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Case Report

Cervicogenic Dizziness after Humeral Fracture: A Case Report

Fateme Bokaee*

Assistant Professor, Department of Physical Therapy, School of Rehabilitation Sciences, Isfahan University of Medical Sciences, Isfahan, Iran

*Corresponding author: Fateme Bokaee; Department of Physical Therapy, School of Rehabilitation Sciences, Isfahan University of Medical Sciences, Isfahan, Iran. Tel: +98-3137925046; Email: fatemebokaee@yahoo.com

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Abstract

Background: Cervicogenic dizziness is a nonspecific sensation of disequilibrium in the space. Abnormal proprioceptive inputs from the cervical spine and neck muscles may induce cervicogenic dizziness. Trigger-point activation of the suboccipital muscles may be related to cervicogenic dizziness. This case study aimed to present a case of cervicogenic dizziness after humerus fracture.
Case Report: The present case report describes a 38-year-old man who was referred for physiotherapy to restore the motion of his right shoulder after surgery for a humerus fracture. The patient reported dizziness after the shoulder surgery. The patient had no medical problems that could induce dizziness. Physical examination revealed a trigger point activation of the suboccipital muscles. Myofascial release and chin-tuck exercises were performed, and the patient reported improvement in dizziness. Trigger point activation of the suboccipital muscles in this patient may be related to abnormal head posture during shoulder surgery and/or impaired scapulohumeral rhythm and overactivity of the cervical muscles participating in shoulder elevation.
Conclusion: The possibility of cervicogenic dizziness should be considered after humeral fractures.

Keywords: Dizziness; Humeral Fractures; Myofascial Release Therapy; Spine; Trigger Points

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Background

Cervicogenic dizziness is a nonspecific sensation of disequilibrium and altered orientation in the space originating from abnormal input from the cervical spine. The pathophysiology of cervicogenic dizziness is unclear and there have been no diagnostic clinical tests. However, some criteria can be used to diagnose this disease. Particular neck position or movement aggravates cervicogenic dizziness, and the management of cervical dysfunction improves it (1, 2).

Cervicogenic dizziness can result from mechanical dysfunction, trauma, inflammation, and degeneration of the cervical spine (3, 4). Abnormal proprioceptive input from the neck muscles and cervical spine may cause sensory mismatch and induce a physiological basis for cervicogenic dizziness. Trigger-point activation and myodural bridges of the suboccipital muscles may be related to cervicogenic dizziness. The suboccipital muscles have a higher muscle spindle density than other cervical spine muscles. Muscle spindles control the posture and movement of the cervical spine, act as sensory receptors (5), provide proprioceptive input to maintain head position and movement, and coordinate head and eye movements. Pain, trauma, degenerative changes, or muscle fatigue can change mechanoreceptor function (6). Abnormal somatosensory input from these muscles is considered one of the major causes of cervicogenic dizziness (4, 6). Abnormal head posture may activate trigger points in the suboccipital muscles and cause cervicogenic dizziness (6). This report presents a case of cervicogenic dizziness after humerus fracture.

Case Report

In September 2023, a 38-year-old man was referred for physiotherapy for a fracture of the proximal humerus. He had undergone surgery for a fracture two months ago (Figure 1). The chief complaint of the patient was decreased range of motion (ROM) in the right shoulder after shoulder surgery. He had no history of disease or medication use.

Figure 1. Radiography of the shoulder

On clinical examination, the ROM of the right shoulder was decreased significantly. The ROM of the elbow and wrist was normal. On observation, the right shoulder was elevated compared with the left side. On physical examination, the patient had impaired scapulohumeral rhythm and a shoulder shrug for active shoulder elevation. Palpation revealed tightness of the right cervical muscles, trigger point activation, and tenderness of the

suboccipital muscles. The skin temperatures of the upper extremities were normal. There were no abnormal findings on sensory examination of the upper extremities.

Radiography of the right humerus revealed a fracture of the proximal humerus managed with internal fixators.

