# Role of Diffusion MRI in Discrimination between Intracranial Cystic Lesions

*Essay*

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**Radiodiagnosis**

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✍ *Mohamed Gamal Abd Elfattah Farrag*

بسم الله الرحمن الرحيم

**وأنزل الله عليك الكتاب**

**والحكمة وعَلَّمَكَ مَا لَمْ تَكُن**

**تَعْلَمُ وكَانَ فَضْلُ اللَّهِ**

**عَلَيْكَ عَظِيماً**

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# List of Contents

# List of Abbreviations

**AA** .......................... Anaplastic astrocytoma

**AC** .......................... Arachnoid Cyst

**ACA** ...................... Anterior cerebral artery

**ACoA** .................... anterior communicating artery

**AC-PC** .................. Anterior commissure–Posterior commissure

**ADC** ...................... Apparent Diffusion Coefficient

**ADCr** ..................... Apparent Diffusion Coefficient ratio

**CCs** ........................ Colloid cysts

**CNS** ....................... Centeral Nervous System

**CPA** ....................... Cerebellopontine angle

**CPCs** ..................... Choroid Plexus Cysts

**CPs** ........................ Craniopharyngiomas

**CSF** ........................ Cerebrospinal fluid

**dMRI** ..................... Diffusion MRI

**DWI** ....................... Diffusion weighted image

**ECs** ........................ Epidermoid Cysts

**EPI** ......................... Echo planar imaging

**FLAIR** .................. Fluid attenuation inversion recovery

**GBM** ..................... Glioblastoma Multiform

**HBL** ....................... Hemangioblastoma

**ICA** ........................ Internal carotid artery

**LGA** ...................... Low-grade astrocytoma

**MRI** ....................... Magnetic resonance imaging

**NCC** ...................... Neurocysticercosis

| | |
|---|---|
| **NGCs** ...................... | Neuroglial Cyst |
| **PAs** ......................... | Pilocytic astrocytoma |
| **PC** ........................... | Pineal Cyst |
| **PCA** ........................ | Posterior cerebral artery |
| **PCoAs** .................... | Posterior communicating arteries |
| **PNS** ......................... | Paranasal sinuses |
| **PVSs** ....................... | Enlarged Perivascular Spaces |
| **RCCs** ...................... | Rathke's cleft cysts |
| **RF** ........................... | Radiofrequency |
| **ROI** ......................... | Region of interest |
| **SENSE** .................. | SENSitivity Encoding |
| **SI** ............................. | Signal intensity |
| **T1WI** ...................... | T1 weighted image |
| **T2WI** ...................... | T2 weighted image |
| **TE** ........................... | Time to echo |
| **TR** ........................... | Time to repeat |
| **VHL** ....................... | Von Hippel- Lindau |
| **WHO** ...................... | World Health Organization |

# List of Figures

# INTRODUCTION

Diffusion-weighted (DW) magnetic resonance (MR) imaging provides 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 **(Schaefer et al., 2000)**.

DWI is a MRI technique that measures tissue water diffusional motion and provides information about orientation, size and geometry of the tissue. Pathological processes that modify tissue organization can cause abnormal water motion with the consequence of altered apparent diffusion coefficient (ADC) values ***(Tavazzi et al., 2007).***

DW-MRI characterized by markedly decreased imaging time and increased sensitivity to signal changes due to molecular motion. But having the disadvantages of decreased spatial resolution of the images and magnetic field inhomogeneities which is partially prominent in anatomic regions with air-tissue interfaces, such as the base of the skull. **(Hagmann P, et al., 2006).**

DWI provides a novel way toevaluate the diffusion properties of the water molecules intissue and has been used in clinical applications such asischemia, tumors, epilepsy, and