

Pathophysiology of cardiovagal and sympathoneural failure Part 1 pathological view

M. Takahashi, S. Orimo

Department of Neurology, Kanto Central Hospital, Tokyo, Japan.

Background

Autonomic failure such as orthostatic hypotension, constipation, urinary dysfunction and erectile dysfunction is frequently observed in Parkinson's disease (PD). Some symptoms precede motor symptoms. The burden of autonomic symptoms can be the important factor of quality of life in PD patients. Reduced *meta*-iodobenzylguanidine (MIBG) cardiac scintigraphy is a useful diagnostic biomarker to differentiate PD from other parkinsonian syndromes and was adopted in the new MDS clinical diagnostic criteria for PD as one of the supportive criteria.

In the pathological view, Lewy bodies are seen over a wide range of autonomic nervous system between central nervous system to peripheral nervous system including cardiac sympathetic nervous system.

Aim

To clarify the pathological findings of cardiac sympathetic nerve in PD.

Methods

We reviewed the cardiac sympathetic denervation (CSD) in Lewy body disease (LBD) including PD.

Results

CSD was specifically seen in LBD including PD even in the early stage. Furthermore, even in the incidental Lewy body disease, about a half cases showed CSD.

Alternatively, it was suggested that CSD started with distal axons and developed into (?)proximal axons. The degree of cardiac MIBG uptake in life was correlated with that of CSD in autopsy confirmed LBD.

Conclusions

The pathological finding of cardiac sympathetic nervous system in PD is pathological background of reduced cardiac MIBG uptake and may represent the pathological mechanism underlying a common degenerative process in PD.

Gastrointestinal dysfunction in Parkinson's disease

M. Hirayama

Department of Pathophysiological Laboratory Sciences, Nagoya University Graduate School of Medicine, Nagoya, Japan

Parkinson's disease (PD) is a common neurodegenerative disorder in aged individuals. Postmortem studies of non-PD subjects disclosed incidental α -synuclein-positive Lewy bodies in the gastrointestinal tract, the olfactory system, and the cardiac sympathetic system, which suggests that α -synuclein pathology in PD may start in these tissues. Especially, constipation could commence 20 years before the onset of motor symptoms in PD. So Gastrointestinal dysfunction is one of the most important factors to contribute to the development of PD. PD is characterized by alpha-synucleinopathy that affects all levels of the brain-gut axis. Gastrointestinal (GI) disturbances in PD are varied, involve the upper and lower GI tract and are evident in all stages of the disease and prodromal symptom. Recently, the brain-gut axis interactions are significantly modulated by the gut microbiota. We will review the clinical importance of gastrointestinal dysfunction and the pathophysiological mechanism of the brain-gut axis in PD.

Sudomotor research in Parkinson's disease: past, present, and future.

M. Asahina

Neurology Clinic Tsudanuma & Dowa Institute of Clinical Neuroscience, Chiba, Japan

From the aspect of physiological function, sweating is usually classified into three categories; thermoregulatory, emotional and gustatory sweating. Professor Yas Kuno (1982 - 1977) was largely attributable in physiology of human sweating, since then many Japanese researchers investigated particularly thermoregulatory and emotional sweating in healthy subjects and several disorders. Sweat abnormalities are often seen in neurodegenerative disorders, such as Parkinson's disease (PD), which is characterized by tremor at rest, slowing of movement and difficulty with walking with short step. PD patients also show non-motor symptoms, including autonomic symptoms, such as constipation, urinary problems, orthostatic hypotension and sweat abnormalities. In regard to thermoregulatory sweating, hyperhidrosis is common in PD patients, and it may be associated with motor fluctuation. Hypohidrosis/ anhidrosis may be a more common form of thermoregulatory dyshidrosis. Saito (1989) classified hypohidrosis/ anhidrosis in PD into clinical subtypes; central, myelopathic and segmental patterns based on results in thermoregulatory sweat test. Meanwhile, Asahina et al. (2002) revealed hypohidrosis on the palm and sole (emotional sweating) in PD patients. The diminished emotional sweating may reflect involvements of the limbic system, basal ganglia, brainstem reticular formation, internal mediolateral nucleus and postganglionic sympathetic nerve, in which alpha-synucleine pathology is detected in PD. Recently, alpha-synucleine pathology in peripheral tissues, such as colon, salivary glands and skin, is considered to be a biomarker of prodromal PD diagnosis, and skin biopsy may be useful to detect alpha-synucleine pathology in sudomotor nerve terminals that innervate sweat glands.