

## Syndromes Caused With Partial Postganglionic Paresis of N. Sympathicus

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**Abstract:** For understanding this work, we must differ preganglionic of postganglionic paralyses of the vegetative system. How postganglionic fibers do not have myelin's coat, they cannot find their distal parts and grow into them after cutting. Postganglionic cut sensitizes the smooth musculature on adrenaline after cutting, leading to considerable rise of vasoconstrictors' reactions of arteries in the innervation's parts of organism, especially on cold. (So, for example, limbs, on which is carried out a postganglionic sympathectomy, strongly react on a stimulus with cold that appeared necrosis. At postganglionic paralyses lacks any coordination. The best treatment is preganglionic sympathectomy.

Because of multilateral approaching postganglionic fibers into executive organs, completely depriving of the vegetative innervation is not possible. Therefore, postganglionic paralysis is always partial. Sensitization of the smooth musculature on adrenaline can ensue at stress reactions, in which are raised adrenaline in blood, causing strong vasoconstriction of blood vessels in partial postganglionic paralyzed area. Consecutively, promptly, or after some time, can ensue impairment already existing syndromes like unilateral or bilateral stress headaches, M. RAYNAUD, causalgias, SUDECK atrophy, intermittent paroxysmal hypertension, and anginas pectoris. (1, 2, 3)

**Keywords:** Angina pectoris, partial paresis, postganglionic fibers, preganglionic sympathectomy, paroxysmal hypertension.

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### I. Introduction

- **History.**

The vegetative neural system adjusts life functions of all organs. Developmentally old, has narrow relations with the mental sphere of the affective and instinctive. 1913 years LERICHE recommended a periarterial sympathectomy for treating peripheral disturbances of profusions. JONNESCO 1916 successfully carried out cervical sympathectomy at an angina pectoris. HUNTER and ROYLE 1924 years cut ramie communicants, revealing one of the most important indications of the surgery of sympathicus – removal of spasms of arteries. WHITE 1936 introduced preganglionic cutting, whose advantages still 1929 noticed FOERSTER (Bratislava). For further development of the surgery of sympathicus were especially meritorious PEET and SMITHWICK. (1, 2)

- **Materials and Methods.**

On the base of scientific facts, anamnesis, doctors reports, and discharge letters of the Universities Clinics in Belgrade (Serbia, former Yugoslavia), I am 1964 diagnosed (created) partial postganglionic paresis of n. sympathicus at intermittent paroxysmal hypertension. The successful treatment is a preganglionic sympathectomy.

- **The sympathicus system.**

The pass for vasoconstriction abandons nucleus intermediolateralis via the front root spinal marrow, going as ramus communicans albus up to the truncus sympathicus and without interruption goes through it as preganglionic in the n. splanchnicus major. It finishes in the ganglion coeliacum, from that it goes toward abdominal organs as postganglionic pass. The same constrictive pass finishes in the truncus sympathicus and as the postganglionic pass enters in the coronary vessels of the heart. For the surgery of the sympathicus at an angina pectoris is important that sympathetic nerves for pain go from the first until the fourth thoracic ganglions towards the heart. For the surgical treatment of essential hypertension this must be taken into consideration; the vasoconstrictor ways for abdominal organs only partially change over in ganglions of the thoracic truncus sympathicus. Preganglionic ways flow, mostly, along the truncus sympathicus, making nerves splanchnicus major and minor, which peripherally finished in the solar plexus celiacus. (1, 2)

- **Others afferent ways for pain caused with vasoconstriction.**

From the nucleus intermedio-lateralis, arrives all constrictive passes to the center in the central supranuclear connection and after for the diencephalon. Afferent passes for pain, entered via back roots in the spinal marrow, cross the medial line and climb together with all ways of pain up to tractus spinothalamicus.

Although certain pains go out over sympathetic ways (e.g. at abdominal colic and causalgia), it is possible, that these afferent ways do not belong to the right sympathetic, than the cerebrospinal system. Those afferent, so-called **ways for pain**, go through ganglions of the truncus sympathicus and reach back roots over the ramie communicants. They cross, with other ways for the pain, the middle line of the spinal marrow and go up through the front lateral bundle. Therefore, at refractors pains we cut them with chordotomy. Contrary of it, vasoconstrictors pass through the supranuclear diencefal vasoconstrictor's way that described FOERSTER, lies ventral of the pyramidal pathway. Operative cutting of this way did not take root in the treatment of hypertension. Too big is the danger of a damage of environment.

Preganglionic ways for the arm we can interrupt between the second and the third thoracic ganglions, and for leg between the second and the third lumbar ganglions.

