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Original Research Article

Measurement and analysis of thoracic outlet area with multidedector computerized tomography method

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ABSTRACT

Background: Thorasic exit; cervical, thoracic, and axillary regions and is a complex structure with three narrow ranges. There are three important structures in this region: subclaviane artery, subclavian vein and plexus brachialis. In this study, it was aimed to establish the reference range of some of the etiologic factors of thorasic outlet syndrome.
Methods: This study was performed on 100 patients (50 females- 50 males) aged between 20 and 65 years. The distance between the sagittal planar clavicle and the first one is closest to each other. Again, the thickness of the clavicle was measured in this plane.
Results: The distance between costa and clavicula was significantly higher in men than in women ($p<0.05$). Likewise, clavicula values were significantly higher in males than in males ($p<0.05$).
Conclusions: Authors believe that the results obtained in present study will be beneficial in the surgeon, radiology and anatomy training, contributing to the literature.

Keywords: Brachial plexus, MDCT, Thoracic outlet

INTRODUCTION

Thoracic outlet; is a complex structure with three narrow ranges, as cervical, thoracic, and axillary regions. There are three important structures in this region: arteria subclavian, vena subclavian and plexus brakialis.[1]

Thoracic outlet syndrome (TOS) is a disease of the plexus brachialis, subclavian artery or subclavian venous thoracic outlet zone, or cesacaclavicus, which is caused by the passage of the penile while passing through the gap. Symptoms varying from neck, back, arm and hand are seen.[2] Some of these symptoms may be paresthesia, numbness, stigma, loss, muscle weakness, weakness and pain.[3] There are many factors in TOS etiology. Cervical ribs, long vertical vertebra, abnormal rib, scaling muscle hypertrophy are some of these factors. Symptoms may develop.[4] Clinical, examination, provakosos tests, ultrasonography, necessary doppler ultrasonography and magnetic resonance images are available for the diagnosis of this disease.[5] Surgical treatment is necessary in patients whose symptoms are not diminished despite the conservative treatment after diagnosis.[6]

In this study, it was aimed to establish the reference range of some of the etiologic factors of thoracic outlet syndrome.

METHODS

The study was performed on 100 patients (50 females- 50 males) who were admitted to Konya Education Research

Hospital and thoracic region bone structures screened with multidector computed tomography (MDCT). Patients ranging in age from 20 to 65 were included in the study. In the first step of working; patients who had previously applied to the hospital and who had obtained MDCT and thoracic region images were identified. In present study, measurements were made on the thorax images acquired while the patient was lying in the supine position. Morphometric measurements were made on the distance between the clavicle and the clavicle and the thickness of the clavicle. On transverse plan it has been scanned for cervical ribs. The distance between the sagittal planar clavicle and the first level of the cradle is measured. Again, the thickness of the clavicle was measured in this plane.

The Ethics Committee Compliance Report of this study was taken from Necmettin Erbakan University.

RESULTS

In present study, two parameters of clavicula and thoracic outlet region were measured, and mean values were determined. In addition, the presence of cervical costa has been recorded. It was investigated whether statistically significant differences exist between men and women. 1. The distance between Costa and clavicula was significantly higher in men than in women ($p<0.05$). Likewise, clavicula values were significantly higher in males than in males ($p<0.05$).

Table 1: Comparison of the obtained data according to gender (mean±SD) (mm).

Parameters	Female (n= 50)	Male (n= 50)	P value
Kot-cl	11.38±3.05	12.16±3.66	<0.05
Clt	11.62±3.08	13.34±3.24	<0.05

Kot-cl: distance between clavicle and 1st rib; Clt: clavicle thickness

Table 2: Comparison of the obtained data according to lateralization (mean±SD) (mm).

Parameters	Right (n= 50)	Left (n= 50)	P value
Kot-cl	11.76±3.20	11.77±3.58	>0.05
Clt	12.71±3.39	12.25±3.20	<0.05

Kot-cl: distance between clavicle and 1st rib; Clt: clavicle thickness.

Averages according to gender and lateralization are presented in Table 1 and Table 2 in detail.

Cervical costa was recorded on the right side in 8 of 50 women, on the left side in 7, on the right side in 6, and on the left side in 5 men.

There was no correlation between the incidence of cervical costa and gender and sides.

DISCUSSION

The clavicle, which is a short tubular bone, is roughly S shaped. Flattening of the clavicle with the sternum is rarely observed. It may be accompanied by some rare syndromes in the normal population. The role of TOS in the etiology of this condition, which can be demonstrated with direct graphs, is known.[7] Qiu X et al found that the clavicle thickness of the Chinese population was 12.7±1.7 mm in males, 10.2±1.3 mm in females; 11.5±1.9 mm on the right and 11.4±1.9 mm on the left.[8] In present study, the thickness of the clavicle was 13.34±3.24 mm in males and 11.62±3.08 mm in females; 12.71±3.39 mm on the right and 12.25±3.20 mm on the left.

The costaclavicular space is a triangular space, the medial part of the anterior clavicle, m. subclavius and tendon and the corticlavic ligament. Posteromedialde the 1st rib and m. scalenius anterior and m. Scalenia medius adhesions are restricted by the upper edge of the scapulae, posterolateral. Congenital anomalies or acquired alterations of the first rib and clavicle cause narrowing of this region leading to compression of neurovascular structures.[1] Oh JK et al recorded 1. costa clavicula intervals as 9.34±3.06 mm on the right and 9.14±3.13 mm on the left.[9] They also reported no bone margins in this area in 5 cases.[9] In present study, these values were determined as 12.16±3.66 mm for males and 11.38±3.05 mm for females. When the right and left sides were compared, it was determined as 11.76±3.20 mm on the right and 11.77±3.58 on the left. Present study did not reveal the closed bone gap.

The cervical cost is usually a cost of 7th cervical vertebra. The accessory is also referred to as jeans and can be observed bilaterally. The cervical costa often joins or cooperate with the first anterior region. It is mostly asymptomatic and is found incidentally on lung or cervical graphs. Sometimes it comes out as a swelling that is deeply palpated.

Kökoğlu et al found that the frequency of cervical costume in the community was 0.5-2% in their studies and they stated that they were seen more in females than in males.[10] On the other hand, Argüder et al determined the incidence in the society to be 0.2-8% and at the same time they reached the result of being seen more in women than in men.[11]

In present study, a total of 26 (13%) side cervical costa was detected. Eight of these were recorded on the right side of the women, 6 on the right side in men, 7 on the left side in women, and 5 on the left side in men. The incidence of cervical costa was not correlated with gender or with the partners.

Authors believe that the results obtained in present study will be useful in the surgeon, radiology and anatomy training, contributing to the literature.

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