Vestibular Neuritis

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Vestibular neuritis is a rather new disease. Although reports of this disease have been described mostly by many authors in Europe (Nylen, 1924[1]; Dix and Hallpike, 1949-1952[2]; Pfaltz, 1955[3]; Aschan & Stahle, 1956[4][5]; Kern, 1958[6]; et al.), recently a few papers of this disease were reported also in our country.

Dix and Hallpike (1952) and Hallpike[7] in their excellent paper, were the first to define the disease as a clinical entity and suggested the name "vestibular neuritis." However, vestibular neuritis is still relatively unknown as to symptom and pathogenesis, particularly in comparison with Meniere's disease.

Chief symptom in vestibular neuritis is vertigo, usually not always paroxysmal and continuous in character. The attack of vertigo is present rather suddenly and lasts usually over period of several hours or days, after which it very slowly decreases. In severe cases the patients develope vertigo with nausea continuing a few weeks, at that time they lie down on the bed. It is usual for the patients that vertigo is experienced as rotatory movements or as a feeling of off-balance while walking or standing, which may be aggravated by all kinds of head movements. In general, the vertigo in this disease is not severe rather than in Meniere's one.

During complaining of vertigo, the patient always shows spontaneous or positional nystagmus beating away from the paretic labyrinth and falling reaction of the body to the normal labyrinth. Dix and Hallpike described that in 100 cases examined at Queen Square Hospital, 47 are bilateral and 53 are unilateral. However, the majority of authors reported that affected ear is only unilateral.

In order to make a diagnosis of vestibular neuritis, it is important that hearing is not affected and no tinnitus occurs. By the conspicuous absence of cochlear signs and symptoms, this disease is chiefly distinguished from Meniere's disease on clinical grounds. According to Dix and Hallpike, the disorder chiefly affects the age group 30 to 50 without preference for sex (Male 57 and Female 43 in 100 cases). The condition is usually benign and

runs a protracted course. However, vertigo and off-balance feeling subside gradually in the majority cases except while quickly changing the head position.

The main purpose of this paper is the description of twelve cases of vestibular neuritis examined and treated by us at Yamaguchi University Hospital during period 1972 to 1974. Age distribution is between 30 and 50 years of age and a closer examination of the age distrubution shows that 90% of 12 cases is from 30 to 40 years of age. Sex distribution is male 7 and female 5.

In all cases otoscopic findings are normal with normal results of hearing tests including pure tone audiometry. When vestibular function is examined, we find out always remarkable abnormalities, in particular of positional nystagmus and caloric responses carried out in accordance with the technique described by Fitzgerald and Hallpike.

A full describtion of results from vestibular function tests is given in Table 1. It can be seen from Table 1 that the essential abnormalities of the spontaneous nystagmus showing direction-fixed type in nature and of caloric responces showing canal paresis in character were present in all our 12 cases. In 4 they were bilateral; in 8 they were unilateral. As shown in Table 1, optokinetic nystagmus revealed no abnormality in the majority, except only one case, and spontaneous nystagmus was present in 5 and disturbances of equilibrium revealed in 4 by Mann's test and in 6 by gait test in all our 12 cases.

In order to make clear history, symptoms and vestibular function, in detail, in vestibular neuritis, our typical cases have been chosen and reported:

Case 1. A 42-year-old woman with right-sided vestibular neuritis, who developed the first onset of vertigo associated with nausea while working at home in the morning. There was no history of any infection on the upper

Table. 1. Results of Vestibular Function Tests in Twelve Cases of Vestibular Neuritis

	Equilibrium		Spontaneous N.	Positional N.	Caloric N.	O. K. N.
	Mann's T.	Gait T.				
Abnormal	4	6	5	12 Direction-fixed type in all cases.	12 Canal paresis in all cases.	1
Normal	8	6	7	0	0	11

Note; N: Nystagmus.
T: Test. O. K. N.: Optokinetic nystagmus.

respiratory pathways before the onset.

