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Perspective

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Evaluation of Spinal Trauma by MRI

Lucas Anderson*

Introduction

To assess the prognostic and clinical value of magnetic resonance imaging (MRI) as a non-invasive diagnostic tool in patients with acute and chronic spinal trauma, and to compare and correlate MRI findings with patient clinical profiles and neurological outcomes according to the ASIA impairment scale.In evaluating and detecting spinal injuries, diagnostic imaging, particularly Magnetic Resonance Imaging (MRI), is critical. MRI can detect subtle bone marrow, soft-tissue, and spinal cord abnormalities that may not be visible with other imaging modalities. A prominent cause of disabling injuries is Traumatic spinal cord injury (SCI). In the younger population, SCI is very common. In evaluating and detecting spinal injuries, diagnostic imaging, particularly magnetic resonance imaging (MRI), is critical. Bone marrow, soft-tissue, and spinal cord abnormalities can all be detected, even if they aren't visible on other imaging modalities. Many advantages of MRI, such as improved contrast resolution, the absence of bone aberrations, multiplanar capabilities, and the capacity to choose from a variety of pulse sequences, allow for a more precise diagnosis of spinal injuries. It is possible to gain more accurate information on neural and extra-neural injuries that necessitate surgical intervention, such as severe disc herniations and epidural hematomas. MRI findings may act as prognostic indications in cases of spinal cord edoema, trauma, bleeding, and ischemia. The sagittal pictures provide the majority of the diagnostic information in spinal trauma [1]. Sagittal T1-weighted pictures provide an outstanding anatomic perspective as a companion to axial images. Disc herniations, epidural fluid collections, subluxation, vertebral body fractures, and cord swell are all examples of disc herniations. Most soft tissue abnormalities, such as spinal cord edoema and bleeding, ligamentous damage, disc herniations, and epidural fluid collections, can be seen on sagittal T2-weighted imaging. Axial and sagittal GE pictures help diagnose acute spinal cord bleeding, disc herniation, and fractures. The presence of parenchymal SCI on MRI not only correlates well with the severity of neurologic loss, but it also has important implications for prognosis and recovery potential. Several researchers have tried to pinpoint the first MRI patterns of injury that predict persistent alterations in the spinal cord parenchyma, which eventually lead to post-traumatic progressive myelopathy. Yamashita found that lesions with low signal intensity on T1-weighted images but high signal intensity on T2-weighted images had the worst prognosis of the five imaging patterns he presented. It was feasible to suggest that the MRI findings associated directly with the degree of weakness according to the ASIA impairment scale because of the advantages of MRI as an excellent diagnostic technology for evaluating spinal damage. Prior to MR imaging, the spinal trauma patient required specific consideration. All possible dangers of imaging the medically unstable patient were carefully balanced against the necessity for MRI diagnostic information [2]. The monitors utilized were MRI-compatible. A fiberglass cervical collar was used to support patients with cervical spine injuries. When sedation was required to complete an examination, it was used. The location(s) of injury, access to the area of interest, and the types of coils available all influenced the choice of surface coil. MR scanner that uses a combination of pulse sequences in both the axial and sagittal planes [3]. For proper evaluation of cord hemorrhaged, the study was conducted with the patient in a supine position with quiet breathing and abdominal band compression, obtaining sagittal T2 and T1-weighted fast spin echo images, STIR and fat suppression images, coronal STIR and axial T2, T1-weighted fast spin echo images, and GRE images. Patients with substantial cord edoema experienced high-grade AIS at first and had a lower chance of recovery than patients with small cord edoema.

To examine the spine, including the lateral parts, a total of nine pictures were required. With a 0.5 mm slice gap, sagittal pictures were 5.0 mm thick. The region of interest's field of vision (FOV) is appropriate at 24 cm in the cervical spine and 32 cm in the lumbosacral spine. For appropriate labeling of the implicated levels in the dorso-lumbar spine, a broad FOV (34/36 cm) was required.

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***Corresponding author:** Lucas Anderson, Department of Orthopedics, Peking University Third Hospital and the Engineering Research Center of Bone and Joint Precision Medicine, Ministry of Education, Beijing, China, E-mail: Lucasa@pek.cn

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Author Affiliations Top

Department of Orthopedics, Peking University Third Hospital and the Engineering Research Center of Bone and Joint Precision Medicine, Ministry of Education, Beijing, China