To obtain the range of shoulder elevation, upward rotation of the scapula was performed to decrease the overactivity of the upper trapezius muscle and increase the activity of the other upward rotators of the scapula. Facilitation of upward rotation of the scapula decreased overactivity of the upper trapezius muscle and increased shoulder elevation. After four sessions of physiotherapy, the range of shoulder elevation improved, and the patient reported neck pain and dizziness after shoulder surgery. The patient reported no history of dizziness prior to the shoulder surgery and did not report tinnitus, hearing loss, or aural fullness. He reported that dizziness was related to changes in the cervical spine position or movement and to the onset of neck pain. The patient had no history of temporomandibular joint (TMJ) problems. Because there are many causes of dizziness (medications, visual, vestibular, neurological, cardiovascular, and metabolic), the patient was referred to specialists to rule out medical causes of dizziness. The medical cause of dizziness was ruled out. Dizziness in the present case report seemed to be of the cervicogenic type, and this was confirmed after improvement was gained by physiotherapy intervention conducted on the upper cervical spine. Physiotherapy included mobilization techniques for the upper cervical spine and myofascial release for the trigger points of the suboccipital muscles. In addition, the patient was instructed to perform a chin tuck exercise as a home exercise to activate the deep neck flexor muscles, decrease the activity of the suboccipital muscles, and maintain treatment effects.

In the subsequent sessions of physiotherapy, the patient reported that after physiotherapy, dizziness improved and tenderness of the suboccipital muscles decreased.

Printed informed consent was obtained from the patient for presentation of this case report.

Discussion

The present case report describes cervicogenic dizziness after fracture of the proximal humerus. Cervicogenic dizziness is a feeling of unsteadiness resulting from musculoskeletal dysfunction of the cervical spine (2). Some studies have suggested that disruption of afferent signals of the upper cervical proprioceptors to the vestibular nucleus is a contributing factor for cervicogenic dizziness. Abnormal proprioceptive inputs result in inappropriate reports of spatial head and neck orientation. Other studies have reported pain as a possible cause (7).

Sensory balance depends on integrating visual, auditory, vestibular, and proprioceptive input (6). Sensory organ dysfunction or asymmetry of the afferent cues can result in dizziness (8). Previous studies have reported that cervicogenic dizziness is related to disturbances in cervical spine proprioceptors. Proprioceptive inputs from cervical muscle spindles and mechanoreceptors indicate head position. The integration of neck vestibular, visual, and proprioceptive information contributes to balance control and position changes. Aberrant or disrupted proprioceptive inputs from the neck to the vestibular nucleus (pain or mechanical dysfunction) can lead to dizziness (2). Mechanoreceptors of the cervical spine play vital roles in proprioception (9, 10). These receptors are abundant in the spindles of the upper cervical muscles. Muscle spindles detect muscle length and the velocity of length change, and contribute to fine motor control. In addition, the capsule of the facet joints is innervated by nociceptors to estimate head orientation. Cervical dysfunction can result in conflict between joint position sense and muscle perception, impaired interaction between cervical and vestibular inputs, and a sensation of unsteadiness (2).

Physical examination of the present case revealed active trigger points in the suboccipital muscles and neck pain. Both these factors may be predisposing factors for cervicogenic dizziness. Trigger point activation of the suboccipital muscles in the present case may be related to abnormal head posture during shoulder surgery and/or impaired scapulohumeral rhythm and overactivity of the cervical muscles participating in shoulder elevation.

Understanding the role of the suboccipital muscles is important for the management of cervicogenic dizziness. These muscles are sensors that transfer sensory inputs to the vestibular and visual systems (6). In the present case, one possible hypothesis of trigger point activation of the suboccipital muscles may be abnormal head posture during shoulder surgery. Deviation from normal posture imposes abnormal stress on the musculoskeletal system (11). Abnormal head posture affects the tension of these muscles and their ability to maintain tension in the myodural bridge (12). Dysfunction of the myodural bridge is associated with sensorimotor function and postural control (13).

Activation of trigger points can compress capillaries and cause muscle ischemia. Muscle ischemia results in the release of inflammatory mediators and the sensitization of proprioceptors (14). Abnormal proprioceptive cues can increase muscle activity. Trigger points can induce a vicious cycle of dysfunctional proprioception and nociceptive activation. Trigger-point activation of these muscles may be associated with cervicogenic dizziness. Abnormal inputs from the trigger points of the suboccipital muscles transfer abnormal proprioceptive information to the central nervous system (CNS). Abnormal proprioceptive information is mismatched with visual and vestibular information. Mismatched information represents dizziness, pain, lightheadedness, and headache (6).

Present study had some advantages. This case report highlights the important role of the suboccipital muscles in cervicogenic dizziness. Physiotherapy has a great and rapid effect on the management of cervicogenic dizziness, but this study did not have a follow-up to determine the long-term effect of physiotherapy on cervicogenic dizziness.

Conclusion

The present case suggests the possibility of cervicogenic dizziness after a humeral fracture. Cervicogenic dizziness can be managed well with physiotherapy.

Conflict of Interest

The authors declare no conflict of interest in this study.

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