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## Spinal cord injury without radiographic abnormality (SCIWORA) in adult: A case report

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### Abstract

SCIWORA (spinal cord injury without radiological abnormality) is rare and almost seen in children; we report the case of an Adult cervical SCIWORA showing the evolution of this injury of high morbidity even well taken in charge. Treatments outcomes of SCIWORA patients are not well defined but still have poor clinical results.

**Keywords:** Spine, injury, radiology, treatment

### Introduction

Spinal cord injury without radiographic abnormality (SCIWORA) is defined as a syndrome of posttraumatic myelopathy, with no evidence of osseous injury on plain radiography or CT-scan. SCIWORA is much more frequent in children, since most traumatism of the cervical spine of the child lead only to minimal or no radiological abnormalities due to the physiological ligamentous hyper laxity.

SCIWORA in adult is rare but is still possible. Therefore, for a timely diagnosis and management, its awareness among clinicians is extremely important to optimize the prognostic outcome of a patient.

### Case Presentation

We report the case of a 49-year-old male who presented to our emergency department following a 2-meter fall from a tree with reception on the face. He immediately noticed severe cervical pain and inability to move or feel his hands and legs. The inspection of his spine and limbs revealed no deformities. Upper and lower limbs had no active movement. He was insensate below bilateral C5 dermatomes. Rectal tone was intact with no perineal sensation. Cervical CT-scan revealed no abnormality (Fig.1). The patient was admitted to intensive care unit. He received intravenous steroid therapy with rigid neck immobilization. An MRI (Magnetic Resonance Imaging) was performed the next day showing on axial and sagittal images an intra-medullary edema is o-intense T1 and hyper-intense T2 signal which extends from the body of c2 until c6 without extra-medullary findings consistent with a SCIWORA type (IIa) according to the recent classification system <sup>[1]</sup> (Fig.2). The patient was instable; a posterior release couldn't be performed. Few days later we observed progressive aggravation of his neurological status; he was completely insensate with no rectal tone. He developed severe difficulty breathing indicating tracheotomy. A second MRI was performed 2 weeks later showing an extension of the cervical intra-medullary signal abnormality extending upwards from the bulb o-medullary junction to D1 at the bottom (Fig.3). Few days later we observed respiratory failure with concomitant hypoxemia and acid-base disorders resulting in cardiac arrhythmia and cardiac arrest causing death.

### Discussion

The concept of medullary lesion without radiological abnormality was introduced by Loyd in 1907 <sup>[2]</sup>, then described by Pang and Wilberger in 1982 under the acronym SCIWORA <sup>[3]</sup>, defining severe post-traumatic neurological deficit without radiologically detectable lesion on plain radiographs and CT-scan.

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SCIWORA has a very marked pediatric and male predominance with an incidence ranging from 19 to 34% of spinal cord injuries in children, according to series [2]. Two-thirds of cases occur in children under 8 years of age, while they become less common in adolescents, and are possible but rare in adults [4].

Most cases of SCIWORA occur in cervical spine due to its hypermobility and high vulnerability to trauma [5]. Road traffic accident and fall from height have been reported as most frequent circumstances [6]. The mechanisms involved are hyperextension, hyperflexion and distraction [7].

SCIWORA can describe any type of neurological injury, ranging from temporary sub-lesion loss of sensation to complete permanent quadriplegia. Onset of neurological deficit may be immediate or delayed ranging from a few minutes to a few days [7].

MRI has now become an investigation of choice for the diagnosis of SCIWORA showing an hyper-intense T2 signal in case of intra-medullar edema, an hypo-intense T2 signal in case of acute hemorrhage and a central hypo-intense T2 signal surrounded with a peripheric hyper-intense T2 signal in case of hemorrhagic contusion. MRI also helps to determine the severity of the spinal cord lesion according to the recent classification system and it finally establish the functional prognosis [1].

