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Nuchal ligament detachment: A rare clinical case

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Abstract

Background: Nuchal Ligament is a flat, membranous ligament in the cervical spine extending from External Occipital Protuberance to the 7th vertebrae of the cervical spine (C7) and provides stability to spinal cord and allows the head to stay in the upright position.

Case Presentation: A 43-yo-male presents to the clinic with neck pain for past 2 weeks which started after lifting a refrigerator at his home. Conservative management has not provided much relief as the pain is constant and sharp in nature. Physical Exam is positive for neck tenderness with full range of motion, intact upper extremity muscle strength bilaterally, with no swelling or edema present.

Discussion: Detachment of Nuchal Ligament is a very rare clinical finding with very limited research conducted about it. It is important for the clinician to keep nuchal ligament detachment in mind when dealing with a patient who has sustained an injury after a loaded rotational movement.

Keywords: Nuchal ligament, prolotherapy, cervical spine

Introduction

The nuchal ligament is a fibroelastic tissue that extends from the external occipital protuberance to the spinous process of the seventh cervical (C7) vertebrae with an anterior attachment to the C7 spinous process^[1, 2]. The nuchal ligament is a midline structure and is attached to many muscles including the splenius capitis, serratus posterior superior, upper trapezius, and rhomboid minor^[2]. It has been postulated that the nuchal ligament stabilizes the head during rotation and counterbalances the head as it flexes^[2, 3]. Conversely, some believe the nuchal ligament is no more than a fibrous membrane that is not a true ligament^[2]. The nuchal ligament is a delicate structure that is easily damaged during dissection; thus little is known about it^[1]. The careful dissection work done by Johnson *et al.* showed that the structural organization of the nuchal ligament directs forces to the lower cervical spine, via the direct attachment to C6 and C7^[1]. The current belief is that the nuchal ligament serves a protective function to support and stabilize the cervical spine^[1].

Case Presentation

A 43-year-old gentleman with a history only significant for controlled hypertension presented to the clinic with a 2-week history of sharp neck pain that radiates to the interscapular space. The patient reports lifting a heavy refrigerator, at which time he heard a popping sound from his neck. A few hours later his neck pain began and has remained constant since. The patient reports that ice, heat, and ibuprofen provided minor temporary relief. He denies loss of consciousness, paresthesia, numbness or tingling, or weakness. The patient reports no significant family history or history of drug or alcohol use. At the time of presentation, vital signs were all within normal limits. Physical exam showed tenderness to palpation along the posterior aspect of the neck but was otherwise unremarkable. There is not presence of erythema or deformity. Full range of motion is noted in all upper extremity joints with intact bilateral muscle strength. Biceps, Brachioradialis, and Triceps reflexes are 2/4 with intact sensation in upper extremities. Spurling Test for Cervical Radiculopathy and Adson's Test for Thoracic Outlet Syndrome were negative. An x-ray of the cervical spine showed increased range of motion in flexion and evidence of posterior cervical soft tissue damage.

An MRI of the cervical spine demonstrated a complete transection of the ligamentum nuchae (Nuchal ligament).



Image 1: Stable Cervical Spine



Image 2: Flexion without listhesis



Image 3: Small disc bulge at C4-5 without central narrowing. Detachment of ligamentum nuchae from spinous process at C7 with a posttraumatic fluid collection and soft tissue thickening.

Upon reviewing MRI images, due to novelty of the presentation, the patient was offered with multiple different options for treatment. Firstly, option of prolotherapy was discussed with the patient. Prolotherapy is a non-surgical ligament and tendon reconstruction via regenerative joint injection [6]. It helps body produce new collagen and stimulated body's natural healing ability. A surgical option was also discussed with the patient in which there could be a possible reattachment of the avulsed ligament. Lastly, patient was given the option to consider taking corticosteroid shot for pain relief. After weighing the available options, patient chose to get corticosteroid shot for pain relief and was referred to a pain management specialist.

Discussion

The significance of this case is the rarity of an isolated nuchal ligament transection injury. Sorimachi *et al.* describes a case report of a decapitation suicide attempt which resulted in transection of the nuchal, interspinous, and flavum ligaments [5]. This case showed the importance of these ligaments in cervical stability and their direct clinical impact on airway management [5].

Another documented injury involving the nuchal ligament is a "clay shoveler's fracture", which is an avulsion of the lower cervical or upper thoracic spinous process due to the forceful unilateral pulling of the trapezius or rhomboid minor muscles [4]. The trapezius muscle originates from the nuchal ligament at C7 and could be involved in this type of injury. The attachment of multiple muscle groups to the nuchal ligament plays an integral role in stabilizing and balancing between these pulling forces. Due to the decline in manual labor in western countries, the "clay shoveler's fracture" is now most commonly seen in repetitive sport related injuries [4]. The typical management of a "clay shoveler's fracture" is conservative therapy consisting of a cervical collar, analgesics, and rest.

Conclusion

Our patient's injury is constant with the biomechanical forces described above. However, on imaging our patient did not have any signs of an avulsion fracture. It is important for the clinician to keep nuchal ligament detachment in mind when dealing with a patient who has sustained an injury after a loaded rotational movement. There is a very limited amount of literature available regarding nuchal ligament detachment and treatment. Due to the significant function it performs such as providing stability to the spinal cord and holding the head in upright position, further research to explore the mechanics of detachment of nuchal ligament and possible treatment should be conducted.

Conflict of Interest

Not available

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