Spinal Cord Injury without Radiological Abnormality in an 8 Months Old Female Child: A Case Report

Kunal R.Bansal[1], Ajay S. Chandanwale[1]

What to Learn from this Article?

The importance of clinical examination and to recognise suttle signs especially in paediatric age groups which is necessary to reach a correct clinical diagnosis.

Abstract

Introduction: Spinal cord injury in children frequently occurs without fracture or dislocation. SCIWORA is a syndrome occurring when the spinal cord sustains neural damage during a traumatic event without positive radiographic findings. The incidence of SCIWORA was found to be 8% to 32% in various studies with very few cases documented in children below the age of 1 year. We report such a case of spinal cord injury without radiological abnormality in an 8 months old female child.

Case Report: An 8 months old female child was brought to the emergency room after a history of fall from the bed four days back. External spine examination revealed no abnormality. She had no upper or lower limb movements, both active and withdrawal movements with painful tactile stimuli, power was grade 0; are flexic ; abdominal ,cremasteric and anal reflexes were absent, bladder was palpable and urine could be expressed on manual pressure. MRI of cervical spine with screening of whole spine: suggestive of non hemorrhagic cord edema at C4 level, with suspicious tear of anterior longitudinal ligament at that level. The child was immobilized in pediatric cervical collar and treatment was initiated with corticosterioids and the dose adjusted as per age of the patient. A paediatric physiotherapist started with physical therapy after four days of commencement of treatment.

Conclusion: In present times with wide spread use of MRI, the definition of SCIWORA is slowly turning towards spinal cord injury without neuroimaging abnormality [4]. Traumatic spinal cord infarction is a special type of SCIWORA which presents with normal radiology with delayed neurological deterioration [1]. Corticosteroid usage has been useful in cases of SCIWORA as proved by NASCISII Trial.

Keywords: SCIWORA- Spinal cord injury without radiological abnormality, MRI –Magnetic resonance imaging, CT scan –Computerised tomographic imaging.

Introduction

Spinal cord injury in children frequently occurs without fracture or dislocation. SCIWORA is a syndrome occurring when the spinal cord sustains neural damage during a traumatic event without positive radiographic findings. The incidence of SCIWORA was found to be 8% to 32% in various studies [8] with very few cases documented in children below the age of 1 year,, We report such a case of spinal cord injury without radiological abnormality in an 8 months old female child.

Case Report

An 8 month old female child was brought to the emergency room after a history of fall on her face from the bed four days back with hyperextension of neck and sudden onset weakness in both upper & both lower limbs. Parents gave the history that the child was all right four days back & was able to stand with support. History of head injury, chest, and abdominal trauma was not reported by the parents.. The child had no history of altered consciousness,

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Figure 1: Antero posterior view of cervical spine radiograph

Figure 2: Lateral view of cervical spine radiograph

vomiting, ear, nose bleed, convulsion, or fever with vomiting and diarrohea. Birth history and perinatal history was not significant. Patient was the second child with one elder sister who was 3 years old and was normal for her age, with no history of prior treatment.

Clinical Examination

The child was afebrile, conscious & normocephalic with no bulge of anterior fontanelle. There was no evidence of external injury to head, chest, abdomen and extremities. There was no evidence to suggest external violence or abuse. The external spine examination revealed no abnormality.

She had no upper or lower limb movements, both active and withdrawal movements with painful tactile stimuli, power was grade 0; are flexic ; abdominal ,cremasteric and anal reflexes were absent, bladder was palpable and urine could be expressed on manual pressure.

Figure 3: CT scan brain

Investigations

Haemoglobin-13.1g/dl, Total WBC count-6,800/mm3. ,Differential counts- neutrophils-68% ,lymphocytes-24%,monocytes-5%,eosinophils,2%,basophils-1%. Peripheral smear examination waswithin normal limits.

Urea-16mg%, Creatinine-0.8 mg% Total bilirubin-0.9 mg%, Random blood sugar-98mg%

Roentgenography:

No obvious trauma related abnormalities were noted.

Computed Tomography Scan

Brain (plain+ contrast): No evidence of trauma related abnormality.

Magnetic ResonanceImaging: Imaging of cervical spine with screening of whole spine: suggestive of non hemorrhagic cord edema at C4 level, with suspicious tear of anterior longitudinal ligament at that level.

Treatment

The child was diagnosed as having traumatic spinal cord involvement based on clinical findings and above investigations; the child was immobilized in pediatric cervical collar. As child was presented 4 days after trauma she was treated with Inj Dexamethasone 0.6mg/kg stat dose followed by 0.15mg/kg Q.I.D. for 2 weeks along with Inj Ranitidine 1mg/kg/dose B.I.D & Syp Paracetamol 15mg/kg/dose. After 2 weeks, child was shifted on oral Tablet Prednisolone 5mg Q.I.D. crushed and dissolved in water for 2 wks and tapering was done.