She felt rotatory movement of her body when walking or standing, which was aggravated by head movements. Such a feeling of off-balance lasted for three days. The ear drums were clear without hearing loss (normal audiogram) and tinnitus on both sides. The vestibular tests were performed 5 days after the onset. On Romberg and Mann's tests with closed eyes her body swayed to the right side, and gait test showed her walk tilting to the right side, that is affected side. No spontaneous nystagmus was seen, and a right-beating positional nystagmus in direction-fixed type was present. Caloric responses (Table. 1) showed severe canal paresis on the left side. Four weeks later positional nystagmus had completely subsided and the canal paresis on the left side had still remained. After two weeks, the feeling of off-balance subsided.

Case 2. A 40-year-old business man with right-sided vestibular neuritis, who developed headache and vertigo with nausea following sore throat lasting a few days. He had a feeling of off-balance when he got up in the morning lasting three hours. At that time he could not stand up at home, because he felt that his body rotated, and never complained of cochlear disturbances with normal eardrums on otoscopically up to date.

Vestibular function tests carried out a week after the first attack of vertigo showed that a brisk left-beating spontaneous and positional nystagmus (direction-fixed type in nature) are present, and his body has a tendency to fall to the right side by Mann's test with closed eyes. The recordings from the caloric test showed a severe canal paresis on the right labyrinth with normal responses on the left one. Two months later his complaints of vertigo and feeling of off-balance was subsided gradually.

Case 3. A 43-year-old house wife with vestibular neuritis. Three weeks

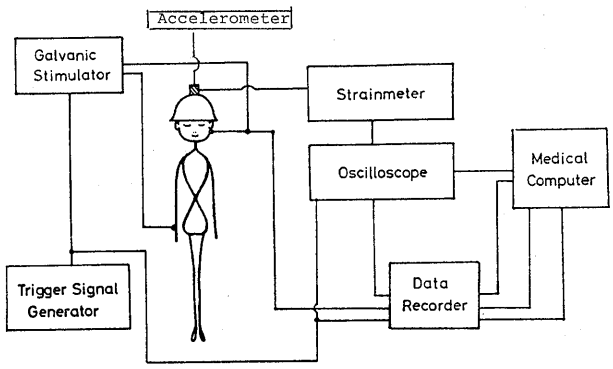

Fig. 1. Block diagram of acceleration registrography (M. Kitahara)

before examination she suffered from mastitis acuta followed by an onset of vertigo a week later. She had a feeling of severe off-balance with vomiting when she tried to get up from the bed in the morning. She never suffered from hearing loss and tinnitus on both sides with normal ear drums.

Equilibrium tests revealed that her body has a tendency to sway to the right side by Romberg's test and to fall down to the same side by Mann's test with closed eyes. We are able to find out a left-beating spontaneous and positional nystagmus (direction-fixed type). Caloric responses showed the right-sided canal paresis with normal on the left side by means of Dix and Hallpike method. The recordings from the optokinetic and eye tracking tests present normal results.

Case 4. A 20-year-old salesman with right-sided vestibular neuritis who developed vertigo suddenly while driving a car 10 days before examination. At that time he felt his body falls to the right side. Tests shows that his body has a tendency to sway to the right side. There are left-beating spontaneous and positional nystagmus (direction fixed type). Recording from the caloric tests shows canal paresis on the right side with normal on the left side. The optokinetic and eye traking tests reveal normal responses.

Comment: We propose to consider in detail three important clinical aspects of the vestibular neuritis: 1. Positional nystagmus; 2. the role of infection as a pathogenic factor; 3. the galvanic responses and their localizing value.

1. Positional nystagmus.

When R. Barany (1921) first became aware of the unknown and dramatic vertigo which occurs in certain head positions he was led to describe the condition as otolith nystagmus called as Barany's first type of positional nystagmus. As Barany's second type, he attributed cursorily to a lesion within the central nervous system.