Connections the nervous centers in the spinal marrow and the first cells of the lateral horn (nucleus intermediolateralis) with the reticular nervous net in organs are not direct. It consists of two neurons, one preganglionic and one postganglionic. (The parasympathicus, which in relation to the sympathicus has a subordinate role, is not a subject of an interest hereinto.) (1, 2)

**Preganglionic neurons** start from lateral horns, abandoning the spinal marrow over front roots, as with marrow enrich white communicants branches, and enter in one of ganglions of the truncus sympathicus on the spine, or arrive through these ganglions in some more peripheral located ganglion, so also in the ganglion celiacum. (1, 2)

**Postganglionic neurons** start there, where ceases preganglionic. Every of them starts from the appropriate ganglion as with marrow poor ramus communicans griseus, mainly over peripheral somatic nerves or over adventitial net of arteries, finishing in the terminal reticulum of executive organs. (1, 2)

The sympathetic lateral chain of spinal marrow starts, at the man only, with eighth cervical segment, and finishes caudal with third lumbar. From that follows, that sympathetic preganglionic treads for the head originate from the first and the second front thoracic roots. Threads for arms start from 3–7 thoracic segments, and segments below of those answers to the motor and the sensitive innervations. Thoracic roots give also sympathetic fibers for organs of the pectoral and venter cavity. From the lower segment, sympathetic nerves go in the leg over the 10 thoracic up to the second lumbar roots. Those ways do not abandon immediately appropriate the chain of the truncus sympathicus as gray communicants branches. They flow, under certain conditions, further along the net of the truncus sympathicus, up or down, and abandon only then ganglions. Postganglionic ways for arms come out, e.g., from the ganglion cervicale medius and the ganglion stellatum (ganglion cervicale inferior and first thoracic ganglion). Postganglionic fibers for the leg go from the five lumbar and upper three sacral ganglions of the truncus sympathicus. From that follows that, as a rule, by cutting the truncus sympathicus between the second and the 3d thoracic ganglions interrupt all preganglionic ways of the center towards the arm, and by the cutting between the 2d and the 3d lumbar ganglions interrupt all preganglionic ways for the leg. (1, 2)

## **II. Tables With Captions**

Paroxysmal hypertension caused with partial postganglionic paralysis of n. sympathicus.

The case of the paroxysmal hypertension caused with a partial paresis of the n. sympathicus.

Angina pectoris caused with partial postganglionic paralysis of the n. sympathicus.

Stress and influence partial paresis of the n. sympathicus on heart, brain, mentally disorders, beauty, sexuality, immune system, digestive system, and metabolism. .

## **III. Habituated Operative Treatment Of Hypertension**

Thanking to the progress realized in the production of pharmaceutical preparations enabled successfully internist treatment of essential hypertension. Sympathectomy is, as methods of choices only in special, mostly hopeless cases. By it operative treatment is contraindicated at all nonessential forms of hypertension, primarily so called the white hypertension at the chronic illnesses of kidneys and various forms of hypertension at affections of pituitary and suprarenal glands. (M. Cushing, and pheochromocytoma.) The operational indication mostly sets up in cases, when in spite of the internist treatment blood pressure remains systolic over 170, and diastolic over 105 mm Hg. For estimation of condition are also important vasospastic and the sclerotic changes of eye background: bleedings, exudates and the edema of papilla. Measurement of the pressure in arteries of retinas enables very exactly judging of the condition of the cerebral arteries. Significant is the function of kidneys. The essential forms of hypertension, which caused various secondary changes on

kidneys, with the bad function of secretion and high values of the rest nitrogen, should not operate, as a pale hypertension too. From an operation needs also to desist if was preceding attacks of an angina pectoris or cerebral attacks. It is not need to operate also when patients are older of 50 years, or when kidneys and the heart show signs of clear damage, and especially then, when on the eye background are revealed signs of hard atherosclerosis of cerebral veins. In these cases spastic components lost its leading role in the pathological processes. By it, we must take into account that under these pathological circumstances, changes requires a rise of pressure how irrigation would be sufficient (hypertensions because of a need). The operation is therefore recommended only in a stadium when is not possible to influence on the hypertension with medicaments, or if it is going for a very young individual with a high diastolic pressure. An impressive alleviation of subjective difficulties (headache) after intervention, happen also then, when the blood pressure is not significantly attenuated, or permanently reduced. Insignificant changes on the eyes' backgrounds can completely disappear.

