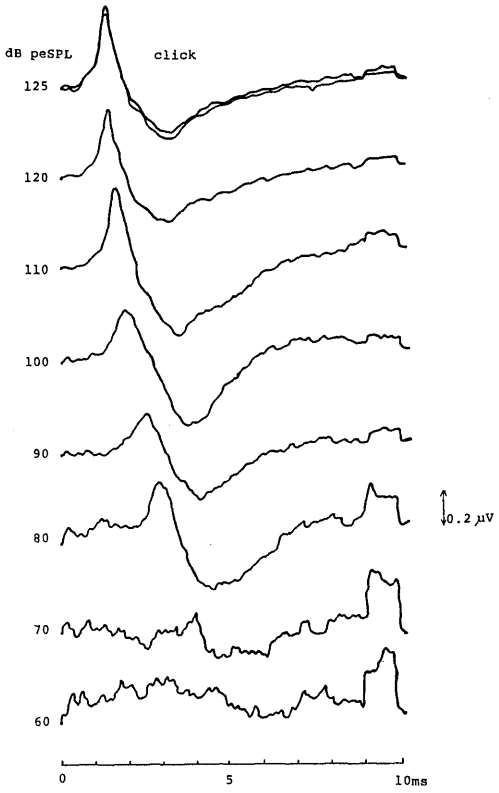


FIG. 3 ELECTROCOCHLEOGRAM
(on the left side)

Fig. 3 Electrocochleogram (on the left side)

Otoneurological Examination

Romberg : NEGATIVE
Mann : NEGATIVE
Stepping : W. N. L.
Writing : W. N. L.
E.T.T. : W. N. L.
O.K.P. : W. N. L.

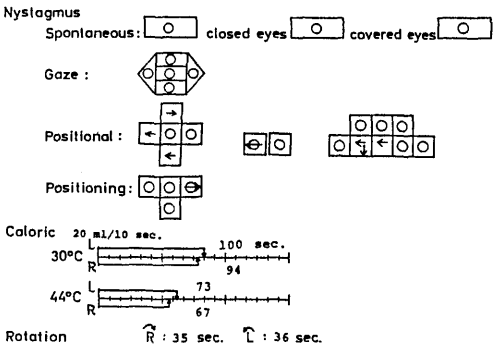


Fig. 4 Vestibular function test

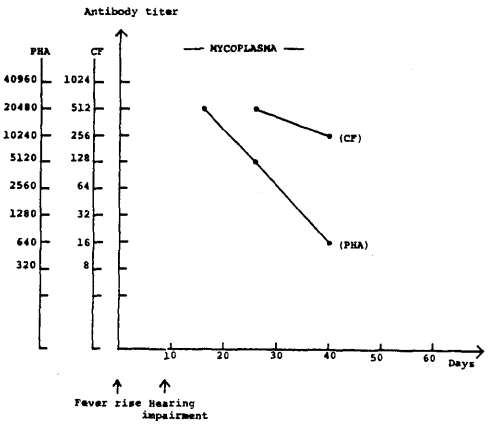
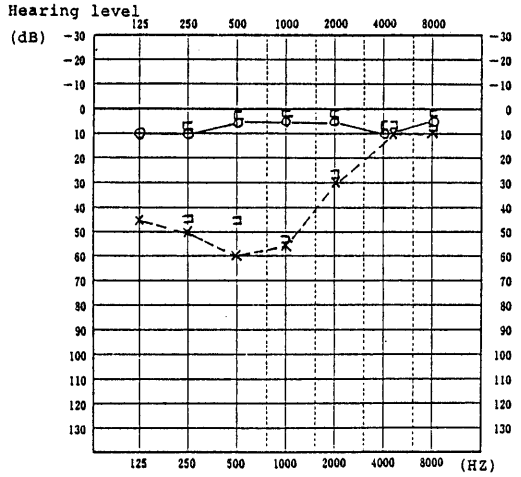


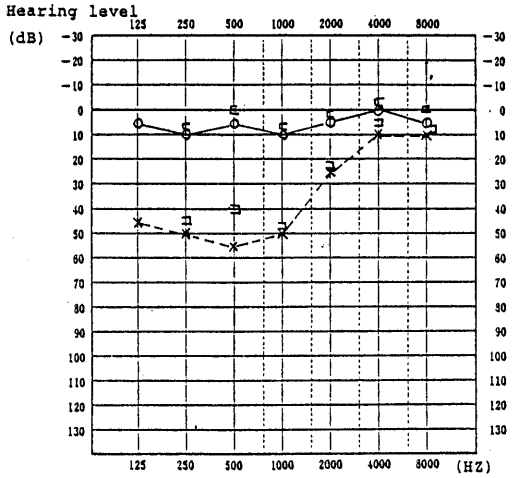
Fig. 5 Changes in mycoplasmal antibody titers

of a few weeks (Fig. 5). On October 10 the complement fixation (CF) antibody titers of Mycoplasma pneumoniae were 1 : 512 and cold agglutinins titer was 1 : 128 on October 14. Steroid therapy was administered in the early stage of hospitalization. During the clinical course, erythromycin was administered orally. The patient began to report gradual improvement in her hearing (Fig. 6). Three weeks after her admission, the patient's dry cough subsided, and she was discharged from our clinic on October 17.