Since then many papers have been published on the subject. Nylen's (1931) clinical and animal studies are well known, particularly his monograph on positional nystagmus occuring in intracranial tumours. In a survey of the subject in 1950 he gives a bibliography of no less than 297 papers by 192 authors. The positional nystagmus seems to afford proof of an organic disorder of the vestibular mechanism, and it is accepted that the characteristics of the nystagmus may be of help in localizing the lesion and is often of prognostic value. In general transitory forms are associated with benign lesions and on the other hand in the persistent forms the prognosis is uncertain.

Several of the classifications proposed are known by the authors'

names, those of Nylen (1950) and Linsday (1951) are the best known, although other many aunors, such as Seiferth (1937), Ruttin (1936), Frenzel (1938), Aubry (1954) and Aschan (1956) also engaged in the same work. Nylen and Lindsay based their classification on the direction and duration of the nystagmus, particularly from the clinical point of view. If the direction of the nystagmus changes with the head position it is named direction changing type I. On the other hand, if the direction does not change it is termed "direction-fixed" type II. If the nystagmus does not behave in either way regularly, but varies from type I to type II it is called irregular type III. Nystagmus in type I is usually maintained as long as the position of the head is steady and in type II it lasts only for a few seconds or more.

Lindsay (1951) proposed to divide the direction-fixed type II into two subgroups: 1; No spontaneous nystagmus is present but a positional nystagmus occurs in one or more position and is constant as to direction; 2. A spontaneous nystagmus is present in all head position, but an increase in intensity appears in certain positions, the direction remaining the same. In this type the posture influences the intensity of the spontaneous nystagmus.

As mentioned before in this paper, all of our twelve cases with vestibular neuritis are present both spontaneous and positional nystagmus fixing the direction in the head position, so that all our cases are attributed to the subgroup 1 in "direction-fixed" type II. In our experience, positional nystagmus in central vestibular affections shows in the majority cases "direction changing" type I and on the contrary positional nystagmus in peripheral vestibular lesions attributes to "direction-fixed" type II with a few exception. Lindsay (1951) stated that on the basis of clinical observations in diseases of the vestibular system of known localization a direction changing positional nystagmus (Type I) has been found to be strong evidence of a central vestibular affection and in peripheral vestibular affection a direction-fixed positional nystagmus has been appeared to be most common.

2. The role of infection as a pathogenic factor.

Great numbers of authors agreed in thinking that vestibular neuritis does not primarily affect the vestibular apparatus but in the majority of cases appears as a complication to an infection in some other parts of the body. A few writers, such as Dix and Hallpike (1952), Pfaltz (1955), Kattum and Mundnich (1957) reported diseases of the upper respiratory pathways play an important role in the pathogenesis of vestibular neuritis, and also Aschan and Stahle (1956) stated intestinal infections, nephritis and parotitis are seen in conjuction with vestibular neuritis.

From clincal point of view Dix and Hallpike (1952) drew the following

conclusions that in vestibular neuritis infection foci in the nose and throat play an important part in its pathogenesis. This view is based upon a study of their fifty cases in which they carried out a routine examination of the nose and throat including x-ray of the paranasal sinuses.

Our twelve cases with vestibular neuritis mentioned in this paper fall into two groups as to whether or not some evidence of infection focus is presented.

In group I, 8 cases presenting presumptive evidence of an infection focus are countered. In 6 of them, the patients have clinical history of acute infection on the upper respiratory pathways a few days or weeks before the first onset of vertigo, such as sore throat with elevated fever, acute bronchitis and acute rhinitis with severe headaches. In 2 of them the patients have acute infection in tonsils and nostrils during the onset of vertigo.

In group II, 4 cases presenting no evidence of an infection focus or a history of infective disease before onset of vertigo are seen. In these experiences we would be rather inclined to agree with Dix and Hallpike who emphasize that infective processes play an important part in the pathogenesis of vestibular neuritis.

