

An Anomalous Incidence of a Cervical Rib-A Radiographic Case Report

VINODHINI P., SENDIL KUMAR, MAMATHA H., ANTONY SYLVAN D'SOUZA

ABSTRACT

The 7th cervical vertebra or vertebra prominence is visible and palpable for its long spinous process at the lower end of the nuchal furrow. The costal lamella is thin and partially deficient or may separate as a cervical rib. During the routine radiologic interpretation of a chest X-ray, in the Department of Radiology, Kasturba Medical College, Manipal, India, we observed a case of right cervical rib, in a 30 years old woman. The patient came to the OPD with the complaints of swelling along the arms, pain, feeling of pins and needles in her affected right arm.

The cervical rib is a supernumerary rib arising from a cervical vertebra, an elongation of the transverse process of the seventh cervical vertebra. However, cervical ribs are accessory or additional ribs that are permanent dysmorphological structures, forms an important cause for neurovascular compression and consequent muscular and cutaneous symptoms at the thoracic inlet and beyond into the upper extremity. Accessory ribs are permanent structures in contrast to ossification sites that disappear postnatally, probably becoming part of the lateral transverse vertebral processes.

Key Words: Cervical rib, Thoracic outlet syndrome, Neurovascular disturbances

INTRODUCTION

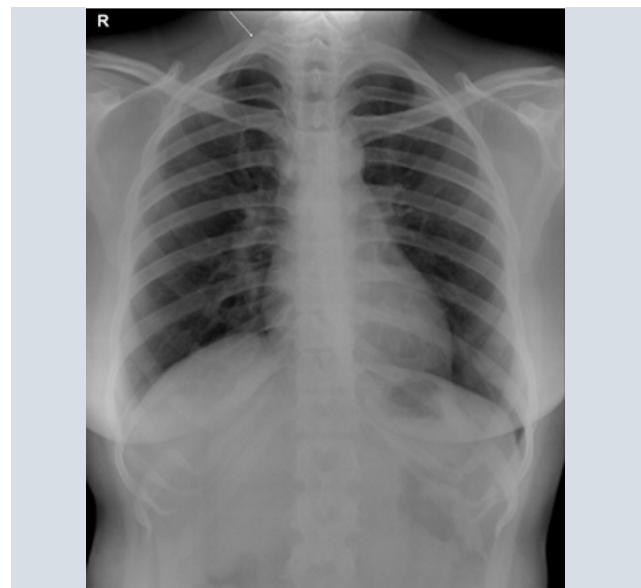
The 7th cervical vertebra or vertebra prominence is visible and palpable for its long spinous process at the lower end of the nuchal furrow. The ribs are 12 pairs of elastic arches that articulate posteriorly with the vertebral column. Their number may be increased by cervical or lumbar ribs or reduced by the absence of the twelfth pair. A cervical rib is the costal element of the seventh cervical vertebra, often it has an head, neck and tubercle. When a shaft is present, it is of variable length, and extends anterolaterally into the posterior triangle of the neck, where it may end freely or join the first rib or costal cartilage. A cervical rib can be partly fibrous, being its effects unrelated to the size of its osseous part [1].

It is related to first thoracic rib, lower trunk of the brachial plexus and Subclavian vessels which are superior and prone to suffer compression in a narrow angle between rib and Scalenus anterior. Hence cervical ribs may first be revealed by nervous and vascular symptoms, particularly those caused by pressure on the eighth cervical and first thoracic spinal nerves [2, 3].

CASE DESCRIPTION

During the routine radiologic interpretation of a chest X-ray [Table/Fig-1], in the Department of Radiology, Kasturba

Medical College, Manipal, India, we observed a case of right cervical rib, in a 30 year old woman. The patient came to the OPD with the complaints of swelling along the arms, pain, feeling of pins and needles in her right arm.



