FAST MRI ASSESSMENT IN ACUTE SPINE INJURIES WITH THE IMPLEMENTATION OF AI

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ABSTRACT

Spine injuries can be categorized into two major groups in the general medical terminology, chronic and acute. Most patients who suffer from such a disease as a chronic incident have a low invasiveness treatment approach that usually accompanies a treatment with NSAIDs and Physiotherapy and groups of Scoliosis. The acute phase of a non-trauma spinal injury commonly involves disc herniation incidents, usually in the lumbar spine region, and less in the thoracic and cervical region. Accidents with an acute injury of the spinal cord may lead to partial paralysis -paraplegia or total tetraplegia. The burden of decision-making in life-threatening situations combined with surgical restoration of the soft tissue and the possibility of spinal cord hematoma is a very demanding procedure. The admission of the patient to the MRI unit will take place in at least a few minutes to access the length and trauma category. The main drawbacks of an MRI examination are the time of MRI sequences and patient status. The need for FAST MRI spine protocols is more than obvious. The fact that most of the time patients are moving during examination employs the need for AI-trained networks for automation in image resolution correction for exact diagnosis, prognosis, and analysis, to reduce artifacts of movement or metallic implant distortion artifacts. The specific kind of implementation can be employed in the arsenal of our toolkit for a variety of acute-induced diseases like stroke, or other variations of hematomas.

OBJECTIVES

Primary outcomes:

- The sequential images are obtained to be segmented and categorized into two groups, control, and intervention. The validation can arise due to diagnosis and via examination images from the PACS system.
- Null hypothesis: no contrast and volume changes can be reflected between groups. Different hypothesis: significant contrast and volume changes can be reflected between groups.
- The control group and intervention group will be evaluated by comparison paired tests, the first value in the pair minus the second value in the pair to find the paired difference for each pair of data. The variations will be a new data set, and the sum of all disparities' standard deviation SDs.
- Aim: To acquire initial data to calculate that the size of the sample is adequate for our hypothesis, significant contrast and volume changes can be reflected between groups.

- **Secondary outcomes:**

- This will be achieved by collecting data from *Fast MRI* scans, for segmentation, comparing intervention with the control group, allowing the investigation of possible statistically significant evidence.
- Our suggestion is to scan or if we might retrieve, with the consent of course via email, patient data, with the number of overall patient and control sample to be 20, and then allocate in two groups, respectively.

METHODS

- Filtering methodologies
- Segmentation
- Database CNN Networking
- MRI Sequence Parameter Optimization

BACKGROUND

This study focuses on the research about an implementation of various methods of medical image processing in patients that have been examined with the *FAST MRI* protocol and had a spine cord injury. Thus, we will analyse the current medical imaging methodologies with the support of AI systems in order to provide noise free images for accurate diagnostic and clinical purposes.

CONCLUSIONS

- **Patients with metal implants frequently need to get an MRI. It is possible to apply a range of methodologies to reduce artifacts, which will optimize image quality and boost diagnostic accuracy. The type and location of the metal implant, the clinical question, the local scanner and sequence availability, as well as knowledge of the MRI parameters and their effects on artifact, must all be carefully considered before imaging these patients.**

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Study flow chart