

SHOULDER PAIN – DON'T FORGET FIRST RIB FRACTURES

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Abstract

First rib fractures are uncommon, mainly in paediatric population, considering its anatomic features and their skeleton plasticity. Traditional teaching usually characterizes it as a hallmark of severe trauma. Herein, to unfold awareness to an unnoticed diagnosis, we describe two paediatric cases of isolated first rib fracture in adolescents without a clear identifiable cause nor an underlining trauma mechanism. Neurovascular injuries should always be investigated, as fracture of the first rib with ensuing callus formation is a rare but fearing cause of thoracic outlet syndrome. We highlight the scarcity of reports on isolated first rib fractures outside of sports medicine, as well as the importance of considering this otherwise easily missed diagnosis in a common complaint in children.

Keywords: First rib; paediatric trauma; shoulder pain

INTRODUCTION

Fracture of the first rib is relatively uncommon because of its anatomic features.¹ In children, its incidence is particularly low because of the higher elasticity and plasticity of the paediatric skeleton.² It may be the result of trauma, violent muscular avulsion, or fatigue, but traditional teaching and thinking dictates that fracture of the first rib is a hallmark of severe trauma, often requiring computed tomography imaging or arteriogram.^{3,4} However, more and more reports of first rib fractures have been published regularly regarding young athletes⁴, swimmers⁵, boxers⁶, football¹, rugby and American football players and even weightlifters⁴, all treated in conservative manners without long-term impact.

METHODS

Herein we add two more cases of isolated first rib fracture in adolescents, although unrelated to sport athletes and without a clear identifiable cause.

CASE HISTORY 1

A 16-year-old male presented to the Emergency Department following a 50cm fall of his bed that morning

exacerbating a 2-week pain in his left shoulder. He also reported practicing punching a boxing bag at home for 2 years, and a bullying incident at school where the left arm was strongly pulled off, both without temporal association to the beginning of complaints. He denied shortness of breath or pleuritic chest pain and physical examination reported pain on full abduction of his left shoulder. There was no neurovascular abnormality of the upper limbs. A plain chest of thorax and left shoulder was obtained, demonstrating an isolated first rib fracture (Figure 1). Patient was discharged on analgesics and rest over a period of three weeks.

CASE HISTORY 2

A 15-year-old boy male presented to the Emergency Department due to a vague left shoulder pain for the last month, without any trauma or noticeable cause. He practiced street skating and biking as hobbies, but none of the falls paired with the beginning of complaints. His physical examination did not add much but on plain film an isolated left first rib fracture was noticeable (Figure 2). Patient was discharged on analgesics and rest over a period of three weeks.

Both patients made an uneventful recovery, returning to their daily routines without pain and with no movement limitations, as confirmed during the two-year follow-up.



Figure 1 Left first rib fracture stressed out with a blue arrow.



Figure 2 Thoracic X-ray displaying a left first rib fracture, highlighted by a blue arrow.

DISCUSSION

Isolated fractures of the first rib are uncommon, but have been documented in sports medicine, whether in collision sports or stress fractures in noncontact sports. However, there is a scarcity of reported cases while performing every-day activities such as a morning stretch⁷ and our two reports.

Five mechanisms have been categorized to cause first rib fracture such as direct trauma, indirect trauma through anterior chest or sternum, violent muscle contraction, fatigue fracture and due to unidentifiable cause. Violent muscle contraction of the neck musculature is also believed to be the cause of many sports-related first rib fractures and could justify our first case. When considering infants, child abuse must be thought about. Possible mechanisms include impact force, compressive force, and shaking or acute axial load (slamming).²

Patients will generally present with nonspecific symptoms of the shoulder girdle. It can radiate to the neck or deltoid and can also acquire a pleuritic nature. It can easily mislead raising concern about shoulder pathology. In physical examination, the “trapezius squeeze test”, as pain with deep palpation and squeezing of the musculature above the first rib, has been suggested as a strong indication of first rib injury.⁸ Other possible physical findings are ecchymosis and bone crepitus. Neurovascular injuries should always be investigated, as thoracic outlet syndrome (TOS) is a rare but fearing documented consequence.⁹ They can present later with neurogenic symptoms due to brachial plexus extrinsic compression or even rarely with Paget-Schroetter syndrome due to subclavian vein repetitive compression and thrombosis.¹⁰ Both caused by an enlarged callus formation combined with young athlete’s muscle hypertrophy that may even require surgical treatment.⁹

First rib fracture is normally visualised with chest radiographs and radiographs of the thoracic ribs as a simple linear crack. Extensive work-up is needed only according to patients’ symptoms and injury mechanism. Therefore, it is rarely necessary in first rib fractures caused by stress or muscle pull.⁶

Conservative management typically includes rest, possibly a sling for comfort, analgesics and gradually returning to usual activity.

CONCLUSION

First rib fractures are uncommonly reported without major trauma involved, but whenever children refer to shoulder pain it should come up as a differential diagnosis. Awareness is important for early recognition and proper management is key for a pain-free return to normal life and documentation to early diagnosis future complications.

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