CHAPTER 32

MEDICAL SCIENCES
RADIOLOGY

Doctoral Theses

245. KAUSHIK (Sameer)
Study of the Application of Advanced MR Imaging Techniques in Dementias and Related Disorders.
Supervisors : Prof. Satish K Bhargava, Dr. Gopesh Mehrotra, Brig R P Tripathi and Dr. M S Bhatia
Th 14241

Abstract

The study shows MR Perfusion studies have the potential to differentiate AD from FTD patients, which was not largely possible with the other modalities used. These techniques have great potential in becoming important clinical tools in the dianosis and treatment of patients with various degenerative and associated cerebrovascular disorders. These also strongly compete against other more costly and low-resolution techniques, currently available, for providing functional information, such as SPECT etc. These advanced MR imaging techniques also hold immense potential to characterize and monitor intervention in other disease processes of brain besides dementia, where they are comparable and even superior to some other available modalities for monitoring disease progression.

Contents

1. Introduction. 2. Aims and Objectives. 3. Review of Literature. 4. Materials and Methods. 5. Results. 6. Discussion. 7. Summary and Conclusions. Bibliography and Annexures.

246. SRIVASTAVA (Ajai Kumar)
Study of the comparative Assessment of Acute Ischemic Stroke by the Use of Optimized Diffusion Weighted MR Imaging and MR Perfusion Imaging.
Supervisors : Prof. Satish K Bhargava, Brig. R P Tripathi Dr. Gopesh Mehrotra and Dr. Sunil Agarwal
Th 14240

Abstract

Attempts to encompass conventional MR imaging together with diffusion and perfusion imaging in acute, subacute and choric stages in defined group of patient with acute ischemic stroke among Indian adults. This study documents the time course of signal intensity $Sl_{T2w,}$ Sl_{DW} and ADC in diffusion weighted imaging and all these of the main descriptors of perfusion weighted imaging (CBV, CBF and MTT). Diffusion weighted imaging (together with ADC Map) is very sensitives in depicting hyperacute lesion and ischemic core can be marked on DWl. On the other hand Perfusion imaging also shown to be qually sensitive in depicting infarct in hyperacute stage and shows quantitative information about hypoperfused region around the ischemic core. Apparent diffusion coeffcients might assist clinician in selecting patient for salvageable tissue within ischemic penumbra. The mean rADC measurement found in this study was 41% below those of normal tissue in core of the infarct. Region of the penumbra, with rADC value greater than 0.90 are unlikely to proceed to infarction. The infarct core has a rADC of less than 0.75. Regions of the penumbra with intermediate rADC values are those at greatest risk of infarction. Although quantitative prediction of abnormal voxel in the penumbra might require a sophisticated computer model performed on a voxel by voxel basis of not only ADC values but also these flow parameters until such programme exist are readily accessible, visual assessment of the color ADC map or even colors diffusion-weighted images might help determine which penumbral patients are likely to have infract expansion. T2 W image was found to be less sensitive. FLAIR sequences provided better result and found to be sensitive to 81% from 6 to 12 hrs of stroke. In the chronic phase this study revealed that the infracted are still appears as hypointensey on T_1W and as a hyperintensity on T2 weighted. In contrast-enhanced images, parenchymal enhancement typically persists throught this phase also; it usually disappears by 3 month. Of the three, parameters of perfusion imaging parameters rCBV maps have been shown to correlate best with final infarct volume on T2W. MTT is an easy to interpret format but MTT does have a tendency to over estimate infarct size. Perfusion maps do nt appear to do an adepuate task in distinguishing between levels of hemodynamic compromise. DWl can easily make this distinction. Matched diffusion and perfusion abnormalities in this study correlate with the region of infarction and are indicative of permanent neuronal death.

Contents

1. Introduction. 2. Aims and Objectives. 3. Review of Literature. 4. Materials and Methods. 5. Results. 6. Discussion. 7. Summary and Conclusions. Bibliography and Appendices.