the 11th hospital day



the 29th hospital day



the 32th hospital day

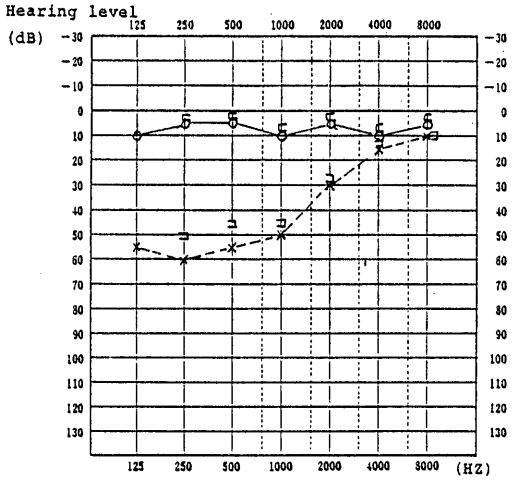


Fig. 6 Progress of audiograms during admission

Discussion

In Japan 96 cases of mycoplasmal infection followed by neurological symptoms have been reported since Minoshima[9] first described two cases of meningitis in 1967 (Table 2)[4]. The rate of incidence involving the nervous system due to an infection of Mycoplasma pneumoniae is estimated to be about 4.0 % in Japan[3], while in other countries it has been reported in the range of 4.8 % to 7.0 %[10,11].

There have been few reports on the temporal association of sudden deafness with an infection by Mycoplasma pneumaniae. Van Dishoeck[12] first reported a clinical picture of sudden perceptive hearing with an infection of Mycoplasma pneumoniae. Rowson et al.[13] and Jaffe[14] later described several more cases of this same type. However, it is possible that the true number of incidences in hearing loss due to Mycoplasma pneumoniae may be higher than what has been reflected in previous reports.

According to the study of Jaffe[14] of the 47 cases of sudden deafness, in seven cases Mycoplasma pneumoniae was isolated by nasopharyngeal swab, while in ten cases serologic diagnosis was established. In addition, Shanon and Zikk et al.[15] described a case of sudden deafness due to an infection caused by Mycoplasma pneumoniae, which was diagnosed by a serological test (CF). In this case vertigo was also present and a caloric test showed canal paresis on the affected side. An audiogram also showed a recruitment of the affected side. It was concluded that the hearing loss was probably of cochlear origin.

The pathogenesis of the hearing loss associated with mycoplasmal pneumonia is poorly understood, however, immunological mediation of some neurological symptoms has been sugested by the fact that antibodies against lipid in Mycoplasma pneumoniae are cross-reactive with lipid in nervous tissue (eg. brain tissue)[8,16]. Of course meningitis and encephalitis are considered by a direct infection with Mycoplasma pneumoniae, which is shown by CSF lymphocytosis[17], but almost all cases have failed to isolate Mycoplasma pneumoniae from CSF[17,18].

In addition, it is well known that otitis media and myringitis may be caused by an infection of Mycoplasma pneumoniae[5,6,19-21]. Bullous myringitis is also thought to be of viral origin (eg. influenza virus). In 1979, Wetmore and Abramson[22] presented three patients with bullous myringitis complicated by transient unilateral sensorineural hearing loss. In two of the three cases serological tests for Mycoplasma pneumoniae, influenza A and B, and adenovirus showed no evidence of infection. These three cases had moderate to severe mixed hearing loss. Feinmesser and Weissel et al.[23] also described a case with bullous myringitis accompanied with

Table II Involvement of the nervous system with mycoplasmal infection (in Japan)

	Below 15 years old 67 (cases)	Above 15 years old 25 (cases)
Polyradiculoneuritis	5	8
encephalitis	25	7 (2) *2)
Meningitis	33	4 (2) *2)
myelitis	2	4
acute cerebellar ataxia	1	1
cranial polyneuropathy	0	1
Fisher's syndrome	1	0
sensorineural hearing loss	0	1 *1)

*1) our case

*2) 4 cases of unknown age

bilateral sensorineural hearing loss. They diagnosed mycoplasmal infection by a rise of cold agglutinin titer. They concluded that sensorineural hearing loss was a more common complication of bullous myringitis than was previously believed and that attention should be given to the states of hearing loss in all cases of bullous myringitis. In our case, otitis media with mild to moderate bleeding was found in the first examination.

A review of the literatures has led us to the conclusion that an infection by Mycoplasma pneumoniae may cause sensorineural hearing loss including sudden deafness.

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