

CLINICAL CASE OF A PATIENT WITH THORACIC OUTLET SYNDROME

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Abstract. Thoracic outlet syndrome (TOS) is a group of conditions that result in compression of the brachial plexus, causing symptoms of pain, muscle weakness, and numbness in the shoulders and upper extremities. The classification of TOS is based on pathophysiological symptoms and is mainly divided into neurogenic (nTOS), venous (vTOS) and arterial (aTOS). Depending on the etiology, TOS can be classified as congenital, traumatic, or functionally acquired. We present a clinical case of a 34-year-old man who was admitted to the Rheumatology Clinic, UMHAT "St. Ivan Rilski" in July 2022. The patient reported complaints of numbness in the fingers, weakness of the upper extremities when the arms are raised, and periungual bruising. The patient underwent phlebography in 2021, with the conclusion of compression of v. subclavia dextra et sinistra during abduction and ipsilateral rotation of the head. From the performed CT-angiography, compression of the right common iliac artery on the left common iliac vein, which was dilated, corresponding to the highest degree with May-Turner syndrome, was found. In the rheumatology clinic, capillaroscopy was performed, which visualized peripheral vascular spasm and nonspecific changes. Laboratory and immunological tests did not reveal any abnormalities.

Key words: thoracic outlet syndrome

INTRODUCTION

Thoracic outlet syndrome (TOS) is a group of changes that result in compression of the neurovascular bundle exiting the upper thoracic aperture. The upper thoracic aperture is an anatomical structure in the lower part of the neck, which is divided into three areas between the clavicle and the first rib, through which several important neurovascular structures pass – these are the brachial plexus, a. subclavia and v. subclavia. Compression of these structures causes symptoms in the corresponding upper limb, including pain, skin discoloration, paresthesia, muscle weakness, muscle atrophy [1, 2]. The classification of TOS is based on pathophysiological symptoms and is mainly divided into neurogenic (nTOS), venous (vTOS) and arterial (aTOS) [3]. Depending on the etiology, TOS can be classified as congenital, traumatic or functionally acquired [4]. Among the most common causes of the congenital type is the presence of a cervical rib. The most common traumatic etiology is falls or whiplash-type trauma. Functionally acquired thoracic outlet syndrome may be associated with repetitive motions associated with sports or occupational exposure. About 90% of all cases are nTOS, which occur in young and active individuals participating in sports activities and weight lifting. TOS usually presents between the ages of 20-50 years and is more common in women [5].

Due to the wide range of etiological reasons for the occurrence of TOS, there are different and multi-disciplinary approaches to its therapy. Among them are surgical treatment, change in lifestyle, rehabilitation, physical therapy, anticoagulant therapy, taking painkillers [6]. Neurogenic TOS results from compression of nerve roots by the brachial plexus at C5-Th1 levels and accounts for about 90% of all TOS [7]. Neurogenic TOS is most common in young, active individuals who participate in sports activities characterized by repetitive movements and overhead lifting [8]. Sanders et al. describes distribution of symptoms in nTOS – paresthesia of upper extremity (98%), pain in neck (88%), pain in trapezius muscle (92%), pain in shoulder and/or arm (88%), paresthesia in all fingers (58%), paresthesia in the 4th and 5th finger (26%) [9]. In 10-15% of cases, the venous form of TOS (also known as Paget-Von Schroetter syndrome) occurs, in which, due to the presence of mechanical compression in the costoclavicular space or repetitive trauma of the v.subclavia, the normal blood flow is disturbed. Clinically, this manifests as upper extremity edema, pain, and cyanosis resembling Raynaud's syndrome. About 7% of cases of Raynaud's syndrome are unilateral, so these patients should be investigated with caution [10, 11, 12]. The rarest form is arterial TOS, in which the clinic resembles the venous form, but there is a greater risk of thrombosis and distal embolization [13].

Diagnosis of TOS should initially focus primarily on physical examination and include the shoulder, upper extremity, and cervical spine. It is examined for traces of muscle atrophy, muscle weakness, change in skin color, skin temperature, disorders in

hair growth in the given area. The venous form of TOS may present with large differences in arterial pressure between the two arms (> 20 mm Hg), the shoulder and chest may appear edematous, while the upper limb is pale or cyanotic [14].

