

## The Vegetative Nervous System and the Vestibular System

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Reports in the literature concerning the relation between the vegetative nervous system and vestibular system have been repeatedly published by many authors. It is to the credit of Purkinje to have demonstrated in 1920 that vertigo, nausea and vomiting were present after stimulation of the labyrinth. Byrne found experimentally that after intense stimulation of the labyrinth disturbances in the function of the heart, the digestive tract, the pupils and vasomotor system were present. He concluded such symptoms as nausea, vomiting, palpitation of the heart and vasomotor changes to be autonomic reflex actions. Camis studied the influence of the labyrinth upon the vascular system. After unilateral or bilateral extirpation of the labyrinth in dogs he stimulated the central stump of vagus-sympathetic nerves and observed disturbances in the blood circulation. Spiegel and Demetriades demonstrated a fall in the blood pressure after stimulation of the labyrinth by calorization. In order to prove the role of the labyrinth they severed the trigeminal and the glossopharyngeal vagus; lowering of the blood pressure was still present. However, after intracranial section of the eighth nerve, reaction could not be elicited.

Kumagai in 1969<sup>1)</sup> studied the influence of the hypertension upon vestibular response in rabbits and patients. Sixteen healthy adult rabbits, weighing 2 and 3 kg, were performed on stenosis of A. renalis on both sides by means of Goldblatt's technique. Three weeks after operation, blood pressure increased between 30 and 40 mmHg in all rabbits.

Positional nystagmus was present in 12 of 16 rabbits with hypertension, a 75 percent incidence, while there was no spontaneous nystagmus in all rabbits. Abnormality (decreased) of the frequency in postrotatory nystagmus was seen in all rabbits with normal duration of the nystagmus as shown in Fig. 1. Caloric tests with 20 cc of water at 10° C for 5 seconds were applied on both sides in all rabbits. As shown in Fig. 2, compared with caloric response in normal rabbits, abnormal caloric response (slightly decreased duration) was present in all rabbits with hypertension.

Fifteen patients with hypertension were performed on vestibular

Fig. 1. Mean value and standard deviation of postrotatory nystagmus in rabbits with hypertension

	Duration (seconds)		Frequency	
	right	left	right	left
pre-op.	10.9±2.9	11.2±3.1	19.5±7.9	21.2±10.4
3 weeks after op.	9.6±2.1	9.2±1.6	13.5±6.4	14.4±4.6

Fig. 2. Mean value and standard deviation of caloric response in rabbits with hypertension

	right	left
pre-op.	75.4±12.6	75.9±15.0
3 weeks after op.	69.3±16.0	66.7±7.4

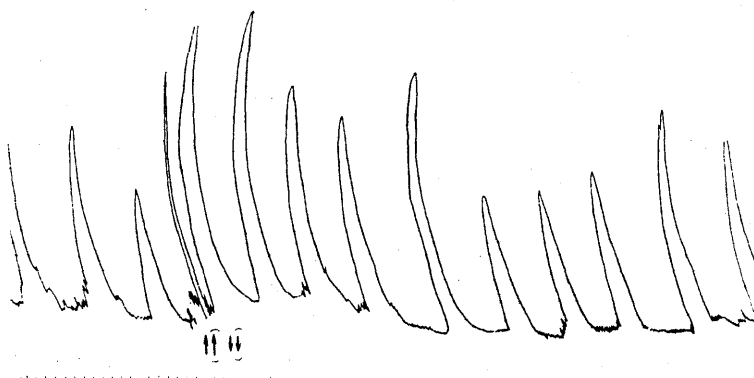


Fig.

tests. They included 11 essential hypertension, 2 renal hypertension, 1 arteriosclerosis and 1 adrenal in nature. Spontaneous nystagmus was seen in about 20 percent of all patients, positional nystagmus was present in 40 percent of patients and abnormal caloric or rotatory responses represented in 30 percent of patients.

Tanaka in 1958<sup>2)</sup> carried out experimental study on influence of the labyrinthine stimulation upon the uterus movement in rabbits. Puerperal rabbits were used in the study because the puerperal uterus is more available to record uterus movement than normal uterus. Double balloons were inserted into the uterus of the rabbit. 24 rabbits were used. Rotatory

stimulation, using 5 times in 10 seconds, elicited remarkable increase of the amplitude of uterus movement in the majority of animals as shown in Fig. 3. Caloric stimulation with 30 cc of water at 10° C gave also increase of the amplitude of uterus movement in all rabbits. In decerebrated rabbits the aforementioned remarkable increase of the amplitude of uterus movement was present by rotatory or caloric stimulation of the labyrinth. On the other hand, in the rabbits performed ablation of the labyrinth on both sides uterus movement never changed by the aforementioned labyrinthine stimulations.

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#### REFERENCES

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