

Review Article,

Eagle Syndrome (Stylohyoid Syndrome, Styloid Syndrome, Styloid-Carotid Syndrome)

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Abstract:

Background

Although there is preserved information about the mention of the stylohyoid ligament as early as 1652 by the Italian anatomist Pietro Marchetti, the discoverer of Eagle syndrome is considered to be the ENT specialist Watt Eagle from one of the most prestigious universities - Duke University, who in 1937 first described it as a separate nosological entity, examining patients with pain in the head and neck region.

Materials and methods

This article is an overview and it is based on the analysis of 31 other articles by foreign authors published in world-renowned and refereed scientific publications.

Discussion

Eagle syndrome is a disease that is a prolongation of the styloid process and/or impingement of the stylohyoid ligament connecting the styloid process of the temporal bone and the lesser horn of the hyoid bone. The reasons for this, according to Watt Eagle, are surgical trauma (most often tonsillectomy) or other local chronic irritation of the tissues and organs in the space around the styloid process, causing osteitis, periosteitis and tendinitis of the same and/or the stylohyoid ligament.

There are two varieties of the syndrome - classic, in which the symptomatology is due to the compression of the adjacent styloid process nerves, and type of the carotid artery, in which the clinical manifestation is due to the compression of the latter.

Its treatment can be both - conservative and surgical. The latter can be carried out by intraoral or extraoral access.

Conclusion

Eagle syndrome is one of the diseases of the head and neck with the most diverse and extensive symptoms, and very often its diagnosis is a great difficulty even for an experienced clinician, and its treatment requires a complex approach and professionalism on the part of treating medical doctors.

Keywords: Eagle syndrome, head and neck surgery, maxillofacial surgery, neuralgia, throat and neck pain

Introduction:

Background

Although there is preserved information about the mention of the stylohyoid ligament as early as 1652 by the Italian anatomist Pietro Marchetti, the discoverer of Eagle syndrome is considered to be the ENT specialist Watt Eagle from one of the most prestigious universities - Duke University,

who in 1937 first described it as a separate nosological entity, examining patients with pain in the head and neck region (1-4). Its symptoms are related to the compression of adjacent structures by the elongated styloid process and is most often provoked by head movements, especially turning it to the side (5). It is often bilateral (6). There are two varieties of the syndrome – a classic type associated with compression of cranial nerves, and

a carotid artery type, the symptoms of which are associated with compression of the carotid artery (5, 6).

Materials and methods:

This article is an overview. It is based on the analysis of 31 other articles by foreign authors published in world-renowned and refereed scientific publications. It describes the etiology, pathophysiology, clinical manifestations, diagnosis and treatment of elongated styloid process of the temporal bone and/or ossification of the stylohyoid ligament – a condition called with different names – Eagle syndrome, stylohyoid syndrome, styloid syndrome or styloid-carotid syndrome. The information from them, after detailed examination, analysis and systematization, was arranged and presented in this form in order to obtain a fully completed scientific work characterizing this pathology.

Discussion:

Eagle syndrome is a disease that is a prolongation of the styloid process and/or impingement of the stylohyoid ligament connecting the styloid process of the temporal bone and the lesser horn of the hyoid bone. The reasons for this, according to Watt Eagle, are surgical trauma (most often tonsillectomy) or other local chronic irritation of the tissues and organs in the space around the styloid process, causing osteitis, periosteitis and tendinitis of the same and/or the stylohyoid ligament, which lead to their reactive ossification and hyperplasia (7, 8). However, the disease also occurs in individuals who have never undergone head and neck surgery or trauma (5).

In 1975 Lentini suggested that between styloid process and stylohyoid ligament mesenchymal tissue, later called Reicher's cartilage, is located, which, as a result of trauma or stress on the body, leads to the production of chondroblasts and chondrocytes, which lead to the elongation of the styloid process (5, 9, 10).

In 1962, Epifanio concluded that the disease occurs primarily in menopausal women with endocrine suction who also have involvement of other ligaments in their body (6, 11, 12).

In 2008, Gokce found that Eagle syndrome occurs exclusively in patients with chronic kidney disease, leading to high levels of calcium, phosphorus and vitamin D in the blood (6, 13-15).

In 2015, Sekerci, examining 542 patients on whom he conducted computed tomography, concluded that an extended styloid process occurs

more often in patients in whom the opening of the spinous process of the first cervical vertebra (atlas) did not close during embryonic development. The same existing postnatally is known as ponticulus posticus (lat.) or arcuate foramen (eng.). It occurs in 3-15% of the population, more often in women (16-18).

It occurs in about 4% of the population, and only about 4-10% of them (0.16-0.4% of the population) manifests clinically. It most often affects people over the age of 30 - three times more women than men. It is observed both unilaterally and bilaterally (9, 10, 13-15).

The normal length of the styloid process in the adult human being is up to 2.5 cm. Pathologically long is the one in which it is 3.0 cm or more (13, 14, 19, 20).

