

Rare First Rib Pseudoarthrosis with Thoracic Outlet Syndrome in Pediatric Gymnast: A Case Report

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INTRODUCTION

Due to the shape and location of the first rib, fractures are uncommon, especially in the pediatric population [1,4]. As children grow, bone stiffness increases, and their bones are more likely to buckle under impact [2]. Rarely does a patient develop pseudoarthrosis of a first rib fracture, and if so, they are historically asymptomatic. Thoracic outlet syndrome is often missed in the pediatric population [5]. Conservative treatments of thoracic outlet syndrome include physical therapy and activity modifications. Absolute treatment of thoracic outlet syndrome is surgical decompression with removal of the first rib [5]. Although all three conditions are rare in a child, this case highlights the importance of having a high clinical index of suspicion in recurrent pain in pre-pubertal athletes.

CASE

- 10-year-old Caucasian male gymnast with past medical history of seasonal allergies. He presented with three-month history of worsening left shoulder pain with a "tic" type movement consisting of hyperextension of the left shoulder but denied weakness. Chest X-ray was read as normal. After 2 years of physical therapy, the patient's mother noticed atrophy to the left upper scapula region and vague weakness of the left upper extremity.
- MRI of cervical spine and CT chest with 3D reconstruction identified "vacuum phenomenon of left first rib suspicious for pseudoarthrosis."
- Diagnosed with isolated first rib fracture, resultant pseudoarthrosis of the first rib, and the development of symptomatic thoracic outlet syndrome.
- The patient underwent a surgical removal of the left first rib to relieve the pressure on the brachial plexus that was causing his thoracic outlet syndrome.
- The patient recovered and the pain, "tic", weakness, and atrophy drastically improved. He returned to gymnastics within a few weeks.

IMAGING RESULTS



Figure 1



Figure 2

Figure 1. CT bone reconstruction showing pseudoarthrosis of left first rib that compressed the brachial plexus resulting in thoracic outlet syndrome.

Figure 2. Axial CT scan revealing pseudoarthrosis of left first rib with vacuum phenomenon.

CONCLUSION

- Children involved in high impact sports are subject to fractures due to the muscles pulling on the bone [2].
- During growth spurts, children are less flexible due to the increase in bone length and are more prone to injuries [2].
- Children, especially in high impact sports such as gymnastics, who present with recurrent shoulder pain not relieved by physical therapy should have imaging to rule out a stress fracture.
- Our patient not only had a first rib fracture, but also had incorrect healing of the fracture leading to pseudoarthrosis and eventual symptomatic thoracic outlet syndrome.
- With the continued failure of conservative treatment for pain, more imaging studies should be ordered to evaluate for any missed pathologies.
- Removal of the first rib is a definitive treatment and should be considered if the patient's thoracic outlet syndrome symptoms do not improve with conservative measures such as lifestyle modifications or physical therapy.

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