

CASE REPORT

Ossification of coracoclavicular ligament in complete paraplegia: a case report

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STUDY DESIGN: A case report.

OBJECTIVES: The objective of this study was to highlight the possible etiological factors and functional implications of coracoclavicular ligament ossification in a man with paraplegia.

SETTING: This study was conducted in King Fahad Medical City, Riyadh, Saudi Arabia.

METHODS: A 25-year-old man was admitted as a case of complete traumatic spinal cord injury (SCI) at the T3 level for comprehensive rehabilitation after 4 months of injury. He also had a right clavicular fracture, which was managed conservatively. During his rehabilitation course, he complained of chronic right shoulder pain, which limited his activities of daily living, transfers and wheelchair mobility.

FINDINGS: His shoulder examination was unremarkable for impingement but range of motion was restricted, which rendered the need for imaging. A computed tomography scan showed ossification of coracoclavicular ligament, illustrating a rare synostosis between the clavicle and scapula. In addition to pain management, the patient was trained on shoulder conservation techniques for performing functional tasks and showed enhanced independence in various activities of daily living.

CONCLUSION: SCI has an association with neurogenic heterotopic ossification (HO), which usually develops below the level of injury. A low threshold for investigating HO may be considered at fracture sites even if they are above the level of SCI, for early prevention and treatment of this disabling complication. The abnormal cross-union between the clavicle and the scapula owing to HO can alter the mechanics of the shoulder girdle along with soft tissue injuries and early degenerative changes. Formation of shoulder HO can be particularly accelerated in SCI patients due to excessive use of upper limbs and to the neurogenic nature of the injury.

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INTRODUCTION

Shoulder heterotopic ossification (HO) in patients with paraplegia is a rare finding, as HO usually does not occur above the level of the lesion.¹ However, ossification of coracoclavicular (CC) ligament associated with a clavicular fracture in a patient with paraplegia has not been reported in the literature before. Formation of HO may be particularly accelerated in patients with paraplegia due to excessive use of their upper limbs. In addition, neurogenic factors due to spinal cord injury (SCI) may accelerate its development. This can have devastating effects on the quality of life of these patients, as they are heavily dependent on their upper limbs for their functional activities. We report a rare presentation of a man with paraplegia, whose activities were limited due to ossification of the CC ligament of the right shoulder.

CASE REPORT

A 25-year-old male college student was admitted with SCI American Spinal Injury Association Impairment Scale A at the T3 level for a comprehensive rehabilitation program after 4 months of sustaining a motor vehicle accident. His trauma resulted in compression fracture of T3 and fracture of the middle-third of the right clavicle. Both fractures were treated conservatively. His initial management

was carried out at a facility in an underdeveloped area with lack of comprehensive rehabilitation services. At the time of admission to rehabilitation, he required maximum assistance in most of his activities of daily living, transfers and mobility. During his rehabilitation course, he complained of chronic right shoulder pain, which interfered with his dressing, pressure relief, transfers and wheelchair mobility. Clinical examination revealed diffuse tenderness over the right shoulder without any deformity or signs of inflammation. Range of motion (ROM) was limited in shoulder flexion and overhead abduction by 30 and 40 degrees, respectively. Special testing was negative for acromioclavicular (AC) joint pathology or impingement. X-ray anteroposterior view of the right shoulder showed a previously healed fracture and callus formation at the middle-third of the right clavicle with an intact AC joint. His symptoms were considered to be due to immobility of the right shoulder after clavicular fracture. He was started on Ibuprofen 400 mg three times daily, tramadol 50 mg half before therapy sessions and acetaminophen 500 mg Q 6 hourly as PRN. He underwent stretching, strengthening and ROM exercises along with functional training. There was no improvement in his shoulder pain or ROM after 4 weeks of physical and occupational therapy, medications and use of modalities including ultrasound.

Owing to concerns of increasing pain during functional activities and persistently limited ROM at the right shoulder,

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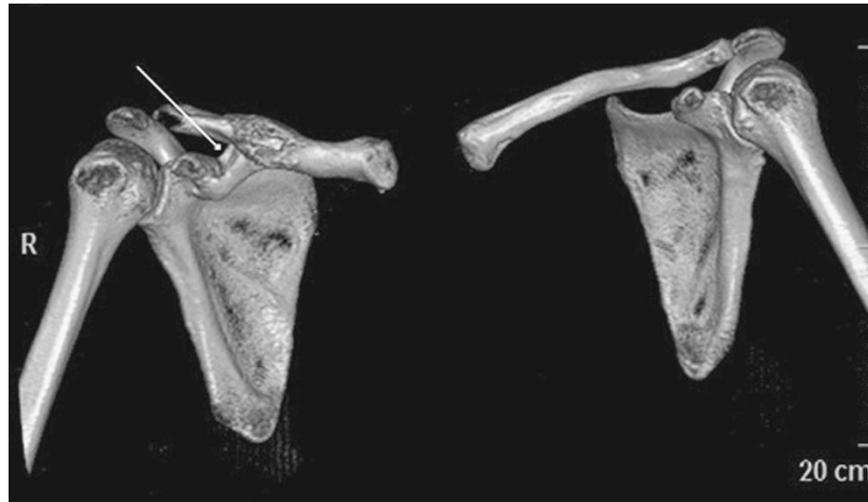


