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ANATOMICAL AND PHYSIOLOGICAL FEATURES OF THE TRIGEMINAL NERVE

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Abstract: The trigeminal nerve is a mixed nerve that performs sensory and motor functions. It emerges from the pons of the brain and divides into three main branches - the ophthalmic n. ophthalmic, the maxillary n. maxillaris and the mandibular n. mandibularis branches. Each branch innervates different parts of the face, head, jaw and oral cavity. In particular, the mandibular branch controls the movement of the chewing muscles. clinical significance of the nerve, in particular trigeminal neuralgia, its causes, symptoms and treatment

Keywords: Trigeminal nerve. Sensation and motor functions of the trigeminal nerve, Ophthalmic branch, Maxillary branch, Mandibular branch. Methods of diagnosis and treatment. Neurological diseases.

TRIGEMINAL NERVE

The trigeminal nerve is the Vth pair of cranial nerves. It is located between the pons and the middle leg of the cerebellum (see Brain). It consists of sensory, motor and vegetative nerve fibers. The sensory fibers of the trigeminal nerve are divided into three branches. The 1st branch innervates the forehead, the frontal hairline, the upper eyelid and the skin on the top of the nose, the 2nd branch innervates the temples, nose, mucous membranes of the upper lip, teeth and gums of the upper jaw, the 3rd branch innervates the lower lip, palate, chin, mucous membranes of the tongue, teeth and gums of the lower jaw. The motor fibers of the trigeminal nerve begin from the motor nucleus cells located in the bridge of Varoli. The motor nerve fibers innervate the muscles of the temple and mastication.

Gasseri's ganglion trigeminal ganglion: pyramidal in shape, located in the trigeminal fossa of the temporal bone. There the three branches diverge.

The three main branches are therefore called "trigeminal":

1. Ophthalmic branch of n. ophthalmicus, V1– purely sensory nerve. It provides sensation to the eyes, forehead, upper part of the nose and the front of the scalp.

2. Maxillary branch of n. maxillaris, V2 – purely sensory nerve. It provides sensation to the upper jaw, lower part of the nose, cheeks, upper gums and lips.

3. Mandibular branch n. mandibularis, V3 – sensor and motor nerve. It controls sensation to the lower jaw, lower lip, lower gums, anterior 2/3 of the tongue and movement of the chewing muscles. Located in the trigeminal fossa.

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One of the most common diseases of the nerve is neuralgia, which is accompanied by severe pain. Sensitivity, responsiveness — the ability of a living organism to perceive the effects of the external and internal environment; in a narrow sense, the ability of analyzers to respond to stimuli. In animals with a nervous system, specialized sensory cells (receptors) have a high degree of selective sensitivity to various stimuli. The more excitable the nervous system, the higher the S. and vice versa. The process of excitation is formed in one part of the cerebral cortex and spreads to other parts. Trigeminal neuralgia is associated with severe depression, anxiety and a high level of sleep disturbance and is the most common type of facial pain, radiating to the face and neck, and is triggered even by the slightest breath of wind. The prevalence of trigeminal neuralgia is very high, according to statistics, the incidence rate is 2-4 per 10,000 population. According to statistics, more than 1 million people worldwide suffer from this disease. This disease most often occurs in women aged 50-70 years, with a 3:1 ratio of men to women, on the right side of the face.

This type of neuralgia was first described in 1773 by the physician John Fothergill and was surgically treated by John Murray Carnochan, a graduate of the Faculty of Medicine of the University of Edinburgh. Due to the severe pain and high suicidal tendencies in patients, this disease was historically also called the “suicide disease”.

The trigeminal nerve, nervus trigeminus, is the 5th cranial nerve of the cranial nerve. Its main function is to serve sensory impulses from the skin of the face, oral cavity, nasal cavity, eye area, jaws and teeth, and to control the chewing muscles. However, if there is pain or damage to this nerve, it can also be a sign of trigeminal neuralgia.

The main causes of trigeminal neuralgia pain are given:

1. Trigeminal neuralgia (neuralgia nervus trigemini) This is a chronic painful disease of the nerve. It is often accompanied by short, sudden, electric shock-like pain. The pain is on one side of the face.

2. Viral infections. For example, the herpes zoster (shingles) virus. It can spread along the nerve and cause painful rashes.

