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TERNARY NERVE ANATOMY, FUNCTION, AND TERNARY NERVE DISEASES

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Annotation: This article covers the anatomy,diseases of the triplet nerve.Ternary nerve disorders have now increased significantly.

Keywords:maxillary,nerve, three horns, neuralgia, eye.

TERNARY NERVE ANATOMY:

The nerve is of a mixed type, contains sensitive and motor nuclei and fibers. It got its name due to the fact that the sensitive part at the exit from the trigeminal node is divided into three main branches: the upper (sensitive) — the ocular nerve (Latin nervus ophthalmicus), the middle (sensitive) — the maxillary nerve (Latin nervus maxillaris) and the lower (mixed) — the mandibular nerve (Latin nervus mandibularis). These three branches provide sensitivity to facial tissues, most of the soft tissues of the cranial vault, tissues and mucous membranes of the nose and mouth, teeth, as well as parts of the dura mater. The motor part innervates the chewing and some other muscles.

The trigeminal nerve is mixed in nature. From the brain, the nerve exits from the side of the varolian bridge and is the boundary, after which the varolian bridge passes into the middle legs of the cerebellum.

On the basis of the brain, it is shown from the thickness of the varolium bridge at the place of departure from the last middle leg of the cerebellum (Latin pedunculus cerebellaris medius) in two parts: the sensory and motor roots.Both parts are directed forward and somewhat laterally and penetrate into the gap between the leaves of the dura mater. Along the course of the sensitive root, a trigeminal cavity (Latin cavum trigeminale) is formed between its leaves, located on the trigeminal depression (Latin impressio trigemini) of the apex of the pyramid of the temporal bone. The cavity contains a relatively large trigeminal ganglion (Latin ganglion trigeminale) (eponym: Gasser node), located concavity backwards and convexity forwards.Three main branches of the trigeminal nerve extend from its anterior convex edge: the ocular, maxillary and mandibular nerves.The motor root wraps around the trigeminal node from the inside, goes to the oval foramen (Latin foramen ovale), where it becomes part of the third branch of the trigeminal nerve.

The trigeminal nerve is mixed. On the one hand, it is the main sensitive nerve of the face and oral cavity, but it also contains motor fibers innervating the chewing muscles.

TERNARY NERVE FUNCTION:

The trigeminal nerve has a nucleus of superficial (painful and tactile) — the spinal nucleus of the trigeminal nerve (Latin: nucleus tractus spinalis n. trigemini) and a nucleus of deep (proprioceptive) sensitivity — its own sensitive nucleus of the trigeminal nerve (Latin: nucleus sensorius principalis n. trigemini). The third sensitive nucleus of the trigeminal nerve is directed to the midbrain — the medullary nucleus of the trigeminal nerve (Latin nucleus mesencephalicus n. trigemini). The motor part of the trigeminal nerve begins from the motor nucleus of the trigeminal nerve (lat. nucleus masticatorius (motorius) n.trigemini).

The sensitive centripetal (afferent) fibers of the trigeminal nerve are the dendrites of the powerful trigeminal (Gasser) node, in which the first sensitive pseudounipolar neurons of the trigeminal nerve are embedded.

Axons radiate from them to the bodies of the second neurons embedded in the nuclei of the brain stem. Depending on which sensitivity they carry information about (superficial or deep), there are two sensitive nuclei of the trigeminal nerve — deep and superficial sensitivity.
The nucleus of superficial (pain and tactile) sensitivity (Latin: nucleus tractus spinalis n.trigemini) is a direct extension of the posterior horns of the spinal cord. It passes through the bridge of the brain, the medulla oblongata and the two upper cervical segments of the spinal cord. There is a somatotopic representation in the nucleus. The oral (upper) part of the nucleus contains the area of the face closest to its midline, and vice versa, the caudal (lower) part contains the most remote areas. Their fibers cross and enter the medial loop (lat. lemniscus medialis) and together with it end in the visual tubercle (its posterior median nucleus).
The nucleus of deep (proprioceptive) sensitivity (Latin: nucleus sensorius principalis N.trigemini) occupies a limited area of the dorsolateral part of the bridge tire. It receives afferent (sensitive) impulses of touch, discrimination and pressure, which are conducted in the spinal cord by the posterior cords. The axons of the second neurons of this nucleus also move to the opposite side and go along with the medial loop to the ventral posteromedial nucleus of the thalamus.
The third neurons of the trigeminal pathways, located in the thalamus, send their axons through the posterior pedicle of the inner capsule to the lower third of the postcentral gyrus.
The motor nucleus of the trigeminal nerve (Latin: nucleus masticatorius (motorius) n.trigemini) has its nucleus in the tire of the bridge. It is located medial to the nucleus of deep sensitivity of the trigeminal nerve. The axons of this nucleus exit next to the sensitive root and attach to the mandibular nerve, innervating the masticatory, temporal, lateral and medial pterygoid, maxillofacial muscles, anterior abdomen of the biconvex muscle. Corticonuclear pathways from both hemispheres of the brain lead to the motor nucleus.The trigeminal nerve is part of the reflex arcs.Sensory impulses from the mucous membrane of the eye are conducted along the orbital nerve to the nucleus sensorius principalis N.trigemini. Here they switch to other neurons representing the afferent part of the corneal reflex arc and connected to the nucleus of the facial nerve on the same side. The efferent part of the reflex arc is represented by the peripheral neuron of the facial nerve.The sensitive fibers that carry impulses from the nasal mucosa to the region of the trigeminal nerve nuclei represent the afferent part of the sneezing reflex. Several nerves take part in the efferent part of this reflex: V, VII, IX, X and nerves responsible for the organization of exhalation.