Life becomes longer. As operational methods come in consideration a supradiaphragmal sympathectomy sec. PEET, a thoracolumbal sympathectomy sec. SMITHWICK, and an endoscopic electrosurgical cutting sec. KUX. The double-sided total resection of the truncus sympathicus sec GRIMSON in not justified. In case of strong changes in kidneys, sympathectomy can be casually completed with the subtotal adrenalectomy.

(1,

2)

#### **IV. Paroxysmal Hypertensy Caused With Partial Paresis Of N. Sympathicus**

Until 1949-year health and very intelligent and successful radio-technical engineer, a prominent sportsman, Erjavec Zvonimir, born in surroundings of Ptuj, Slovenia, serving a political sentence in a concentration camp for political prisoners, became ill of the lung tuberculosis with numerous complications, empyema, and a consecutive spondylitis of the thoracic spine. Because of the tuberculosis and its complications, he was cured more than a decade in different sanatoriums in former Yugoslavia. In 1958 year, in conditions of fear, knockdowns, affective reacting, more briefly said stress, he became to feel intensive tachycardia and headache, accompanied with an intermittent paroxysmal hypertension. In the beginning, physicians and authorized neurologists treated him by DNV sedatives, diet and anti-hypertensive drugs. During the time with clinical picture dominates symptomatology of paroxysmal hypertensive crises: dizziness, headache, and pain in breasts, throbbing, and an enormous rise of the blood pressure. During some time, after such attacks, the patient could not get asleep. In the end, he suffered of insomnia without a previous stress. 1959 and 1960 years, patient was in several occasions hospitalized in Universities' clinics in Belgrade under a suspicion on pheochromocytoma. Every time pheochromocytoma excluded.

As an excellent engineer, the radio-technician, patient 1964 years suggested to me possibility of breaking some "power line" in his organism that could have been the culprit of his disturbances. After this, to me would not be difficult, learning surgery of the sympathicus for the specialist's exam, set up the hypothesis about the permanent interruption of the postganglionic sympathicus fibers with cicatrices of surrounding tissue, and consecutive stretching of the truncus sympathicus, either by it, or by hyperextensions of the spine. Retraction of the cicatrices of the adjacent tissues contributed also to this. How the white preganglionic fibers have the myelin covering, and theirs way to ganglions are relatively short, they can easily find the way into distal parts, and growing in to them, quickly renew and establish theirs function. Contrary to it, postganglionic grey fibers do not have myelin covering, once interrupted cannot find their way, and renew function. During years, come to be the partial postganglionic paralysis, with an oversensitivity of the smooth musculature of arteries on adrenaline, and consecutive strong vasoconstrictors' reactions blood vessels inside abdominal organs.

Analogically the partial postganglionic paralysis of the n. sympathicus can happen in others region of organism with corresponding symptoms, causing for example unilateral or bilateral intermittent paroxysmal stress headaches. Heart can also suffer from the same, what confirm numerous curing with sympathectomy, although a true cause of illness was not known.

At postganglionic paralyses lacks any coordination. How one region is not able total vegetative denervation, paralyses is always partial.

1928 years Cannon proved that intensive excretion of adrenaline stands in the center of reaction of security or necessities with that organism answers on the fear, pain, cold etc. We can say that any stronger outer excitement can causes intensifying excretion of adrenaline with consecutive spasms smooth musculatures of arteries in the innervation's segment of the sympathetic postganglionic paralyses. (1, 2, 3, 5)

#### **V. Angina Pectoris Caused With Partial Postganglionic Paresis Of N.Sympathicus**

Anglo-Saxon and Nordic literatures published series successfully treated cases of an angina pectoris with sympathectomy.

At frequent stresses, excretion of stressful hormones adrenaline and nor-adrenaline burden the heart. It can eventually obtain irregularities in the heart functioning (heart arrhythmias), with not appearing pains in the area of heart at rest and effort (anginas pectoris), and, in the end, a heart infarct. Individuals with heart disorders show the characteristic line of personality: they are very aspirational, more socialized, with a strong self-control feeling.

Working, they frequently work more and longer of others, expressing strong feeling of responsibility and conscientiousness, sacrificing them. In conflicts, they are optimistic and calm. Additional risk factors in such individuals are the irregular nutrition, excessively smoking, and alcoholism.

