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An almost forgotten neurological entity: man in a barrel syndrome

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Abstract: Man in a barrel syndrome (MIBS) presents with bilateral upper extremity weakness but preserved strength in face, neck, and lower extremities. In this case report, two cases of MIBS were admitted to the emergency department (ED) presented. The first patient injured his neck after falling off a ladder. The second patient was a victim of a traffic accident. Bilateral upper extremity weakness was examined in the first patient at first admission to the ED. On the other hand, progressive weakness was shown in the second patient during ED follow-up. The cervical imaging findings consisted with MIBS. This case report and review of literature highlights that physicians should consider every possible cause, even the rarest ones when a patient complains of neck trauma with non-specific symptoms. Rapid identification and treatment of treatable causes such as cerebral hypoperfusion are vital for patient prognosis.

Keywords: Emergency Department; Magnetic Resonance Imaging; Man in a Barrel Syndrome; Paralysis; Trauma

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1. Introduction

The man in a barrel syndrome (MIBS) is a neurological syndrome characterized by bilateral upper extremity weakness but preserved facial, neck, and lower extremity muscular strength. Sage and Van Uitert coined the term in 1986 after seeing a patient with cerebral hypoperfusion (1).

Patients appear to be stuck in a barrel because they can't move their upper extremities. It's important to consider MIBS in the differential diagnosis of patients with isolated upper extremity muscle weakness after trauma.

2. Case presentation

The first case was a 75-year-old man a neck injury who fell from a ladder and was presented to the emergency department (ED). His vital signs were in the normal range except for a blood pressure of 236/145 mmHg, and a pulse of 105 beats per minute. His Glasgow coma score (GCS) was 15, and his pupillary reflexes were normal. Proximal muscles of the upper extremity had a loss of motor function characterized by shoulder abductors 2/5, elbow flexors 2/5, elbow extensors 3/5, wrist extensors 4/5, finger flexors, and abductors 5/5 (medical research council scale) bilaterally. He had minor numbness in his shoulders and arms. There was no sign of motor, sensory, or vascular pathological findings in the lower extremities.

Brain and cervical computed tomography (CT) scans were performed, and a fractured lamina of the fifth cervical vertebra was seen (Figure 1).

Hemorrhage was not observed on the brain CT scan. Laboratory studies showed no significant abnormality. During the follow-up, there was no improvement in his clinical features. Cervical magnetic resonance imaging (MRI) was performed and hyperintensity on T2 MRI at the level of C4-C5 was seen due to the protrusion of the intervertebral disc (Figure 2). The patient was diagnosed with MIBS and hospitalized in the neurosurgery department.

The second case was a 66-year-old man who presented to the ED after a traffic accident. He had multiple traumas affecting his extremities, head, and neck region. His primary survey was significant for blood pressure of 140/89 mmHg. His GCS was 15, and his pupillary reflexes were normal. In his first examination, bilateral upper and lower extremities muscle strength were 5/5. Hypoesthesia and tenderness were noticed in both shoulders. During the patient's ED follow-up, his upper extremity muscle strength worsened to 2/5, and his lower extremity muscle strength was 4/5. Vascular examinations of all extremities were normal. No pathological findings were observed on the cranial CT scan. Previous operation materials were observed in the cervical CT scan. On cervical MRI, several instances of narrowing in the spinal cord were reported at the C3-C4 and the C4-C5 levels. Hyperintensity was detected in the spinal cord at the C4 level (Figure 2). The patient was diagnosed with MIBS and admitted to the neurosurgery intensive care unit. Methylprednisolone treatment was given for both patients in the ED. They followed with methylprednisolone and physiotherapy, and there was a general improvement in muscle strength (4/5) after discharge.

