

## Format for ANSWERING REVIEWERS

May 10, 2015

Dear Editor,



Please find enclosed the edited manuscript in Word format (file name: 17917-review.doc).

**Title:** Imaging evaluation of traumatic thoracolumbar spine injuries: radiological review

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**Name of Journal:** *World Journal of Radiology*

**ESPS Manuscript NO:** 17917

The manuscript has been improved according to the suggestions of reviewers:

**REVIEWER 1: Reviewed by 02503737: NO COMMENTS**

**REVIEWER 2: Reviewed by 00214317: COMMENTS**

The manuscript is well written but needs some modification

**1-Update your references some references are too old**

Answer: Following references are added.

- LoobyS , Flanders A . Spine trauma .RadiolClin North Am 2011 ; 49 (1): 129 - 163
- JoaquimAF ,Fernandes YB , Cavalcante RA , Fragoso RM , Honorato DC , Patel AA . Evaluation of the thoracolumbar injury classification system in thoracic and lumbar spinal trauma . Spine 2011 ; 36 ( 1 ): 33 - 36 .
- Radcliff K , Su BW , Kepler CK , et al. Correlation of posterior ligamentous complex injury and neurological injury to loss of vertebral body height, kyphosis, and canal compromise . Spine 2012 ; 37 ( 13 ): 1142 - 1150 .
- RajasekaranS . Thoracolumbar burst fractures without neurological deficit: the role for conservative treatment .Eur Spine J 2010 ; 19 ( suppl 1 ): S40 - S47 .

- Khurana B, Sheehan SE, Sodickson A, Bono CM, Harris MB. Traumatic thoracolumbar spine injuries: what the spine surgeon wants to know. Radiographics. 2013 Nov-Dec;33(7):2031-46.
- Rajasekaran S, Kanna RM, Shetty AP. Diffusion tensor imaging of the spinal cord and its clinical applications. J Bone Joint Surg Br. 2012 Aug;94(8):1024-31.

**2-Add some information from recent reference discuss same issue RadioGraphics 2013; 33:2031-2046 and compare with your**

**Answer: Added**

**3-Add you opinion which best classification in clinical practice of imaging**

**Answer: Following lines are added in the conclusion**

The TLICS is the recent thoracolumbar injury grading scale to combine injury morphology, assessment of mechanical stability relevant to the PLC, and neurologic status into a system capable of guiding injury management. The TLICS provides the best available predictor of surgical versus nonsurgical management

**4-Add paragraph about trauma in children**

**Answer: We have added a following paragraph in manuscript and marked as bold**

**Spinal trauma in children:**

Spine injury in children is relatively rare with the incidence of 2% to 5% of all spine injuries<sup>37</sup>. The biological differences between children and adults, and the growth potential of children, result in different fracture patterns and alter the management necessary for successful treatment. The concept of spinal cord injury without radiological abnormality in children is known by the acronym SCIWORA. New imaging techniques such as diffusion-weighted MR imaging (DWI) and diffusion tensor imaging (DTI) may help in predicting the severity of spinal cord injury and prognostic evaluation of recovery

from SCIWORA<sup>38</sup>

#### **5-Add paragraph about imaging technique and when use CT with contrast and when apply MR**

**Answer: e have added a note on Imaging technique , when to use CT with contrast and MR. Added text is marked as bold.**

#### **Imaging Techniques**

##### **MDCT**

Multidetector CT (MDCT) is the imaging modality of choice for fracture detection and alignment assessment when there is a high or moderate suspicion of acute trauma to the spine. Radiographs are not required prior to CT for acute trauma, since negative radiographs does not preclude obtaining a spine CT if the clinical suspicion is high. Recent literature data also indicate that MDCT diagnoses thoracolumbar spine fractures more accurately than plain X-ray films<sup>30,31</sup>. In many trauma centers, CT has replaced plain film as the primary modality for evaluation of spinal trauma<sup>32</sup>. CT images are acquired using thinnest collimation of 0.6mm and images are reconstructed using both bone and soft tissue algorithms. Reformation is done in sagittal and coronal planes. Images are viewed in all three planes and in both soft tissue and bone window on CT workstation for final analysis and reporting. Intravenous contrast administration is indicated if the CT is done for suspected injuries in other body parts like chest, abdomen and pelvis. In such conditions the coverage of those scans can be adjusted to include the spine, eliminating double irradiation. If patients had undergone CT scan for other body parts, and with raw data still available, then every effort should be made to reconstruct the raw data to create reformatted images of the spine. The most important limitation of CT technique is the detection of ligamentous injury and spinal cord lesions.

##### **MRI**

MR imaging is the preferred technique for the detection of soft tissue injuries. MR imaging is the

modality of choice for assessing traumatic lesions involving spinal cord, intervertebral disks and spinal ligaments. The MR protocol for spine trauma includes sagittal T1W, sagittal T2W, and sagittal STIR images, as well as localized axial imaging (T1W and T2W). Any patient with presumed spinal cord injury should undergo an MR imaging examination as soon as possible. In patients with spinal cord injury, MR imaging is able to reveal the location and severity of the lesion and, at the same time, to indicate the cause of spinal cord compression. This is especially useful in the management of patients for whom surgical intervention may prevent further deterioration<sup>33</sup>. Several types of traumatic spinal cord lesions can be found: intramedullary hemorrhage, spinal cord contusion/edema, extrinsic compression by hematoma, a bone fragment or a traumatic disk herniation, and even complete transection of the cord<sup>34</sup>. Of the spinal hematomas, those in epidural locations are most common. Preoperative diagnostic localisation of the hematoma informs the surgeon of the need to open the dura or arachnoid, particularly in cases complicated by the coexistence of epidural and subdural hematomas. MR imaging helps in predicting neurological recovery. Neurological recovery is usually insignificant in patients with intramedullary hemorrhage or cord transection, whereas patients with cord edema or contusion may significantly recover from neurological dysfunction<sup>35,36</sup>.

#### **6-If Diffusion tensor MR imaging has role in trauma**

**Answer: We have added small note on DTI and DWI, marked as bold in manuscript**

New imaging techniques such as diffusion-weighted MR imaging (DWI) and diffusion tensor imaging (DTI) may help in predicting the severity of spinal cord injury and prognostic evaluation of recovery from SCIWORA<sup>38</sup>

#### **7-Add shortly about hematoma associated with trauma**

**Answer: We have added note on hematomas associated with trauma.**

Of the spinal hematomas, those in epidural locations are most common. Preoperative diagnostic

localisation of the hematoma informs the surgeon of the need to open the dura or arachnoid, particularly in cases complicated by the coexistence of epidural and subdural hematomas. Neurological recovery is usually insignificant in patients with intramedullary hemorrhage or cord transection, whereas patients with cord edema or contusion may significantly recover from neurological dysfunction<sup>35,36</sup>.

**REVIEWER 3: Reviewed by 00227360 : COMMENTS**

In this review, the authors presented a comprehensive summary of classification systems on the evaluation of traumatic thoracolumbar spine injuries based on imaging techniques. The review provided a detailed and practical guide with nice illustrations in this field for relevant physicians and radiologists.