TRIAD NERVE DISEASES:

Trigeminal nerve pathologies disrupt the functioning of the corresponding sensory or motor systems. The most famous of these is trigeminal neuralgia, when a patient experiences attacks of acute pain along the course of the trigeminal nerve.
Clinical manifestations of lesions of different parts of the trigeminal nerve:
When one of the branches of the trigeminal nerve is affected, disorders of both deep and superficial sensitivity occur (anesthesia, hyperesthesia, etc.). When the I branch is affected (lat. n. ophthalmicus), sensitivity of the skin of the forehead and anterior scalp, upper eyelid, inner corner of the eye and back of the nose, eyeball, mucous membranes the upper part of the nasal cavity, frontal and latticed sinuses, and meninges. A decrease in brow and corneal reflexes is also characteristic.
With the defeat of the II branch (lat. n. maxillaris), there is a violation of the sensitivity of the skin of the lower eyelid and the outer corner of the eye, part of the skin of the lateral surface of the face, the upper part of the cheek, upper lip, upper jaw, teeth of the upper jaw, mucous membrane of the lower part of the nasal cavity, maxillary (maxillary) sinus.
When the III branch is affected (lat. n.mandibularis), both sensitivity disorders occur (in the lower lip, lower cheek, chin, back of the lateral surface of the face, lower jaw, gums and teeth, cheek mucosa, lower oral cavity and tongue) and peripheral paralysis of the chewing muscles. At the same time, due to their atrophy, the asymmetry of muscle contours can be determined. The sinking of the temporal pit is especially pronounced in peripheral paralysis of the temporal muscle. With paralysis of the masticatory muscle (Latin M. masseter), an asymmetry of the oval of the face occurs. The tension of the masticatory muscles in violation of their innervation is weakened. This can be determined by placing your hands on the area of the patient's temporal or masticatory muscles and asking him to make chewing movements that should cause their contraction. At the same time, an asymmetry of muscle tension on the diseased and healthy sides is

revealed. It can be noted that when they are affected, the bite force on the affected side decreases. If paralysis of the external and internal pterygoid muscles has occurred, then the slightly lowered lower jaw deviates from the midline towards the pathological focus. With bilateral damage to the chewing muscles, the lower jaw may droop. A decrease in the mandibular reflex is also characteristic.

In case of violation of both superficial and deep sensitivity on the face in the area of innervation of one of the branches, it is said that there is a violation of sensitivity on the face according to the peripheral type. It should be borne in mind that the innervation zones of the branches of the trigeminal nerve are layered on top of each other and therefore, when one of them is affected, the area of skin on which a sensitivity disorder is detected is usually smaller than its innervation zone.

When the trigeminal (Gasser's) node or the sensitive root of the trigeminal nerve is involved in the process on the basis of the brain, loss of sensitivity is observed in the area of the zone of all three branches. In the presence of herpetic rashes in the area of innervation of any of the branches of the trigeminal nerve, the virus persists in the gasser node. The fact is that in the ganglia, the herpes I virus is elusive for the cells of the immune system and sometimes it spreads along any of the branches of the trigeminal nerve.

Sensitivity disorders can also occur when the sensitive nuclei of the trigeminal nerve located in the brain stem are affected. At the same time, dissociation of sensory disorders is characteristic.More often, the nucleus tractus spinalis n.trigemini, which has a large extent, is subject to pathological influences. In this case, the area of sensitive disorders on the face will be located depending on which part of the nucleus of the descending root of the trigeminal nerve is affected in this case. If only the oral part of the nucleus is affected, then sensitive disorders are detected only in the oral part of the same half of the face (the nose and lips area), if the pathological process spreads through the nucleus from top to bottom, then the zones of sensitive disorders gradually spread to the entire half of the face from the nose to the auricle and lower jaw. The sensitivity of the lateral parts of the face is impaired only when the most caudally located part of the nucleus is affected. Thus, each floor of the core on the face corresponds to a certain area having the shape of a bracket, known as the Zelder zone. In the zones of the Zelder, only surface sensitivity (temperature and pain) falls out, while the deep sensitivity remains preserved. Such damage to the nucleus of the spinal pathway of the trigeminal nerve can occur with cerebral infarction, demyelinating diseases, syringobulbia and other focal lesions of the brain stem.

Facial pain called trigeminal neuralgia (pain tic) is of particular importance. It is characterized by paroxysmal attacks of acute, cutting, harrowing pain, limited by the innervation zone of one or more branches of the trigeminal nerve, and is usually accompanied by vasomotor and secretory disorders.

Main article: Trigeminal neuralgia

Gradenigo syndrome is characterized by pain in the area of the frontal branch of the trigeminal nerve in combination with paresis of the abductor nerve. It is associated with inflammation of the pneumatized cells of the apex of the pyramid of the temporal bone.

An aneurysm of the internal carotid artery within the cavernous sinus can cause irritation of the first and possibly second branches of the trigeminal nerve and, consequently, pain in their innervation zones.When the motor neurons of the trigeminal nerve are irritated, tonic tension of the masticatory muscles (trism) develops. The chewing muscles are tense and hard to the touch, and the teeth are so tightly clenched that it is impossible to push them apart. Trism can also occur when the projection centers of the masticatory muscles in the cerebral cortex and the pathways leading from them are irritated. Trism develops in tetanus, meningitis, tetany, epileptic seizure, tumors in the area of the bridge of the brain. At the same time, eating is disrupted or completely impossible, speech is impaired, and there are respiratory disorders. The neuropsychic tension is expressed. The trism can be prolonged, which leads to exhaustion of the patient.

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