There is still a controversy regarding surgical and conservative management of SCIWORA in adults. Recent

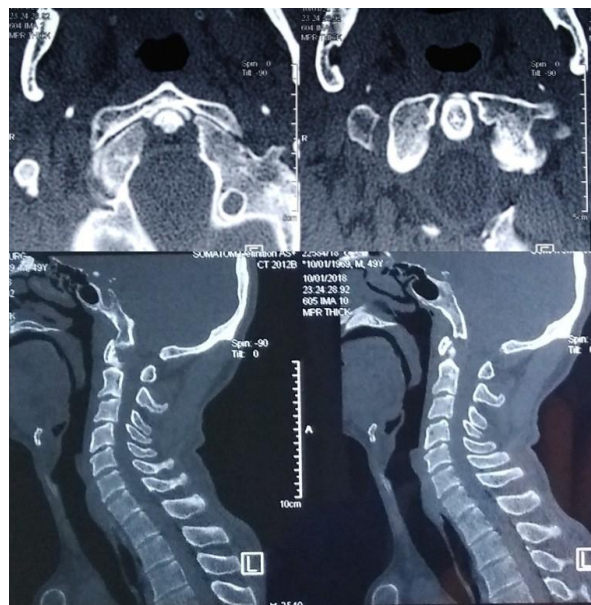
studies showed that high-dose intravenous corticosteroid injections within 8 hours of injury and continued for 24 to 48 hours improves the functional outcome of patients [8].

Kalra indicated conservative management of cervical spine injury by neck immobilization and high dose steroids [9]. Whereas, Saruhashi suggested neck immobilization only for those patients who showed good response to steroids while patients with severe or progressive symptoms should undergo surgical intervention [6]. The presence of epidural hematoma or compressive disc herniation on MRI sequences are also indications for surgical decompression [10].

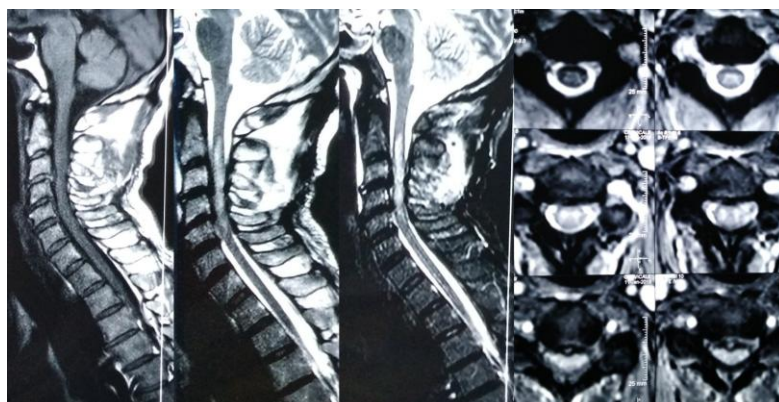
The SCIWORA is usually associated with a poor neurological outcome, a high susceptibility to delayed onset of neurological deficit, and a high proportion of complete neurologic deficit. Only normal looking cord on MRI is a sign of good prognosis whereas the prognosis progressively worsened with intramedullary and extramedullary lesions [7].

**Conclusion**

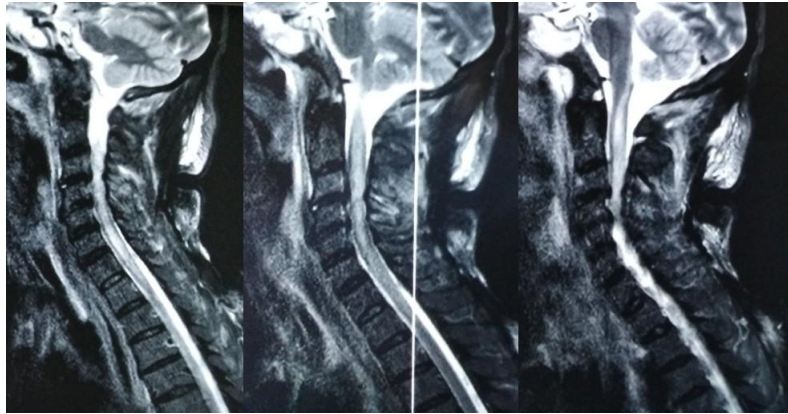
In a traumatic context, with quadriplegia, and in the absence of radiological abnormality in plain radiography and CT-scan, it is necessary to evoke the diagnosis of SCIWORA even in the adult and to continue the investigations by an emergency MRI. MRI will first of all exclude extra-medullary lesions requiring emergency surgical procedure, then confirm the topography, the type and extent of medullary involvement, and finally establish the functional and even vital prognosis.



**Fig 1:** CT-SCAN showing no abnormality



**Fig 2:** First MRI showing edema from body of C2 to C5



**Fig 3:** second MRI showing extended edema from C1 to C6 Body

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