The Physiotherapy was given by pediatric physiotherapist after 4 days of starting treatment. The girl started regaining power in lower limb first followed by upper limbs. After 15 days, the girl was able to turn to prone position on her own in bed. The child had good neck holding in pull to sit test, the child had started active movements of both lower and upper limbs. The child was discharged after 1 month of hospital stay on pediatric cervical collar which is to be kept for 12 weeks. Parents have been asked to follow up after 1 month.

Discussion

In 1982, Pang and Wilberger [8]defined this disorder as marked by objective signs of myelopathy resulting from trauma, with no evidence of ligamentous injury or fractures on plain Xray films or tomographic studies. The original definition excludes penetrating trauma, electrical shock, obstetric complications, and congenital spine anomalies. Most studies of traumatic myelopathy in children report an incidence of SCIWORA of 8% to 32% [12].

This disorder is more common in children younger than 8 years of age [8,10]. With the advent of MRI, there have been description of various injury pattern to the spinal cord on MRI like cord transection, major hemmorahge, minor hemmorahge, disc prolapsed, contusion, cord edema, muscular and interspinous ligament tear and normal [4,6,9].

Male to female ratio is 1.6:1 [2]. Majority of injuries occurred in upper cervical cord C1-C4 [2]. Injuries are children less than 3 years is most commonly due to motor vehicle accident and domestic violence [2], injuries in adolescents are due to outdoor sporting activities[2].

Mechanism of neural injury most often relates to inherent elasticity of juvenile spine, which permits self-reducing but significant inter segmental displacements when subjected to flexion extension and distraction forces [3, 8].

The other associated injuries are head injuries, chest injuries.

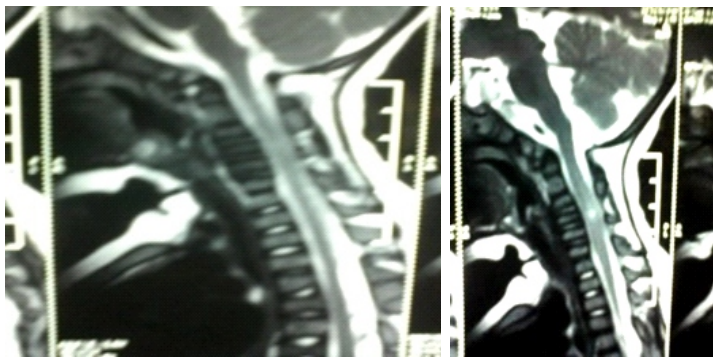

Figure 4 & 5: MRI Images showing non hemorrhagic cord edema at C4 level, with suspicious tear of anterior longitudinal ligament at that level

Associated injuries increase the likelihood of significant cord injury. Low GCS scores on initial examination indicate poor prognosis in terms of recovery [7]. GCS scores of 15/15 have correlation of lower grades of cord injury on MRI [7].

Long term neurological outcome in children with SCIWORA is determined by admission neurological status [8]. The outcome can be improved by ruling out occult injuries which would lead to recurrent SCIWORA and also to identify patients with delayed neurological deterioration, who are normal on initial neurological examination but show deterioration later can be identified by transient warning symptoms of transient paresthesias, subjective paralysis and lhermittes phenomenon 30 minutes to 4 days prior to onset of deterioration [8].

Bracing is recommended in cases of SCIWORA as there is some occult instability in these cases which may lead to recurrent episodes [5, 8].

However, in some studies these minor recurrent episodes of SCIWORA recovered completely and bracing did not provide additional benefits in preventing these episodes [1].

Abnormal somatosensory evoked potential also have correlation with prognosis of neurological recovery in SCIWORA [9].

Injury prevention, prompt recognition, use of MRI and timely bracing remain key measures to improve outcome in cases of SCIWORA [9].

Conclusion

In present times with wide spread use of MRI, the definition of SCIWORA is slowly turning towards spinal cord injury without neuroimaging abnormality [4]. Traumatic spinal cord infarction is a special type of SCIWORA which presents with normal radiology along with delayed neurological deterioration [1]. Corticosteroid usage has been useful in cases of SCIWORA as proved by NASCISII Trial

Clinical Message

Early detection by maintaining high index of suscpicion, MRI findings, bracing, early adoption of steroids are cornerstones in the treatment of SCIWORA. Further avenues for research are detecting recurrent episodes in cases of SCIWORA, severity of these attacks, end point of bracing in cases of occult instability for prevention of these attacks and measures for early detection of individuals prone for such incidences.

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