

CASE REPORT

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A Gray Zone in Forensic Medical Practice: An Adult Case of SCIWORA

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ABSTRACT Traumatic myelopathic conditions without radiological findings are called spinal cord injury without radiographic abnormality (SCIWORA). Magnetic resonance imaging (MRI) is the standard diagnostic tool. Although first seen as a pediatric condition yet later began to be reported in adult populations too. In our case of a 27-year-old male who suffered a motor vehicle collision, there was a presentation of bilateral hyperesthesia in C4-C5 dermatomes. Patient's vitals, X-ray and computed tomography were normal. During the extended diagnostics, a bilateral, symmetrical signal intensity and a "snake eyes" sign were seen in MRI. Having a common injury mechanism, the diagnosis of SCIWORA continued to be overlooked, causing the forensic reporting to be erroneous, could lead to a loss of legal rights. In cases that have a relevant history and neurological signs that could be SCIWORA, using proper imaging and keeping forensic medical guides up to date remains a must.

Keywords: SCIWORA; spinal cord injury; forensic medicine; magnetic resonance imaging

In medical literature, traumatic conditions accompanied by myelopathic symptoms without radiological signs such as fractures or subluxations are called spinal cord injury without radiological abnormalities (SCIWORA).¹ In the underlying trauma mechanism, hyperextensive forces in the cervical region due to rear-end motor vehicle collision stand out as the most common. In the past, these injuries were seen as rather specific to pediatric age groups yet in time they became reported in adult populations too.² In these cases, there is a lack of any massive or prominent lesions in computed tomography (CT) or X-ray. Magnetic resonance imaging (MRI) is considered the standard diagnostic tool.³ Although the mere presence of a sign itself does not, any lesion that shows a compressive character to the neural components concludes a definitive exclusionary criterion in the diagnosis of SCIWORA.⁴ In this presented case of a person who suffered an in-vehicle collision with

clinical signs of spinal cord injury, the medical evaluation and diagnostic procedures along with critical points, potential shortcomings and possible solutions were discussed.

CASE REPORT

A 27-year-old male, involved in an in-motion motor vehicle accident while driving, was brought to a university hospital. On initial evaluation, he was conscious, Glasgow coma score: 15, initial vital signs were stable. Beside a 5 cm abrasion on the right forearm, no other exterior lesions were present on skin. Laboratory tests showed no abnormality. Motor strength was normal. In sensory examination, the patient described hyperalgesia in areas related to bilateral C4-C5 dermatomes. X-ray and brain CT scans were interpreted as normal by a radiologist (Figure 1). Cervical MRI showed minimal bulging at the C4-

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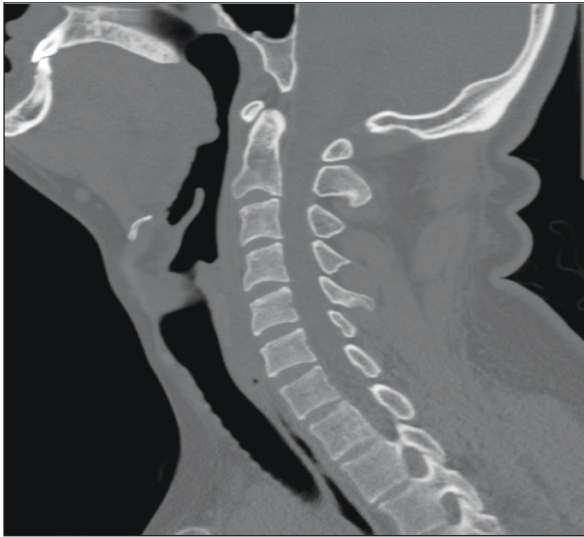


FIGURE 1: Normal cervical computed tomography image

C5 intervertebral disc segments, slight narrowing of the anterior subarachnoid space and symmetrical bilateral signal increase at the C4-C5 level (Figure 2). In the axial plane, a “snake eyes” appearance was identified at the same level (Figure 3). At all other levels, the signal intensity of the intervertebral discs was preserved and no pathology that could cause compression on the dural sac or neural elements was detected. There was no accompanying osseous pathology but the presence of signal changes in the