Watt Eagle also describes two varieties of the syndrome - classic, in which the symptomatology is due to the compression of the adjacent styloid process nerves, and type of the carotid artery, in which the clinical manifestation is due to the compression of the latter.

The classic form occurs most often after a tonsillectomy or some type of surgery or trauma to the throat. Postoperative or posttraumatic cicatrix of the pharynx has been suggested to result in ossification of the stylohyoid ligament and lengthening of the styloid process, causing chronic irritation of the latter and it grows and compresses the mandibular (V3), facial (VII), vestibulocochlear (VIII), glossopharyngeal (IX), vagus (X) and hypoglossal (XII) cranial nerves and the sympathetic nerves or their terminal nerve endings in the neck. This is mainly manifested by the sensation of a foreign body in the neck and throat, dysphagia,odynophagia, dysphonia, pain in the ear (otalgia), noise in the ear (tinnitus), pain when turning the head (although in most cases the pain manifests when turning the head to the side with the pathology, there are also described cases when turning to the other side) and when sticking out the tongue, hypersalivation (8, 15, 21, 22). Most often, the pain is localized in the area of the tonsillar fossa. Very often, patients describe pain like that of glossopharyngeal neuralgia (neuralgia of the glossopharyngeal nerve), which, in contrast, is longer and duller, but there are also those in which it is throbbing and short-lasting (22, 23).

In the type "Eagle syndrome associated with the carotid artery" (styloid-carotid syndrome), the clinical manifestation is due to the compression of the internal or external carotid artery and the

surrounding perivascular sympathetic fibers from the elongated process and the ischemia to which this compression leads. Their compression can be from both their medial and lateral side. When affecting the external carotid artery the clinic is pain in the temple, infraorbital and upper jaw from the same side of the body. Affecting the internal carotid artery presents with syncope, ipsilateral migraine-like pain, pain in the eye and supraorbital, visual disturbances (8, 15, 21, 22).

In 2009, A. Faivre and Z. Abdelfetah described a longitudinal bifurcation of the internal carotid artery from an abnormally long styloid process (25).

Making the correct diagnosis is not easy because the symptoms that characterize it often resemble neuralgic pain of the various cranial nerves in the head and neck area (18).

It is easily diagnosed with a pronounced clinical picture, palpation of a swelling in the area of the styloid process (both extra- and intraoral in the area of the tonsillar fossa) and the results of performed imaging studies (x-rays, including orthopantomography, and 3D-computed tomography). Carotid artery stenosis can be detected and measured with an angiographic examination of the neck. The described pain is usually provoked by extra- and/or intraoral palpation with moderate pressure on the tip of the styloid process (5).

In terms of differential diagnosis, volume-occupying processes, including malignant ones, in the neck area, neuralgia (most often glossopharyngeal and trigeminal), diseases of the temporomandibular joint, cervical spondylosis, migraine headache, diverticula of the esophagus, diseases of the major salivary glands, carotid artery dissection, temporal arteritis and impacted third molar.

Its treatment can be both conservative and surgical.

Conservative therapy consists of oral administration of analgesics, antidepressants and anticonvulsants and/or the transpharyngeal application of local anesthetics and steroids, Diazepam or NSAIDs adjacent to the styloid process and stylohyoid ligament (26-28). In some patients, physiotherapy treatment with local heating also brings relief (6).

The most lasting results are obtained with surgical treatment. It can be carried out with both intraoral and extraoral access. The advantages of the intraoral approach are a simpler technique, a

shorter duration of the manipulation, the possibility that it can be performed only under local anesthesia and the absence of a visible scar. Disadvantages are difficult access, especially with limited opening of the mouth and the presence of bleeding, the possibility of iatrogenic injury to the vascular-nerve bundle of the neck, postoperative edema, which often leads to difficulty speaking and swallowing, the possibility of postoperative trismus and the increased risk of infection.

The advantages of extraoral access are greater visibility of the styloid process, stylohyoid ligament and the structures around them, which causes easier shortening of the process. The disadvantages of the extraoral approach are longer manipulation, possibility of damage to the facial nerve and its branches, presence of a visible scar and longer recovery period (20, 26-29).

In the case of intraoral access, after performing a tonsillectomy and opening the bottom of the tonsillar fossa, a vertical incision is made on the pharyngeal mucosa and superior pharyngeal constrictor muscle, after which it is reached to the styloid process and stylohyoid ligament. Extraoral access involves a vertical or horizontal neck incision in the upper third and reaching the styloid process and stylohyoid ligament after soft tissue dissection. Regardless of access, after reaching the styloid process and stylohyoid ligament the same are shortened with the help of an osteotome (20, 27-31).

Conclusion:

Eagle syndrome is one of the diseases of the head and neck with the most diverse and extensive symptomatology, and very often its diagnosis is a great difficulty even for an experienced clinician, its differential diagnosis includes a large number of similar diseases, it is a great burden for the patients suffering from it, and its treatment requires a complex approach and professionalism on the part of treating doctors.

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