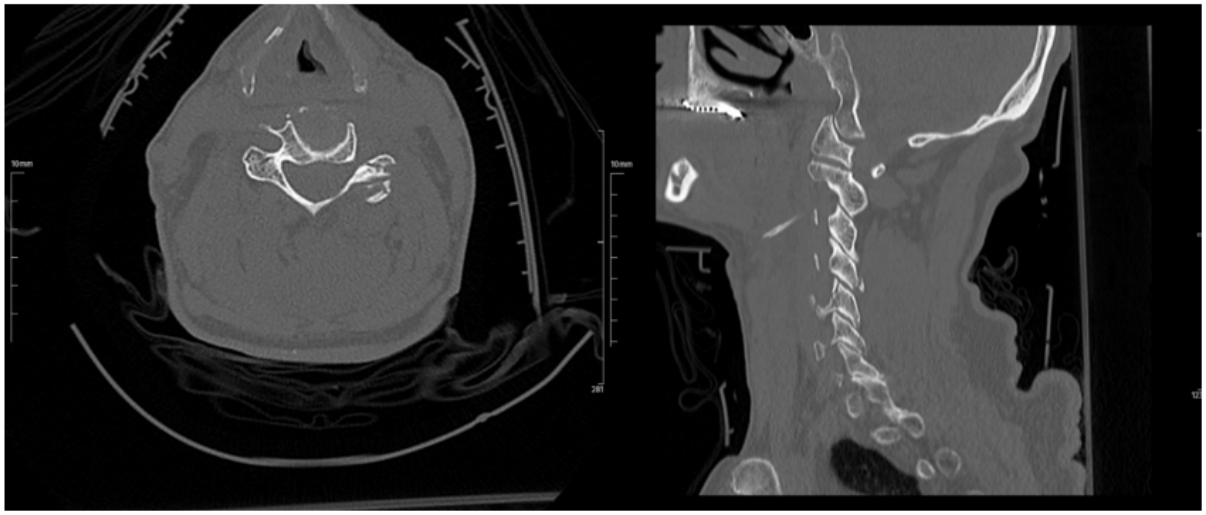

Figure 1 Cervical computed tomography imaging of the first patient showing fractured lamina of the fifth cervical vertebra

Figure 2 Cervical magnetic resonance imaging of the patients showing hyperintensity on T2 magnetic resonance imaging.

3. Discussion

Man in a barrel syndrome is a rare condition, for which the precise incidence is yet unknown. Both men and women are equally affected by MIBS (2). The etiology of MIBS may include diseases affecting the cerebral cortex, brain stem, spinal cord, and bilateral peripheral nervous system.

Ischemic stroke was previously identified as the most common cerebral etiology of MIBS (3,4). Non-ischemic lesions have also been described in patients with acute diplegia, such as metastases to the cervical region, infratentorial lesions caused by cervical spinal infarcts, and cervical spinal cord injuries, as in our cases, may be detected (4,5). Ischemia and transient weakness in both limbs may arise because of cervical disc herniation lesions compressing the spinal

artery. Due to spinal cord ischemia, symptoms may persist after treatment in a MIBS clinic, but extracerebral conditions may have better outcomes (5).

Bilateral upper extremity weakness with preserved facial, neck, and lower extremity muscular strength is a defining feature of MIBS. Once the clinical diagnosis of MIBS is made based on a comprehensive neurological examination, the subsequent step involves localizing the causative lesion. Brain imaging through MRI or CT scans can detect a range of lesions, including ischemic, hemorrhagic, metastatic, and inflammatory. For cervical spine scans, CT can identify compressive lesions, while MRI can detect extrinsic and intrinsic lesions, which can be demonstrated as hyperintensity on T2 MRI.

Our patients had spinal cord hemorrhage due to trauma. Examination findings in spinal cord hemorrhage often include sudden, severe, localized back pain with or without radicular pain, hemiparesis, paraparesis, or quadriparesis, sensory loss below the hematoma, and loss of sphincter control. In our patients, an isolated upper extremity motor defect developed. In our second case, it was determined that the motor loss in the lower extremity was due to the patient's previous operation.

At the same time, our patients also had compressions on the cervical discs at more than one level due to disc herniation. When we look at the literature, there are reported cases of non-traumatic MIBS caused by spinal cord compression due to cervical disc herniation (6). This may be one of the factors in the development of MIBS in our patients.

4. Conclusion

Rapid identification and treatment of treatable causes such as cerebral hypoperfusion are critical for patient prognosis. In situations of bilateral upper extremity sensory loss owing to trauma, like in our patients, MIBS should be evaluated, and cervical spinal MRI approaches should be incorporated into patient care in the ED.

5. Declarations

5.1. Acknowledgement

None.

5.2. Authors' contribution

All authors contributed to the manuscript equally.

5.3. Conflict of interest

The authors declare no competing interests. All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

5.4. Funding

Not applicable.

5.5. Ethical consideration

All information is de-identified, including the photograph and radiological images. We confirm that we have read the journal's position on issues involved in ethical publication and affirm that this case-based review is consistent with those guidelines.

5.6. Informed consent

Written informed consent for publication of their clinical details and/or clinical images was obtained from the patient. A copy of the consent form is available for review by the editor of this journal.

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