Figure 1. CT scan of both shoulders with three-dimensional reconstruction illustrating ossification of the coracoclavicular ligament as a synostosis between the mid-clavicle and the coracoid process of the scapula. Due to this bony bridge, the scapular movements are restricted, and the clavicle and the scapula act as a one-bone unit.

further imaging with a computed tomography scan was done, which showed an old displaced fracture of the right mid-clavicular shaft with exuberant callus formation growing toward the origin of the coracoid process from the scapula and forming a synostosis (Figure 1). His pain and restricted range of the right shoulder were attributed to cumulative effects of HO of the CC ligament and altered shoulder mechanics. The patient was trained on conservative therapeutic approaches including relative rest, weight-loss program and environmental modifications to reduce mechanical load and muscular demand. Individualized training was focused on ergonomics, appropriate equipment selection and environmental adaptation. Wheelchair modifications, transfer techniques and pressure-relief skills were tailored to accommodate his shoulder limitations and high level of thoracic injury. At the time of discharge, he required supervision to minimal assistance in transfers using a transfer board, and he was able to propel his own wheelchair for short distances. Long-distance wheelchair propulsion was limited owing to pain and restricted ROM. He was discharged on indomethacin 25 mg three times orally daily and advised to continue outpatient therapy. The magnetic resonance imaging and bone scan were planned to further evaluate shoulder pathology, but could not be done as the patient was lost to follow-up.

DISCUSSION

The incidence of ectopic bone formation has been reported to be 10–53% after SCI.² There is an increased incidence of HO in patients with complete lesions. Traumatic SCI tends to have a higher incidence of HO as compared with nontraumatic SCI.³ Twenty to thirty percent of patients with SCIs are reported to have clinically significant HO with a reduction of joint ROM, whereas 3–8% of the SCI patients develop ankylosis.² In patients with paraplegia, HO has been reported to be ranging from 29 to 60%, with highest incidence in patients having flexion injuries of thoracic vertebrae.⁴ Another type of HO is traumatic myositis ossificans, which is localized to the site of injury surrounding the bones and joints. It usually follows fractures and orthopedic surgeries. Little has been reported on HO of the shoulder after clavicular fractures, but trauma in general increases the risk of HO.⁵

In our case, HO involved the CC ligament and resulted in synostosis of clavicle and scapula. Due to the presence of an

ossified bridge between the two bones, scapula and clavicle can be considered a single-bone unit. This would alter the dynamic forces acting on the lateral part of clavicle, especially the AC joint, and limit the scapular movements as well. This can explain restricted shoulder flexion and abduction in our patient. Cross-union between the clavicle and coracoid process of scapula will change the mechanics of shoulder girdle movements and can lead to strain of muscles, ligaments and joint capsules in the short term, and degenerative changes in the long term. This process will be particularly accelerated in SCI patients due to the neurogenic nature of injury and excessive use of upper limbs. This will have devastating effects on the life of SCI patients, as they are greatly dependent on their upper extremities. In presence of a major injury like SCI, clavicular fractures can be considered minor and they can be overlooked. Earlier detection of HO can direct the rehabilitation strategies towards preserving joint function, improving functional outcomes and preventing debilitating complications. As early HO may not be clearly evident on plain X-rays, aggressive exercises to improve the range of motion can further accelerate its formation, worsen the symptoms and predispose to mechanical restriction of joints when synostosis sets in. Another important factor is the use of heat or other modalities for treating pain and joint stiffness. Data regarding modalities is still limited for treatment of HO. Theoretically; heat modalities may actually precipitate the formation of HO due to high vascularity. Regular follow-up is required owing to concerns of associated ligamentous injuries secondary to mechanical instability of the shoulder. In SCI, the functional outcomes of surgery for HO associated with clavicular fracture are not known. This study suggests keeping a low threshold for investigating a fracture site for HO, even if it is above the level of SCI. It also supports the idea of prophylactic treatment of HO in similar situations.

COMPETING INTERESTS

The authors declare no conflict of interest.

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