Introduction

Traumatic injuries of the cervical spine are potentially catastrophic. When associated with neurologic damage, they can result in devastating medical, social, emotional, and financial consequences
(Shanmuganathan et al., 2008).

The past several decades have witnessed the rapid development of imaging technology that has dramatically transformed the diagnosis and management of vertebral injury and spinal cord injury (SCI). Magnetic resonance imaging (MRI) has enabled the noninvasive visualization of the spinal cord. The initial value of MRI in the detection and evaluation of fractures was thought to be limited, but with advances in knowledge and technique, it is now known to be considerable. Concurrently, computed tomography (CT) has also been further perfected and has replaced plain radiography as the first-line modality for evaluating the traumatized vertebral column ***(Goldberg and Kershah, 2010).***

Conventional MR imaging is routinely used to image the spinal cord to demonstrate the location of cord injury and the amount of cord compression from extramedullary bleeding or posterior disk herniation.
The amount of cord compression and the presence of hemorrhage or edema at the injury site may help in treatment planning and in predicting neurologic outcome. T2-weighted and fat-suppressed inversion recovery images are the most useful sequences to demonstrate these findings ***(Biton et al., 2006).***

New techniques that have shown potential utility in improving the diagnostic assessment of SCI include DWI, diffusion tensor imaging, MR spectroscopy, and functional MRI. Although much more widely used in the brain, DWI has on occasion detected SCI that was not seen on conventional sequences ***(Shen et al., 2007).***

Diffusion tensor imaging is an application of DWI that exploits diffusion anisotropy in white matter tracts of the central nervous system to visualize either their normal course or their disruption in the setting of pathology. Recent research has suggested that diffusion tensor imaging can demonstrate more extensive injury to the cord than before ***(Shanmuganathan et al., 2008).***

DTI parameters are sensitive markers of cervical cord injury, with ADC showing the greatest sensitivity. Changes in DTI parameters are most marked at injury sites and reflect the severity of cord injury ***(Shanmuganathan et al., 2008).***