[Table/Fig-1]: The chest radiograph illustrating the presence of a cervical rib on the right side of a 30 years old female patient. The arrow indicates the cervical rib

DISCUSSION

The cervical rib, a supernumerary rib, an elongation of the transverse process of the seventh cervical vertebra are permanent dysmorphological structures, induced by xenobiotic or maternal stress, forms an important cause for neurovascular compression and consequent muscular and cutaneous symptoms [3]. Accessory ribs are permanent structures in contrast to ossification site that disappear postnatally, probably becoming part of the lateral transverse vertebral processes. Cervical ribs are normally present in crocodiles [4].

The correlation of symptoms must be due to mutual influences of the notochord, neural tube, neural crest, and somites during the time of somite formation. An incidence of 25% cervical ribs was found along with childhood carcinomas. HOX genes play an important role in the patterning of the axial skeleton in all vertebrate classes. In mammals Hox genes are involved in patterning of the skeletal axis and in its proliferation, whereas the neuronal problems are a direct consequence of the aberrations in the regulation of Hox genes. During embryological development, each segment contains spinal nerve, meroblastic tissue which will form a rib or the costal element of a vertebra. An extensive studies of adults found cervical ribs to be more common in females and on the right side [5].

In the cervical and the lumbar regions the developing nerve takes precedence over the rib so that development of a rib at these levels is prevented. The costal element of the 7th cervical vertebra was normally present as a separate entity in the cervical region in the fetus, which disappears after birth by becoming incorporated by synostosis into the transverse process of the associated vertebra [5, 6].

The embryonic nerve trunks are larger in proportion to the vertebra and ribs. The obliquely running nerves impede the growth of the ribs, therefore discouraging them to form vertebral processes. Ribs are normally present in the fetus in articulation with vertebrae above the eighth, and after birth they are present only as transverse processes of the cervical vertebrae. The extent of growth of a cervical rib is determined by the resistance of the nerve in its path. The complete cervical rib extends forward and downward between the Scalenus anterior and Scalenus medius muscles to meet the costal cartilage of the first rib [7, 8].

The effect of a cervical rib is to raise the artery in the neck, thus sharpening the smooth curve, arching over the first rib. Any drag on the arm will angulate the artery over a rigid structure, and a common complaint of these patients is inability to carry a heavy package on the affected side. The end result may be ischaemic contracture of forearm and hand, or a major amputation, following occlusion of the main vascular channels by embolism or thrombosis [9].

The lowest trunk of the brachial plexus is intimately related to a cervical rib more often than is the subclavian artery, suggested that vascular symptoms associated with such a rib might be due to paralysis of the sympathetic fibers running in this trunk [9, 10].

In our present case, the presence of a right cervical rib, presume to cause the right Subclavian vascular compression known as Thoracic Outlet Syndrome: [TOS]. Such an Arterial TOS would have been the result of emboli arising from subclavian artery stenosis or aneurysms. Symptoms of digital ischemia, claudication, pallor, coldness, paresthesia, and pain in the hand but seldom in the shoulder and the neck are analyzed during outpatient medical examination and X-rays almost disclose a cervical rib of osseous type with a round end. Our findings coincide with the cases having complications due to arterial emboli arising either from mural thrombus in a Subclavian artery aneurysm or from thrombus forming just distal to Subclavian artery stenosis. TOS is the most difficult-to-treat entrapment neuropathy encountered by neurosurgeons. Surgical intervention is indicated for patients with vascular and true neurogenic symptoms [11, 12].

The etio pathogenesis can be explained by the pressure and functional disturbances on the neurovascular bundle in the supraclavicular fossa or in the costoclavicular space. Such pressure may be caused by tightening, fibrosis or hypertrophy of the anterior scalene muscle, the pressure of a cervical rib, narrowing of the costoclavicular space. The pain in the shoulder and the arm was occasionally relieved by elevating the shoulder on a pillow [11, 12].

An attempt being made to resect the rib along with the division of intervening bands, the cervical trunks and the neurovascular bundles are repositioned in order to escape further entrapment.

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