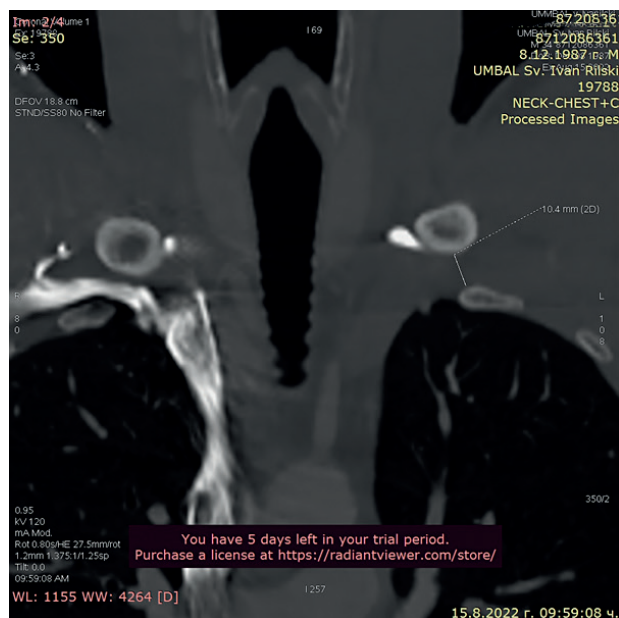


Fig. 1



Fig. 2

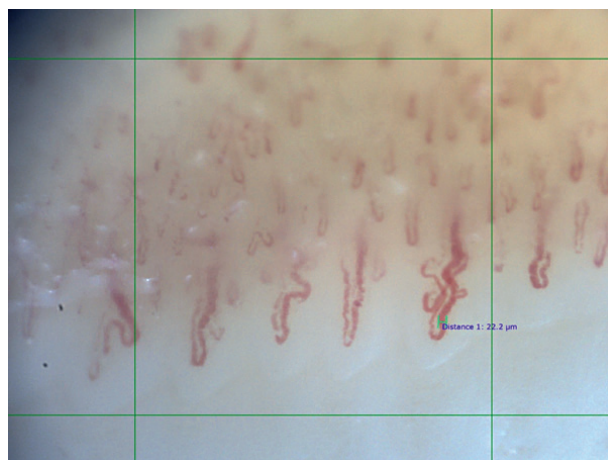
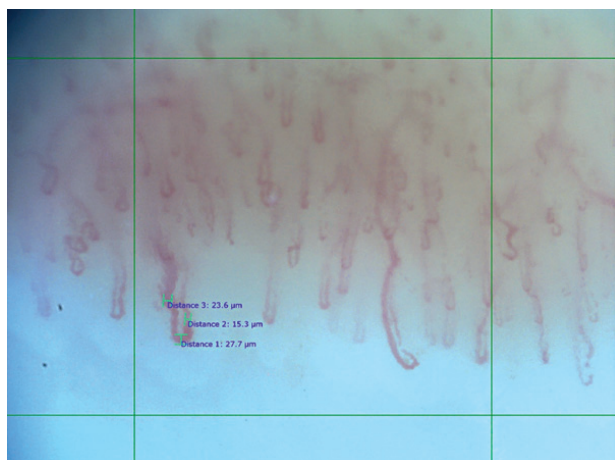


Fig. 3 and 4. Capillaroscopy of the fingers of both hands

CLINICAL CASE

We present a clinical case of a 34-year-old man who was admitted to the Rheumatology Clinic, UM-HAT "St. Ivan Rilski" in July 2022. The patient complained of numbness in the fingers, weakness of the upper limbs when the arms were raised, diminution of both hands in the supine position and periungual bruising (Fig. 5 and Fig. 6).

In outpatient conditions, a magnetic resonance imaging (MRI) of the thoracic department was performed, which revealed degenerative spondylosis changes and MR data for disc protrusions at levels C3-C4, C4-C5, C5-C6 and C6-C7, as at the level C4-C5 secondary neuroforaminal stenosis from a disc-osteophyte complex has been described. From the performed electroneuromyography (ENMG), evidence of a root lesion of C6, C7,



Fig. 5 and 6. Periungual bruising of the fingers of the hands



Th1 on the left was established. In 2021, the patient underwent phlebography of the upper limbs bilaterally in the neutral position and in abduction. On the right, passable deep and superficial veins are visualized, without current stasis in the neutral position. During abduction and ipsilateral rotation of the head, significant compression of the v. subclavia dextra in the proximal third in the area of its passage through the bone-clavicular gorge with stasis of the venous outflow and retention of the contrast in the v. subclavia for more than 20 seconds was observed. On the left, a callus is observed with a deviation of the left clavicle in the distal third, confirming the anamnestic data of a fracture of the latter in the past. The left subclavian vein is passable with compensatory dilated collateral veins, performing more than 50% of the drainage of the left upper extremity. Intraluminal changes in the left subclavian vein, resembling connective tissue encrustations, with delayed venous drainage of the limb through the latter in a neutral position were found. With abduction and rotation of the head – a similar finding with more pronounced stasis of venous blood flow was found.

