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A Case Study of Conservative Management for Cervical Rib Induced Thoracic Outlet Syndrome

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Abstract: ***Background:*** *Cervical ribs, commonly addressed as accessory or neck ribs, are rare congenital supernumerary ribs arising from the seventh vertebra. This anatomic variant's prevalence is believed to be underreported as only symptomatic cases are brought to attention, whether unilateral or bilateral. A gender preference is observed, with the condition being twice as prevalent in women as men. Thoracic outlet syndrome (TOS) is caused by the compression of the subclavian artery/vein and/or the brachial plexus as they traverse through the thoracic outlet. TOS development is the leading clinical picture of discovery and morbidity associated with cervical ribs; such ribs are large and frequently fused to the first rib. This placement also predisposes to aneurysm formation or thrombosis[1]. Cervical ribs have been associated with mutations in the HOX genes responsible for constructing axial skeleton patterns. Owing to their rarity, it has been challenging to establish a familial pattern. Cervical ribs have an estimated prevalence of 2% in the general population and 8.3% of those with thoracic outlet syndrome symptoms[2]. Case Presentation: 38-year-old healthy female presents with intermittent hand numbness and tingling along the C8 distribution that worsened with sewing work. She reported at times; her symptoms had gotten bad enough for her to temporarily lose sensation in her fingertips. Records review revealed an x-ray confirming cervical rib on the left side. Results: After the treatment of surrounding dysfunctions without improvement in symptoms, the cervical rib was identified, manually isolated, and treated with interferential current (lFC), moist hot pack (MHP), manual therapy and therapeutic exercise; this treatment provided immediate resolution of her symptoms. She remained asymptomatic for 10 days after treatment. A repeat treatment at two weeks resulted in resolution of her symptoms as far out as 1 month. Conclusion: At the end of two and half weeks of an outpatient physical therapy program including interferential current (lFC), moist hot pack (MHP), manual therapy and therapeutic exercise, the patient reported a significant reduction in the frequency and intensity of her symptoms as an effective option in the conservative management of thoracic outlet syndrome.*

Keywords: cervical ribs, neck ribs, vertebra, thoracic outlet syndrome

1. Introduction

Thoracic outlet syndrome encompasses three related syndromes: compression of the brachial plexus (neurogenic TOS), compression of the subclavian artery or vein (vascular TOS), and a non-specific or disputed type of TOS[3].

Neurovascular compression may be observed most commonly in the interscalene triangle, but has also been described in the costoclavicular space and subcoracoid space.

Clinical features may include pain in the shoulder and neck region, which radiates into the arm, paresis or paralysis of muscle innervated by branches of the brachial plexus, loss of sensation, reduction of arterial pulses in the affected extremity, ischemia, and/or edema[3].

Neurogenic TOS (NTOS) is the most common form of thoracic outlet syndrome, comprising well over 90% of all TOS patients[4] and according to Hooper et al a majority of patients with neurogenic TOS can be expected to improve with proper conservative treatment[5]. However, Novak et al found that poor outcomes to conservative therapy were associated with obesity, worker's compensation, and double crush pathology involving the carpal or cubital tunnels[6].

Since one of the areas of neurovascular entrapment is the costoclavicular space between the clavicle and first rib, it should logically follow that widening this space would be advantageous. One such conservative method to achieve this would be to use a mobilization to manually depress the first rib. However, research supporting the use of manual therapy in the treatment of TOS is scarce[7].

The purpose of this case study is to further explore the efficacy of manual therapy, to relieve the symptoms of a 38year old female, suffering from TOS.

2. Report of Case

A healthy 38-year-old female presented with a 10-year history of intermittent left hand numbness and tingling. Her symptoms had originally started in high school with an increase in overhead activities when she started playing volleyball. The patient described symptoms to be isolated in the C8 distribution intermittently during this time. The patient more recently noted that symptoms worsened after sewing regularly and were exacerbated with military posture (i.e shoulder depression with external rotation). Radial pulses were symmetric bilaterally. Reflexes at the triceps, biceps brachii and brachioradialis were 2/4 bilaterally. Upon record review, the patient had radiologic evidence of a left-sided cervical rib attaching primarily to C7 with a minor attachment to T1. Direct pressure inferiorly on the rib reproduced patient's symptoms.

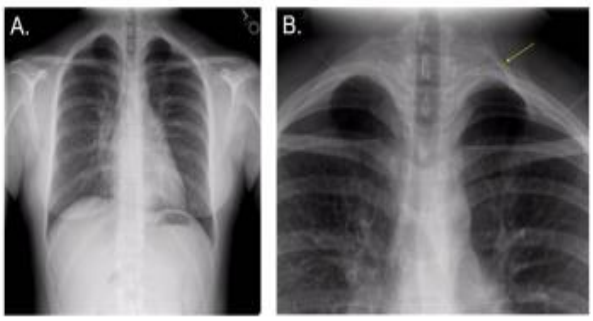

Figure 1: Radiological evidence of left sided cervical rib

The patient was placed in the supine position and the cervical rib was manually isolated with a finger of provider's left hand along the superior shaft of the rib and the tip of that finger contacting the tip of the rib. Motion restriction was most notable with attempted elevation of the rib. The rib was treated with direct myofascial release with respiratory assistance. Superior pressure was provided by the operator's ipsilateral distal digit. The distal phalanx of the provider's digit was wrapped around the anterior tip of the cervical rib.

Following treatment, symptoms had resolved, even with military posture. The patient remained asymptomatic for ten days after the initial treatment. She was seen two weeks after this initial treatment, and a repeat treatment of the cervical rib with the above listed method was performed. The patient then remained asymptomatic at rest greater than a month in the post-treatment observation period.

3. Discussion

Cervical ribs are common in patients with thoracic outlet syndrome, and treatment for these patients typically includes physical therapy followed by surgical intervention for non-responders. We propose that OMT, with a focus on direct myofascial release, may be effective in alleviating symptoms for patients with cervical ribs. A limitation of this study is that it is a case report of one young active female. A larger study that includes various ages, activity levels, and both sexes would be more generalizable.

The primary purpose of this study was to evaluate the effectiveness of mobilization in the treatment of thoracic outlet syndrome in a symptomatic 38- year-old female. At the conclusion of two and half weeks of an outpatient physical therapy program including interferential current (lFC), moist hot pack (MHP), manual therapy and therapeutic exercise, the patient reported a significant reduction in the frequency and intensity of her symptoms. This reduction made the patient's symptoms very manageable, allowing her to avoid the need for surgical intervention. While literature investigating manual therapy in the treatment of thoracic outlet syndrome is very limited, our results show a manual depression of the 1st rib to be an easy, effective option in conservative management of thoracic outlet symptoms.

4. Conclusion

At the end of two and half weeks of an outpatient physical therapy program including interferential current (lFC), moist hot pack (MHP), manual therapy and therapeutic exercise, the patient reported a significant reduction in the frequency and intensity of her symptoms as an effective option in the conservative management of thoracic outlet syndrome.

5. Limitations

Some limitations of this case report include the absence of a functional assessment, the treatment of only one patient, and possible variations in the performance of the afore-mentioned special tests. Thus, the findings of this case report should be applied to the general public with caution.

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