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# Neuroimaging for Neurological Disorders: A Comprehensive Overview

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## Short Communication

Neuroimaging has revolutionized the field of neurology by providing unprecedented insights into the structure and function of the brain and central nervous system. The evolution of neuroimaging techniques, including Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Functional MRI (fMRI), and Positron Emission Tomography (PET), has significantly advanced the diagnosis, management, and understanding of various neurological disorders. This manuscript offers a comprehensive overview of neuroimaging modalities and their application to neurological disorders. Emphasis is placed on the utility of these techniques in diagnosing conditions such as stroke, epilepsy, neurodegenerative diseases, and tumors. Additionally, the paper explores the integration of neuroimaging with other diagnostic tools and the potential future directions for research in this field. Neuroimaging has become an indispensable tool in modern neurology, providing critical insights into both the structural and functional aspects of the brain. The progression of neuroimaging technologies has enhanced our ability to diagnose, understand, and manage neurological disorders, revolutionizing patient care. This manuscript reviews the principal neuroimaging modalities and their applications in diagnosing and monitoring a range of neurological conditions [1].

Computed Tomography (CT) is one of the earliest neuroimaging techniques, offering rapid imaging capabilities and excellent resolution for detecting acute intracranial hemorrhages and structural abnormalities. CT scans utilize X-ray technology to generate cross-sectional images of the brain, allowing for the identification of lesions, strokes, and tumors. Its primary advantages include speed and availability, making it a go-to tool in emergency situations. However, CT is less effective than other modalities in differentiating between various types of brain tissue and is limited by its exposure to ionizing radiation; Magnetic Resonance Imaging (MRI) represents a significant advancement in neuroimaging, offering superior resolution and contrast compared to CT. MRI uses strong magnetic fields and radiofrequency pulses to create detailed images of the brain's internal structures. It is particularly valuable for assessing soft tissue details, including brain lesions, demyelination, and neurodegenerative changes. Various MRI techniques, such as T1-weighted, T2-weighted, and Diffusion Tensor Imaging (DTI), provide different contrasts and are useful for evaluating a broad spectrum of neurological conditions. MRI is especially effective in diagnosing multiple sclerosis, Alzheimer's disease, and brain tumors [2].

**Keywords:** Neuroimaging; Neurological disorders; Computed tomography

## Conflict of Interest

None.

## References

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