FIGURE 2: Detected the area of increased signal intensity at the C4-C5 segments marked with a red arrow on the sagittal plane in a T2-weighted cervical magnetic resonance image

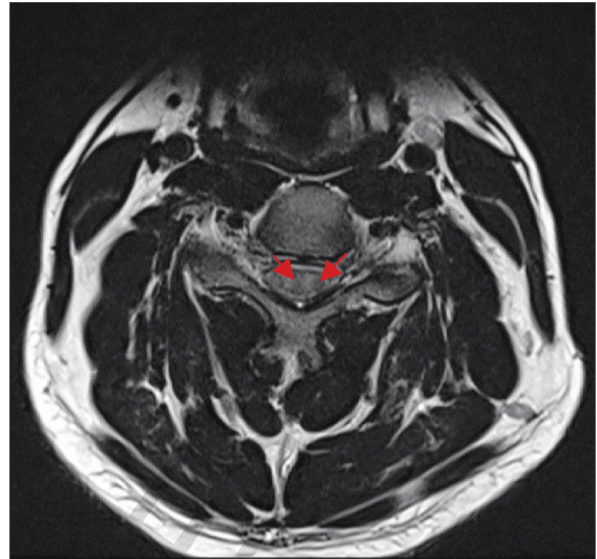


FIGURE 3: The “snake eyes”, sign at the C4-C5 segments marked with red arrows on the axial plane T2-weighted cervical magnetic resonance image

spinal cord were considered indicative of SCIWORA. The patient was monitored for 4 days by the department of neurosurgery with supportive care.

DISCUSSION

SCIWORA was first described by Pang and Wilberger in 1982 as a condition in which spinal cord injury was present without any signs in CT or X-ray but with traumatic changes in MRI.⁵ Later, some studies concluded any positive imagery including MRI is an exclusionary criterion as well, thus coining the term real SCIWORA in which all imaging is considered normal including MRI.⁶ Adult SCIWORA cases are rarely reported in the recent clinical literature. Prominent examples in the last 5 years are the case of a 60-year-old in a motorcycle accident, with a T12 level injury, presenting as hypoesthesia and paraplegia.⁷ In another case, a 38-year-old with a T4 level injury presenting as right lower extremity weakness that progressed into a Brown-Séquard syndrome.⁸ The most commonly injured spinal cord segment in SCIWORA is reported to be C4.³ An exemplifying case involved a 46-year-old man who sustained a C4 level injury after a jump, resulting in spastic quadriplegia and compromised bowel and bladder functions.⁹ Although the presenting symptoms differed, the spinal injury level was consistent

with our case. A more severe case involved a 49-year-old male who fell from a height and sustained multiple cervical spinal cord lesions, despite subtle imaging findings, his condition rapidly progressed, leading to cardiac arrest and subsequent death, demonstrating that SCIWORA can quickly become life-threatening.¹⁰ Despite being found more often, adult SCIWORA cases remain scarce in the clinical literature and show highly variable symptomatology. Cases in which trauma is caused by a legally implicated event such as traffic accidents, falls from heights etc. require reporting the detailed functional impairments and possible life-threatening probabilities; this is of utmost importance, like in our case in which a cervical spinal injury with possible lifelong neurological deficits occurred. Forensic medical guides used in our country define a diagnosed spinal cord injury as an organ impairment.¹¹ SCIWORA recognized as a serious clinical entity in the literature yet the aforementioned guide lacks the clear definition of it. In medical practice, clinicians often do not perform an MRI in single neurological symptom cases such as hyperalgesia; this causes this diagnosis to be overlooked, which creates a cascade causing both medical follow-up issues and due to lacking forensic reporting in the ensuing legal procedures, could lead to many problematic legal outcomes, since, if reported such life-threatening conditions are associated

with increased penalties. Culminating in a significant loss of rights for affected parties. Due to the complex nature of SCIWORA, the absence of both appropriate medical imaging and clear diagnostic algorithms in current guidelines can pose significant challenges in reporting, even for experienced forensic medicine specialists. Therefore, in traumatic cases even with subtle neurological signs, further investigation is warranted, which we believe is of critical importance. It is also noted that current guidelines used in forensic medicine applications must be updated to fill the gray zones, resulting in a clear inclusion of gray zones such as SCIWORA.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

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