

Spinal Cord Injury Induced When Playing Beach Flags

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Abstract: A 39-year-old man found himself unable to raise his bilateral upper extremities when he stood after trying to grab a flag stuck into the sand by jumping and extending his upper extremities while over-extending his neck. He was transported to our hospital. On arrival, his vital signs were stable. He had bilateral motor weakness at the upper extremities and hyperesthesia at the bilateral C5-C7 area. His lower extremities were intact and functioning. Cervical computed tomography revealed cervical spur formation, and urgent magnetic resonance imaging disclosed disc herniation at the C3/C4 level with mild compression of the spinal cord. He was put on bed rest with a cervical collar. On the second hospital day, his motor weakness and hyperesthesia improved, and he was able to stand and walk as usual. He was discharged on foot that day and referred to a local hospital near his home. To our knowledge, this is the first case report of a spinal cord injury induced when playing Beach Flags. Underlying spinal canal stenosis and pinching effect by hyperextension of the neck during jumping and catching movements in this sport may cause cervical central spinal cord injury in rare cases.

Keywords: beach flags; spinal cord injury; hyperextension.

INTRODUCTION

Beach Flags is a sport created by lifeguards to train beach sprinting and reflexes. The winner is the person quickest to grab a flag stuck into the sand. There have been no medical reports concerning Beach Flags. We herein report a case of spinal cord injury induced while playing Beach Flags.

CASE PRESENTATION

A 39-year-old man who lived in a city visited the Izu Peninsula to attend a Beach Flags sporting event. During the first game, he found himself unable to raise his bilateral upper extremities when he stood after trying to grab a flag stuck into the sand by jumping and extending his upper extremities while over-extending his neck (Figure 1). He tried to grab another flag, but he lost his balance and fell down. As he could not move his upper extremities initially and complained of neck pain, an ambulance was summoned. Emergency technicians diagnosed him with a spinal cord injury, so he was transported by a physician-staffed helicopter to our hospital.

He had a history of appendectomy but had never suffered any neck injury by accident or during sports. His family history was not remarkable. On arrival, his vital signs were as follows: Glasgow Coma Scale, E4V5M6; blood pressure, 118/94 mmHg; pulse rate, regular at 86 beats per minute; and respiratory rate, 14 breaths per minute. He had bilateral motor weakness at the upper extremities (manual muscle test [MMT] score: grade 4 at every extremity) and hyperesthesia at the bilateral C5-C7 area. His lower extremities were intact and functioning. A blood examination demonstrated no specific findings. Whole-body computed tomography revealed no traumatic lesions in either the intracranium or cervical bone, but cervical spur formation was noted (Figure 2). Urgent spinal magnetic resonance imaging disclosed disc herniation at the C3/C4 level with mild compression of the spinal cord (Figure 3).

He was placed on bed rest with a cervical collar. On the second hospital day, his motor weakness and hyperesthesia improved, and he was able to stand and walk as usual. He was discharged on foot that day and referred to a local hospital near his home.



Fig-1: Schematic illustration of the Beach Flags plays style. The patient in the present case was attempting to grab a flag stuck into the sand by jumping and extending his upper extremities while over-extending his neck (arrow)



Fig-2: Cervical computed tomography (CT) findings on arrival. CT revealed spur formation at the superior posterior margin of the C4 vertebral body

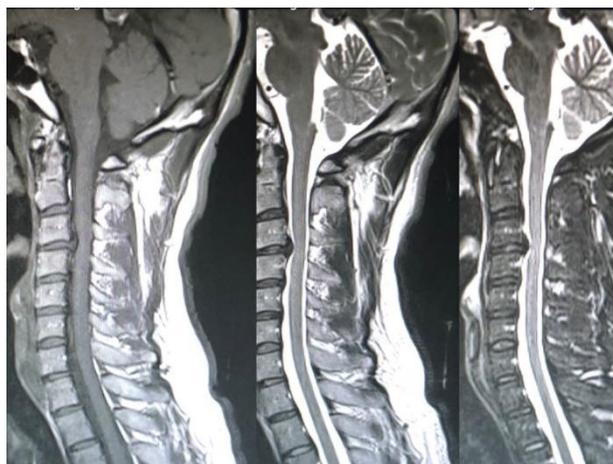


Fig-3: Cervical magnetic resonance imaging (MRI) findings on arrival MRI revealed disc herniation at the C3/C4 level with mild compression of the spinal cord (left: T1-weighted image; middle, T2-weighted image; right, short TI inversion recovery).

DISCUSSION

To our knowledge, this is the first case report of a spinal cord injury induced when playing Beach Flags. The National Spinal Cord Injury Statistical Center at the University of Alabama at Birmingham

reported the epidemiology of 6766 cases of spinal cord injury [1]. Among them, vehicular accident accounted for 39% of cases, falls for 29.5%, acts of violence for 14.4% and sports and recreation for 8.4%. Among the sports and recreation-related spinal cord injuries, diving

was most frequent cause, followed by winter sports and surfing. As there were no reports of Beach Flags-related spinal cord injury, this particular case would have been placed in the unclassified group, the frequency of which was 0.87% in the database.

The mechanism underlying the occurrence of spinal cord injury on the present case was probably cervical central spinal cord injury induced by hyperextension of the neck, as our patient showed greater weakness in the upper extremities than in the intact lower extremities. Acute hyperextension of the neck causes pinching and edema of the cervical cord by buckling of the ligamentum flavum and increasing spinal cord diameter if a patient has narrow spinal canal [2]. The present patient had a narrow spinal canal based on osteoarthritic changes in the cervical bone and prolapse of disc herniation, which might have been induced by hyperextension of the neck during the game [3]. Underlying spinal canal stenosis and pinching effect by hyperextension of the neck during jumping and catching movements in this sport may have caused the cervical central spinal cord injury in the present case.

CONCLUSION

To our knowledge, this is the first case report of a spinal cord injury induced when playing Beach Flags. Underlying spinal canal stenosis and pinching effect by hyperextension of the neck during jumping and catching movements in this sport may cause cervical central spinal cord injury in rare cases.

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