

# SPINAL CORD INJURY WITHOUT RADIOGRAPHIC ABNORMALITIES (SCIWORA) IN A PRESCHOOL CHILD: A CASE REPORT

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## ABSTRACT

A 3½ year old boy presented at the Soldiers' Family Rehabilitation Unit, Armed Forces Institute of Rehabilitation Medicine, Rawalpindi with 2½ years' history of weakness and numbness in legs and loss of control over bowel and bladder following run over by a vehicle. At presentation, the child was unable to stand without support with power of 2/5 in iliopsoas, 3/5 in extensor hallucis longus and 0/5 in ankle plantar flexors on both sides. The power in quadriceps was 0/5 on right and 2/5 on left side. The knee and ankle jerks were absent bilaterally. Sensations to both light touch and pin prick were impaired below T9 level on both sides. Perianal sensations were intact but voluntary anal contraction was absent. He was categorized as a case of Spinal Cord Injury T9 as classified by American Spinal Injury Association (ASIA) with impairment Scale C. X-Rays and Magnetic Resonance Imaging Scans were normal. These investigations aided by relevant clinical features qualified him as a case of Spinal Cord Injury without Radiographic Abnormalities.

**Key Words:** Spinal Cord Injury without Radiographic Abnormalities (SCIWORA), Neurosurgery, Rehabilitation

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## INTRODUCTION

Spinal Cord Injury without Radiographic Abnormalities (SCIWORA) was defined by Pang in 1982 as a disorder demonstrated by objective signs of myelopathy without evidence of ligamentous injury or fractures on X-Ray films or Computerized Tomographic (CT) Scan<sup>1</sup>. After advent of Magnetic Resonance Imaging (MRI), Pang reviewed his work in 2004 and advocated that cases with intraneural injuries only and normal findings on MRI could be counted as SCIWORA and purely extra neural compressive lesions should be excluded<sup>2</sup>. SCIWORA is more common in younger children<sup>3</sup>. They are also more likely to have severe neurological injuries and a poorer outcome<sup>3</sup>. Here we present, case of a preschool child who developed SCIWORA following a road traffic accident.

## CASE REPORT

A 3½ year old child presented with weakness and numbness in legs and loss of control over bowel and bladder for 2½ years. The patient had history of run over by a vehicle. He remained unconscious for 15 minutes. Voluntary movements in legs were absent along with fecal incontinence. He was admitted to a hospital where

an indwelling catheter was placed. Plain X-Rays of the whole spine, skull and long bones were normal. MRI of the whole spine done next morning was unremarkable. A diagnosis of Intramedullary Contusion T<sub>4</sub>-T<sub>8</sub> was made by neurosurgeon and the patient was advised to receive physiotherapy as outdoor case. During the subsequent year, voluntary control in his legs gradually improved.

At presentation to us, the child was unable to stand without support. On examination, he was vitally stable with intact higher mental functions and cranial nerves. The tone was reduced in legs. He had a power of 2/5 in iliopsoas, 3/5 in extensor hallucis longus and 0/5 in ankle plantar flexors on both sides. The power in quadriceps was 0/5 on right and 2/5 on left side. Ankle dorsiflexors were not testable owing to tightness in tendo achilles. The knee and ankle jerks were absent bilaterally. Sensations to both light touch and pin prick were impaired below T<sub>9</sub> level on both sides. His perianal sensations were intact but voluntary anal contraction was absent. Based on above findings he was categorized as a case of SCI T<sub>9</sub> ASIA Impairment Scale C. A contrast enhanced MRI of dorsolumbar spine was advised which also came out to be normal (Figure 1). In view of history of significant trauma, paraplegia, normal X-Rays, CT and MRI, a diagnosis of SCIWORA was made. Therapeu-

**Figure 1: Sagittal film of MRI scan of cervical spine showing no abnormality**

tic exercises and electrical muscle stimulation of weak muscle groups were advised. Parents were taught clean intermittent catheterization and counseled regarding the outcome.

## DISCUSSION

Most cases of SCIWORA occur in cervical spine on account of its hypermobility and vulnerability to traumatic injury<sup>3</sup>. Young children are prone to develop SCIWORA due to immaturity and greater elasticity in the vertebral column than in the spinal cord and a feeble spinal cord blood supply<sup>4</sup>. Flexion and extension injuries are the most common mechanism, but lateral bending, distraction, rotation, axial loading or a combination may also be involved<sup>5</sup>.

SCIWORA can have a wide spectrum of neurological dysfunction, ranging from mild, transient spinal cord concussive deficits to permanent, complete injuries of the spinal cord<sup>6</sup>. Approximately one-quarter of the affected children may experience delayed onset of neurologic signs ranging from 30 minutes to four days<sup>1</sup>. Thus, it is critical to have a high index of suspicion in an apparently normal child whose mechanism of injury is consistent with cervical or thoracic spine injury and MRI of the Spine should be performed in such cases even if plain radiographs and/or CT of the spine are normal<sup>7</sup>.

Acute management in children with SCIWORA con-

sists of maintenance of spinal immobilization, emergent support of airway, breathing and circulation while treating other life-threatening injuries and emergent consultation with a neurosurgeon with pediatric expertise<sup>5</sup>. The administration of methylprednisolone after injury is associated with a better recovery but is not a standard treatment<sup>5</sup>. Definitive therapy should be based on the MRI findings and provided in consultation with a neurosurgeon<sup>5</sup>. Persistent neurologic deficit and positive MRI necessitate a rigid brace for three months<sup>2</sup>. Stem cell therapy for SCIWORA is still under trials<sup>8</sup>. Poor prognosis in SCIWORA is expected in children younger than 8 years, MRI findings, a delay in onset or deterioration of neurologic symptoms and recurrent injury<sup>5</sup>.

## CONCLUSION

SCIWORA is an important SCI entity and must be investigated in a child having symptoms and signs of myelopathy with normal X-rays, CT and MRI. Pediatric neurosurgical consultation in such a case is of utmost importance. Post-acute management primarily involves comprehensive rehabilitation.

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