Out-patient CT-angiography revealed compression of the right common iliac artery on the left common iliac vein, which is dilated, corresponding to the highest degree with May-Turner syndrome – without leg complaints.

In the rheumatology clinic, a CT examination of the superior thoracic aperture native and with contrast material i.v. was performed – no CT data for cervical ribs.

The costoclavicular space on the right has a minimum coronary size of 8.8 mm, and on the left – 10.4 mm. Subclavian artery and subclavian vein are

bilaterally filled normally with contrast material. The right subclavian vein appears slightly compressed at the level of the costoclavicular space. The norm of the costoclavicular space relative to the subclavian vein and the brachial plexus is 1.23 cm (± 0.40) and 1.24 cm (± 0.47) [15].

Capillaroscopy that visualized peripheral vasospasm and nonspecific changes was performed.

Laboratory and immunological results showed as follows: blood count and biochemistry – normal; ESR and CRP – normal; ANA-pack – normal; “Antiphospholipid syndrome” pack – normal.

DISCUSSION

Publications in the scientific literature over the past 20 years summarize only some of the difficulties in the management of TOS. Some authors such as Vos et al., as well as Povlsen et al., emphasize the challenges in patients with TOS, due to the lack of recognized diagnostic criteria [16, 17]. Clinicians should use a combination of accurate history taking, clinical examination, and the use of other diagnostic imaging modalities. Each subtype of TOS, venous, arterial, and neurogenic, presents with different clinical symptoms.

The difficulty of diagnosis is also compounded by the uncertain role of imaging in TOS. Some authors emphasize the importance of venography in venous TOS, which is standard practice for demonstrating subclavian vein compression. Other imaging studies (computed tomography, conventional radiography) are useful only to identify anatomic abnormalities that could be a source of compression, or to identify arterial complications such as embolization or aneurysms using angiography. The

correct diagnostic algorithm is the basis of making the correct diagnosis. Neither the symptoms, nor the clinical examination, nor the imaging tests are sufficient by themselves to identify the disease, but in combination they complete the correct diagnostic algorithm [17].

In the clinical case described by us, the patient presented with complaints of bruising of the hands (periungual and ungual) during cold exposure, as well as a change in the body temperature of the extremities. The first impression of the patient's clinical complaints could be associated with Raynaud's phenomenon. The performance of more detailed imaging studies, as well as the results of the performed physical examination, specify the morphological changes and give a detailed idea of the likely combined genesis. In our patient, the most likely etiological factor is active sports and weight lifting. Neurogenic TOS is most common in young, active individuals who participate in sports activities characterized by repetitive movements and overhead lifting [8]. In the presented clinical case, it is possible to miss the main diagnosis, masked behind the typical clinical complaints characteristic of Raynaud's phenomenon. The capillaroscopy finding of peripheral vasospasm and present non-specific changes is probably both a consequence of the altered microcirculation of the upper extremities (evidence of TOS) and a manifestation as a result of cold exposure (worsening of complaints in the winter season). It is important in these cases to make a broad differential diagnosis and to look for a reason for the complaints.

In our patient, outpatient CT-angiography revealed compression of the right common iliac artery on the left common iliac vein, which is dilated, corresponding to the highest degree with May–Turner syndrome – without leg complaints. May–Turner syndrome (MTS) is a venous compression syndrome in which the left common iliac vein (LCIV) is compressed between the lower lumbar spine and the right common iliac artery (RCIA). While most of the cases are asymptomatic, it can cause severe morbidity in symptomatic individuals, most commonly deep vein thrombosis and post thrombotic sequelae [18].

Surgical treatment of upper thoracic aperture syndrome usually involves decompression by resection of the 1st rib or congenital cervical rib, if present. Vascular TOS may require reconstructive vascular surgery as an adjunct.

Literature data show that rib resection is the better therapeutic option than other operations such as supraclavicular brachial plexus neuroplasty [17, 19].

Non-surgical treatment of TOS includes non-invasive interventions such as injection of botulinum toxin into the anterior and middle scalene muscles. However, the results reported so far are contradictory. A randomized control trial comparing botulinum toxin injection with placebo (saline) injections found no significant difference in pain or disability ratings at 6-month follow-up. [20] Conventional treatment with anticoagulants, antiplatelets, and vasodilators is used in patients diagnosed with TOS.

In the clinical case described by us, the patient reported a good therapeutic result from the therapy with pentoxifylline and clopidogrel.

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