3. Tumors (swellings). A tumor in the brain or face can put pressure on the nerve and cause pain.

4. Injuries to the maxillofacial area. Dental injuries, surgeries, or jaw fractures.

5. Exposure to cold. Not keeping the face in extreme cold or exposure to cold winds.

6. Dental diseases. Inflammation of the root of the tooth, infection, or inflammation near the nerve.

7. Psychogenic factors. Sometimes mental stress or stress can also increase the pain.

Trigeminal neuralgia is often acute, short-term and very strong. To accurately determine the cause of the pain, a neurological examination, MRI or CT (computed tomography) is

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performed. Treatment depends on the symptom: medications (carbamazepine, gabapentin), physiotherapy or sometimes surgery.

This nerve has three branches (eye, upper jaw and lower jaw), so symptoms can appear in different areas of the face. The main clinical signs of trigeminal neuralgia:

1. Severe pain in the facial area. It begins suddenly, feels like an electric shock, a burning sensation. The pain lasts for a short time (from a few seconds to 2-3 minutes), but often recurs. It is most often on one side of the face (right or left).

2. Trigger points. Pain can be triggered by washing your face, brushing your teeth, talking, chewing food, or even just blowing air.

3. Facial muscle spasms. Facial muscles can contract and tighten during pain.

4. Changes in skin sensitivity. A feeling of numbness, tingling, or “pins and needles” in the face.

5. There are no signs of inflammation on the face. That is, there is no redness, swelling, or sores in appearance unless the cause is the shingles virus.

If the cause is a virus or tumor, the following may also occur. Rashes on the face are due to herpes zoster. Redness or inflammation of the eye. Weakness of the chewing muscles when the V3 horn is damaged. Increased sound sensitivity sometimes occurs when other structures near the nerve are affected.

1. Clinical examination and symptoms. The doctor determines the following:

Nature of the pain: sharp, lightning-like, short-term, on one side of the face.

Pain area: mainly the jaw, cheek, forehead, around the eyes.

Triggers: brushing teeth, talking, chewing, touching the face.

2. Neurological examination - Sensitivity is checked on the face (sound, pain, touch).

Muscle function and reflexes are assessed (for example, the masseter muscle reflex). Any loss or decrease in sensation may be a sign of another disease.

3. Magnetic resonance imaging MRI

The most important instrumental method is to visualize the brain and nerve roots.

It is mainly performed to determine the presence of blood vessels or tumors that are pressing on the nerve.

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Trigeminal neuralgia is the most common type of facial pain associated with severe depression, anxiety, and sleep disturbances, and it is associated with a high level of pain in the face and neck, and is triggered by even the slightest breath of wind.

Treatment Methods:

Damage to the branches of the trigeminal nerve — n. ophthalmicus ophthalmicus, n. maxillaris maxillary, n. mandibularis mandibular — is mainly associated with trigeminal neuralgia, but can also be caused by trauma, infection, or tumors.

The most commonly used drugs: Carbamazepine Tegretol - is considered the "gold standard" for trigeminal neuralgia.

Gabapentin, Pregabalin Lyrica - reduces nerve pain.

Baclofen - relaxes muscles, relieves pain.

Amitriptyline, nortriptyline – antidepressants, especially useful if psychogenic factors are present.

NSAIDs (ibuprofen, naproxen) – provide symptomatic relief in mild cases.

Ultrasound therapy

Magnetic therapy

Electrophoresis with carbamazepine or novocaine

UHF ultra-high frequency waves

Percutaneous radiofrequency thermocoagulation – stops pain signals by heating the nerve roots using radio frequency.

Glycerin injection – injected into the Gasseri ganglion, temporarily stops nerve activity.

Balloon compression – the trigeminal ganglion is compressed using a special catheter.

Alcohol blockade – provides temporary relief in severe pain.

Additional methods:

Psychotherapy in cases associated with stress

Vitamins B1, B6, B12 – improve the functioning of nerve tissue.

Dental procedures – if the cause is inflammation of the tooth root or gums.

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Conclusion. The trigeminal nerve, nervus trigeminus, is the fifth paired nerve of the cranial nerve and is a mixed nerve that combines sensory and motor functions. It innervates the face, head, jaw, oral cavity, and masticatory muscles. Anatomically and functionally, it is divided into three main branches - the ophthalmic (n. ophthalmicus), the maxillary (n. maxillaris), and the mandibular (n. mandibularis). In particular, the mandibular branch plays an important role in controlling the movement of the masticatory muscles.

One of the most common pathological conditions of this nerve is trigeminal neuralgia, which is characterized by short, sudden, and sharp pains. The disease occurs more often in women aged 50-70 and significantly reduces the quality of life of patients. Among its causes, viral infections, tumors, trauma, dental diseases, and psychogenic factors play an important role.

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