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CASE REPORT

THORACIC OUTLET SYNDROME

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Abstract

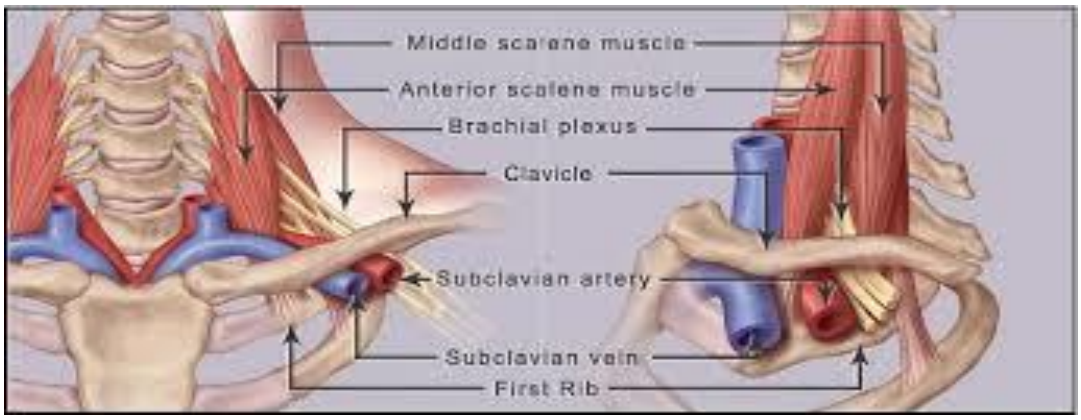
Thoracic outlet is a space that borders the clavicle, the first rib and the scalene muscles. In this space an extra rib can also be inherently present. The subclavian artery and vein, as well as the nerve roots of the brachial plexus, pass through this space. Compression on any of these structures can result in symptoms and cause an arterial, venous or neurogenic type of thoracic outlet syndrome. In the arterial type dominate symptoms of painful and cold arm. In the venous type of pain and edema and in the neurogenic type of pain - tingling and burning sensation in the upper extremity can be present.
A case report is of a patient who had unspecified neurologic symptoms of tingling, burning sensation and pain in the right arm that exacerbated especially when the patient was sleeping on the left side of the bed. The patient had consulted several specialists regarding the symptoms; internists, orthopedic doctors, neurologists and rheumatologists, whose therapies proved unsuccessful. When in the right supraclavicular fossa appeared a formation with solid consistency and the needle biopsy proved presence of osteocytes, a CT examination of this region was proposed. The result of the CT scan proved presence of an accessory cervical rib that compresses the brachial plexus and was the cause for the neurological symptoms. Thoracic outlet is still a diagnostic challenge, and regarding the treatment plan several experienced specialists from different specialties should be consulted due to its multicausality.

Key Words: *Extra rib; plexus brachialis; subclavian – artery and vein; thoracic outlet syndrome.*

Introduction

Thoracic outlet is an anatomical region which borders: the first rib, the clavicle, the anterior and middle scalene muscles, and there are also neurovascular structures present (1). In this relatively narrow space are located: the subclavian artery and vein and the nerve

roots of the brachial plexus (Picture 1). Due to the close proximity of the aforementioned structures a compression is possible on one of them.



Picture 1. Anatomy of the thoracic outlet space.

In this space some patients can have an accessory rib that is called a cervical rib (2). This cervical rib can fuse with the first rib through bone or fibrous tissue. Sometimes inherent fibrous tracks, ligaments and muscles that normally are not in this anatomical region can be present in this space and increase the pressure in it. Thoracic outlet syndrome may also result from trauma, repetitive arm movements, tumor and pregnancy.
Synonyms for this term are the following: upper aperture syndrome, accessory rib syndrome, brachial plexus compressive syndrome, retroclavicular compressive syndrome etc.
Patients with thoracic outlet syndrome are classified in two groups:
1. Group with compression of blood vessels (subclavian artery and vein), and
2. Group with compression of nerves (brachial plexus).
The compression of blood vessels can be arterial or venous.
During arterial compression of thoracic outlet syndrome (TOSa), the main clinical manifestation is painful, cold and bruised arm (3).
The venous compression of thoracic outlet syndrome (TOSv) manifests with edema, pain and redness of the arm (4).
Symptoms that appear in brachial plexus compression – neurogenic type of thoracic outlet syndrome (TOSn) are tingling, paresthesias and pain in the arm and hand, and are more frequent compared to those of vascular compression (5).
The clinical manifestations can be a combination of the neurogenic as well as the vascular type of this syndrome. However, patients with compression of the brachial plexus are more complex because neurogenic symptoms can be caused by more causes, primarily cervical spondylosis. The goal of this publication is to present a case report of a patient who has made many medical examinations, spent much time consulting several medical specialists, and none of them has pointed out that this diagnosis is possible as a differential diagnosis.

Case Report

The patient is a 55-years-old intellectual woman who takes care of her health. She has made regular occupational health checkups and was without any significant health issues. Occasionally she complained of cold arms, especially of the right arm and tingling of the right arm that worsened during sleeping on the right side of the bed. The GP explained these symptoms as part of cervical spondylosis and menopause.

On a routine breast checkup, an enlarged lymph node was detected with the size of a walnut in the right supraclavicular region which was not painful on touch.

The patient was disturbed because her older sister was diagnosed with Non-Hodgkin lymphoma and an enlarged lymph node in the femoral region before 4 years, on the same age as her younger sister.