#### **VI. Causalgia And Partial Postganglionic Paresis Of N. Sympathicus**

(Complex regional pain syndrome (CRPS) formerly reflex sympathetic dystrophy (RSD), "causalgia", or reflex neurovascular dystrophy (RND) is an amplified musculoskeletal pain syndrome (AMPS). It is a chronic systemic disease characterized by severe pain, swelling, and changes in the skin. CRPS is expected to worsen over time. It often initially affects an arm or a leg and often spreads throughout the body; 92% of patients state that they have experienced a spread, and 35% of patients report symptoms in their whole body. "Vasomotor instability", especially in earlier stadiums, can worsen clinical picture too. It is oftenest associated with dysregulation of the autonomic nervous system resulting in multiple functional loss, impairment, and disability, or **allodynia** – a pain due to a stimulus which does not normally provoke pain. Reflex **sympathetic dystrophy, or** algoneurodystrophy (reflex neurovascular dystrophy) though not have demonstrable nerve lesions can be caused or become worse at partial postganglionic paresis of n. sympathicus. The vast majority of patients with CRPS can be of this type, because causes of the mechanisms of CRPS Type I and II are unknown. I cannot exclude influence of the autonomic nervous system by it. (6)

#### **VII. The Stress, Metabolism And Partial Postganglionic Paresis N. Sympathicus**

The negative stress can challenge different stoppages glands with internal excretion. An intensified function of the thyroid gland (the hyperthyroidism) is monitoring nervousness, insomnia, loss of the weight, strengthened sweating and throbbing, what can straighten results of stressful events. Certain people in a negative stress lose weight, while other can extravagantly eat. An exaggerated fatness can monitor some disorders of metabolism and provokes development of diabetes. Repeated vasoconstrictor reactions after stress at partial postganglionic paresis n. sympathicus can change metabolism successively with impairment function of glands with internal excretion. (7)

#### **VIII. The Stress, Digestive System And Partial Paresis N. Sympathicus**

Majority of individuals in a stress are afflicted with constipation because of effect of stressful hormones on the digestive system. The importance of negative feelings in creation of an ulcer disease is also proved. Ulcerous colitis has also certain relation with the stress. Repeated vasoconstrictor reactions at partial paresis n. sympathicus can also influence at impairment function of digestive system. (7)

#### **IX. Stress, Immunity And The Partially Postganglionic Paresis Of N. Sympathicus**

Excretion of stressful hormones of the suprarenal glands (cortisol) cause a suppression of the immune system, reducing defense abilities, so that such individuals are more receptive for many diseases. Repeated vasoconstrictions caused with increasing sensitiveness at stress at partial postganglionic paresis n. sympathicus, impair function for immunity responsible glands. From special interest could be investigation possible consequences. (7)

#### **X. The Stress, Sexuality, And Partial Postganglionic Paresis N. Sympathicus**

Repeated vasoconstriction region for sexuality responsible organs can cause impotence. Menstruations can become irregular, and absent. Premenstrual syndrome caused with an excretion of stressful hormones (aldosterone), can grow worse. (7)

#### **XI. The Stress And Beauty At Partial Postganglionic Paresis N. Sympathicus**

Beauty and the health are twins. The negative stress with increased sensitiveness blood vessels at adrenalin can cause different changes on the skin (dirtiness, eczemas, rashes), and intensify feeling of sadness with disfiguring face, especially lower lips, because stressful hormones cause a tightening of arteries weakening intradermal circulation. (7)

#### **XII. Mentally Disorders At Partial Postganglionic Paresis N. Sympathicus**

Pathological stresses, especially a psycho-trauma, have an importance in creations all functional mental disorders. In individuals with a genetic predisposition for schizophrenia, even so-called small life

stresses can lead to development this disease. In the individual with a genetic affinity for depression, so-called middle life stresses can result with an appearance of depressing episodes. Stronger psycho-traumas even at individuals without any genetic predispositions for mental disorders can result with an appearance of a posttraumatic stress disorder. Anxiety and panicky reactions, disorders in fact, are regularly a result of experience stressful situations. Repeated stresses with concomitant vasoconstriction in hit region at partial postganglionic paresis n. sympathicus can initiate and impairment mentally disorders. (7)

**Causalgia** and **Sluder's neuralgia** can be also concomitantly appearing at a syndrome of the partial postganglionic paresis.

In the end, I would point out that these observations and thinking about the existence of miscellaneous syndromes caused by segmental partial postganglionic paralyses have in many cases still ever hypothetically character, demanding further meticulous investigations.

### **XIII. Raynaud's Disease And Partial Postagnlionic Paresis N. Sympathicus**

All functional disturbances of the vegetative system are more or less can be deteriorate with partial postganglionic paresis n. sympathicus, inclusive M. Reynaud and organic vascular diseases like endangitis obliterans. It is known that preganglionic blockages can benefit the Sudeck's bone atrophy too, what speaks for possible influence this syndrome at it. (1, 2, 3)

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