3. The galvanic test results and their localizing value. Purkinje (1820) was the first to describe that a galvanic current, flowing through the head, affects equilibrium. About 100 years later, Huizinga (1931) and Dohlman (1938) proved that the galvanic responses depend upon the integrity of Scarpa's ganglion and the vestibular neurones central thereto, and are preserved in lesions of the peripheral sense organ in the labyrinth.

The galvanic stimulation in vestibular neuritis would appear to be available in order to understand exact location within the perpheral nerve pathway. Dix and Hallpike (1952) carried out galvanic stimulation in 16 cases of vestibular neuritis and observed body swaying of the patients. They obtained the following results that in all, except three cases, a significant reduction of the galvanic responses is present and concluded that vestibular neuritis seems to be a lesion of the vestibular neurones involving either Scarpa's ganglion or the vestibular neurones central thereto.

Tanaka (our colleague) carried out galvanic tests in 4 cases of our patients with vestibular neuritis according to unilateral method. The tests were carried out with the patient standing with eyes closed and feet close together. An anodal electrode was placed on the mastoid process and an indifferent electrode (cathode) was fixed on the other-sided forearm. The response was described as positive when swaying, which occurs towards the ear placing anodal electrode with 0.6 mA of current and stimulation for 10

seconds.

In order to observe body sway of the subject, we used an acceleration registrography (Kitahara) of which block diagram shows in Fig. 1. Medical data processing computer was used for anylysing our data. In all our cases a significant reduction of the galvanic responses was present, which is suggestive of a lesion of the vestibular neurons in vestibular neuritis (Fig. 2).

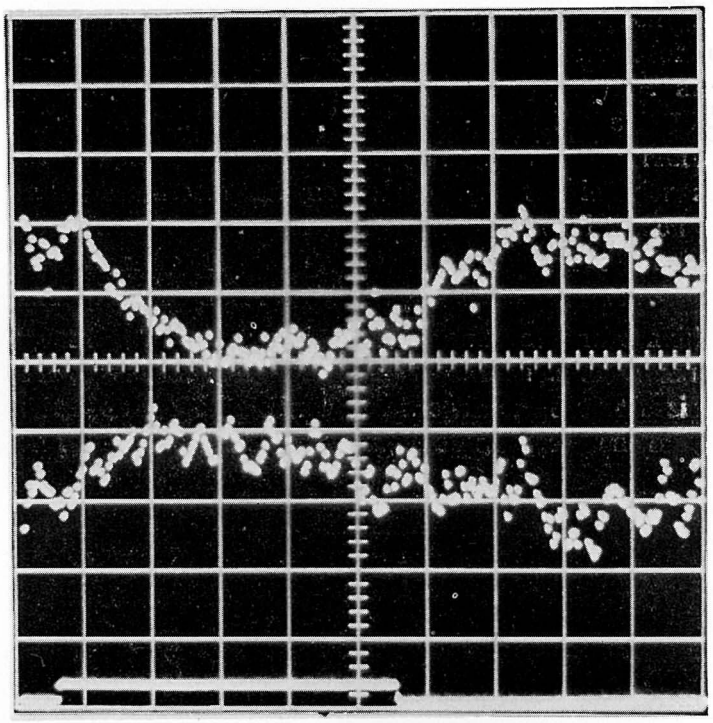

Fig. 2. Results of galvanic test in a patient with vestibular neuritis on the right side.

The wave on occilloscope of medical computer, obtaining from 8 times superimposition of response waves of head swaying induced by galvanic test, shows the abnormal slow deviation to the stimulated side at onset of current and current flow. The normal subject shows usually a quick head swaying at the onset of current flow (M. Tanaka).

SUMMARY

In twelve cases in vestibular neuritis symptoms and vestibular test results were demonstrated, and positional nystagmus, the role of infection as a pathogenesis and galvanic test results and their localizing value were discussed.

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