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Rajendra D Badgaiyan

Icahn School of Medicine at Mt Sinai, USA

Differentiating Parkinson's dementia from other types of dementia

Diagnosis of Parkinson's dementia is mostly clinical. However, there are many forms of demetia. Treatment approach of some forms of demetia is different from those of the Parkinson's type. For example dementia due to Alzheimer's disease are dependent on acetyl choline neurotransmission while Parkinson's demetia is due to dysregulated dopamine neurotransmission. Because of subjective nature of clinical diagnosis, many patients are misdiagnosed with a different type of dementia, resulting in patients receiving wrong treatment. It is therefore important to have a diagnostic method that allows us to differentiate dopamine and acetyl choline dependent dementia. A novel neuroimaging technique that we recently developed could be useful in this context. The technique called single scan dynamic molecular imaging technique (SDMIT) uses positron emission tomography (PET) to detect, map and measure dopamine released acutely during cognitive or behavioral processing. It exploits the competition between a neurotransmitter and its receptor ligand for occupancy of the same receptor site. In this technique after patients are positioned in the PET camera, a radio-labeled neurotransmitter ligand is injected intravenously and the PET data acquisition started. These data are used by a receptor kinetic model to detect, map and measure neurotransmitter released dynamically in different brain areas. Patients are asked to perform a cognitive task while in the scanner and the amount of neurotransmitter released in different brain areas measured. By comparing it with the data acquired in age-matched healthy volunteers during performance of a similar task, it is possible to determine which neurotransmitter release is dysregulated in the patients and whether the dysregulation is responsible for clinical symptoms. Finding of a significant dysregulation of dopaminergic neurotransmission would indicate a diagnosis of Parkinson's dementia while dysregulated acetyl choline neurotransmission would suggest dementia of Alzheimer's type.

Biography

Rajendra D Badgaiyan, MD, is a psychiatrist and cognitive neuroscientist. He is Chairman of the Department of Psychiatry and Behavioral Sciences at Richmond University Medical Center, and Professor of Psychiatry at Icahn School of Medicine at Mount Sinai in New York. He received formal training in psychiatry, psychology, cognitive neuroscience, molecular imaging and neuroimaging. He was awarded the prestigious BK Anand National Research Prize in India and Solomon Award of Harvard Medical School. His research is focused on the study of neural and neurochemical mechanisms that control human brain functions. He developed the single scan dynamic molecular imaging technique (SDMIT) to detect, map, and measure neurotransmitters released acutely in the human brain during task performance. This technique is now used in laboratories all over the world. Using this technique, he studies dopaminergic control of human cognition and behavior. He is also interested in learning the nature of dysregulated dopamine neurotransmission in psychiatric and neuropsychiatric conditions. His research is funded by NIMH, NINDS, VA, and various foundations. Previously he served in the faculty of Harvard Medical School, SUNY Buffalo and University of Minnesota. He has published extensively in peer-reviewed journals.

sbadgaiyan@gmail.com

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