The following tests were recommended: blood work for inflammatory markers, lymph node biopsy, X ray of the cervical spine and lungs, ultrasound of the abdomen, consultation with a hematologist.

The blood work, primarily for inflammatory markers, sedimentation, leukocytes, blood differential test, CRP, RF and AST were all within the reference ranges.

The X ray of the cervical spine and the lungs were normal for that age.

The ultrasound examination of the abdomen was in physiological range except for the involuted changes of the uterus.

Ultrasound of the breast and surrounding structures findings were the following:

Unclearly limited formation with solid consistency with dimensions of 3x2 cm and is located deep in the soft tissues of the right supraclavicular fossa;

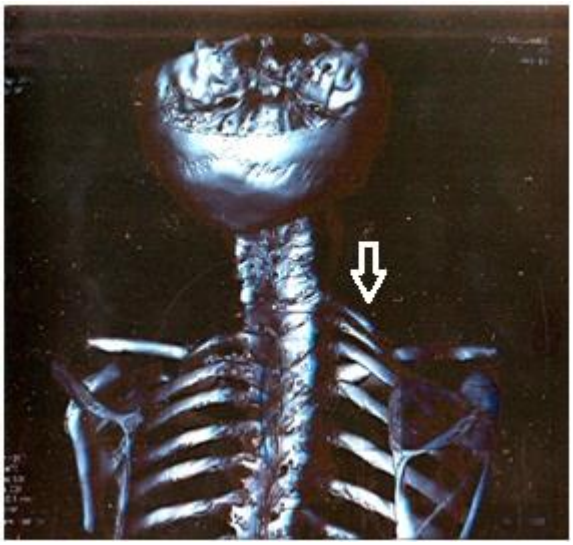
Bilaterally above the clavicles, lymph nodes and blood vessels with dimensions of 6.5mm;

In the axillary fossa normal lymph nodes.

Findings of the biopsy of a lymph node.

With puncture and aspiration, it was unable to break through the bone consistency of the formation. The punctured formation fits mostly with benign osteoma or osteocartilaginous exostosis. Atypical and malignant cells were not found.

The GP who ordered these tests analyzed the data, and said that the diagnosis is unspecific, so he proposed a CT scan of the neck and upper part of the thorax.



Picture 2. CT of the neck and upper thoracic region. The arrow points to the extra rib.

The CT scan of the cervical spine has shown a right accessory (cervical) rib which originates from the C7 vertebral body, and the end of the rib touches the first rib and makes a small pseudoarthrosis (Picture 2). Degenerative changes of the C5-C6 vertebral bodies on the touching surfaces of the vertebral bodies were present, and no spinal canal stenosis and no enlarged lymph nodes.
The CT scan has helped in making the diagnosis: Thoracic Outlet Syndrome – accessory cervical rib right with neurological manifestations.

Discussion

Thoracic outlet syndrome is a condition in which there is a compression of the nerves, veins or arteries in the superior thoracic aperture, the passageway from the neck to the armpit known as the thoracic outlet.
This condition was first described in 1818 and the term “thoracic outlet syndrome” for the first time was used in 1956 (6).
This condition is relatively rare, represented with frequency of 1% of the population, more common in women than in men and the most commonly manifested at the age of 20-50 years (7).
Making the diagnosis of this syndrome can be controversial. This group of patients visits doctors of many different specialties: internists, rheumatologists, orthopedic doctors, neurologists, psychiatrists, without an accurate diagnosis, and of course without a significant effect in therapy.
The patient presented in our case report had neurological issues such as tingling, burning and pain in the right arm especially while sleeping on the right side for years and visited several specialists. The explanations were that she had cervical spondylosis, rheumatic issues and menopause. In several instances X ray of the cervical spine was performed, and an accessory cervical rib was not detected. The compression of the cervical rib confused

the pathologist who thought that he was performing a biopsy of an enlarged lymph node, and he was later surprised by the result findings of osteocytes in the tissue sample.
The neurologic type of thoracic outlet syndrome is the most common type of this condition with frequency of 85-90% from the whole count of cases of this syndrome, and the vascular type, arterial and venous type of TOS are 10-15% (8).
Almost all patients with neurogenic type of TOS report exacerbation of symptoms when they elevate their arms above their heads. Some activities may provoke symptoms such as prolonged work on a computer, long driving on motorcycle, long time holding the phone while speaking, putting the clothes to dry etc. In clinical examinations, the infraclavicular space should be palpated so that the symptoms linked to compression of the brachial plexus can be revealed in 40-50% of the patients with TOS (9).
One of the most important components of the physical examination for TOS is the Elevated Arm Stress Test (EAST). Patient is positioned with the arms elevated in a 90/90 degree “surrender” position and asked to repetitively open and close the hands for up to 3 minutes. Most of the patients with TOSn report the rapid onset of pain in upper limbs within 20-30 seconds (10).
When this test is positive electrophysiological testing is additionally performed.
In patients suspicious of the vascular type of TOS, the arterial and venous circulation is estimated to be with duplex ultrasound.
The treatment of the neurogenic type of TOS is controversial with advice to avoid positions that exacerbate symptoms and physical therapy. Medicaments that are most often used are NSAIDs, muscle relaxants and Botox treatment that alleviates the spasm if the compression is from the scalene or pectoral muscle (11).
The most radical treatment is surgical resection of the accessory rib (extra rib) or the muscles that make the compression. The surgical procedure is linked to possible complications and should be performed in centers that have experience with this medical issue.

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