# SUMMARY

Stroke is n injury to central nervous system that is characteristically abrupt in onset and due to vascular insult. The term I reflective of damage to the brain secondary to ischemia or hemorrhage. It is the number three cause of mortality and the number one cause of disability in adults in the United States. Stroke is ischemic approximately 80% of the time, and until recently, there was no available beneficial intervention. In 1995 the published results of the national institute for neurological diseases and stroke (NINDS) recombinant tissue plasminogen activator ( rt-PA) trial represented the first demonstration of efficacious treatment for acute cerebral ischemia. This has redefined the role of the radiologist and neuroimaging from peripheral to central in the management of acute cerebral ischemia ***( Beauchamp NJ, et al; 2004).***

MRI is a new and promising tool that is being increasingly used in the diagnosis and management of acute ischemic stroke. MRI is the fast growing technology that is sensitive and relatively specific in detecting changes that occur after such strokes. ***( Schaefer PW et Al, 2005)***

Diffusion-weighted images (DWI) provide potentially unique information on the viability of brain tissue. It provides image contrast that is dependent on the molecular motion of water, which may be substantially altered by disease. The method was introduced into clinical practice in the middle 1990, but because of its demanding MR engineering requirements- primarily high- performance magnetic field gradient- it has only recently undergone widespread dissemination. The primary application of DW MR imaging has been in brain imaging, mainly because of its exquisite to ischemic stroke- a common condition that appears in the differential diagnosis in virtually all patients who present with a neurologic complaint ***(Scaefer PW et Al, 2005)***

Because DWMR imaging uses fast (echo planner) imaging technology, it is highly resistant to patient motion, and imaging time ranges from a few seconds to 2 minutes. As a time ranges from a few seconds to 2 minutes . As a consequence, DWMR imaging has assumed an essential role in the detection of acute brain infarction and the differentiation of acute infarction from other disease processes. DWMR imaging is also assuming an increasingly important role in the evaluation of many other intracranial disease processes. ***(Scaefer PW et Al, 2005)***

Combined diffusion-perfusion weighted images has shown great promise in the diagnosis of acute stroke ***(Karonen JO, et al, 2005)***

Diffusion weighted images can depict ischemic tissue in rates after a middle cerebral artery (MCA) occlusion, with decreased diffusion within 5 minutes ***( Liu Y, et al 2004)***

Perfusion weighted images permits the detection of hemodynamic changes. In many patients with acute ischemic stroke, the volum of hypoperfused tissueon perfusion-weighted maps is larger than the volum of tissue with decreased diffusion on diffusion weighted images ***( Karonen JO, et al, 2005)***

This mismatch between the volumes of abnormal tissue on perfusion- and diffusion weighted images (perfusion-diffusion mismatch)in the same imaging session can be considered as an estimate of the ischemic penumbra and thus may be a predictor of potential infarct growth ***( Karonen JO, et al, 2005)***

DWI and PWI are relatively and accurate imaging modalities for the timely diagnosis of acute ischemic infarction and hypoperfusion. Lesions on diffusion- perfusion weighted images have been found to correlate well within infarct growth, final infarct volume, stroke severity, and clinical outcome. DWI and PWI may eventually become incorporated into acute stroke management algorithms for evaluating potential candidates for thrombolytic therapy by detecting "tissue at risk" for infarction and by identifying patients at an increased risk for complications. DWI and PWI can also be utilized for patients for patient follow up after thrombolytic therapy to exclude potential complications and to evaluate the response to treatment. Further studies are needed to confirm the sensitivity and specifity of DWI and PWI in combination with multimodality MRI to exclude intracranial hemorrhage; to evaluate the changes in perfusion and diffusion abnormalities following thrombolytic therapy and recanalization; and to determine the cost effectineness of DWI and PWI in the evaluation of acute ischemic stroke ***(Bochar Sa 2001)***