Differentiating Parkinson's disease from Multiple System Atrophy by MIBG: is it always possible?

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Background

Differential diagnosis between Parkinson's disease (PD) and atypical parkinsonisms is sometimes challenging in clinical practice. Conventional magnetic resonance imaging (cMRI) is often used to identify Progressive Supranuclear Palsy (PSP) and Multiple System Atrophy (MSA) but the typical features of these conditions rarely appeared in the early phase of the disease. Cardiac Meta-Iodo-Benzyl-Guanidine (MIBG) scintigraphy is useful to distinguish PD from MSA since it is related to high sensitivity and specificity (up to 90%). Nevertheless, studies also show a difference in sensitivity and specificity, respectively of 79-100% and 84-89%.

Methodology

Myocardial meta-iodobenzylguanidine (MIBG) uptake on MIBG myocardial scintigraphy is frequently reduced in patients with Parkinson's disease, while multiple system atrophy (MSA) showed relatively modest reductions of cardiac MIBG uptake or normal pattern.

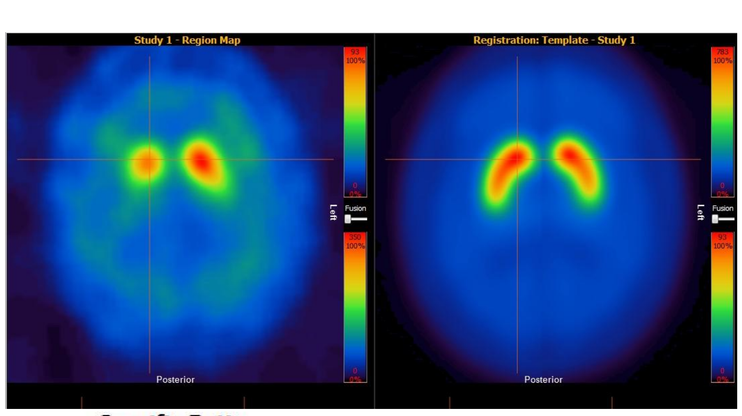
Our experience

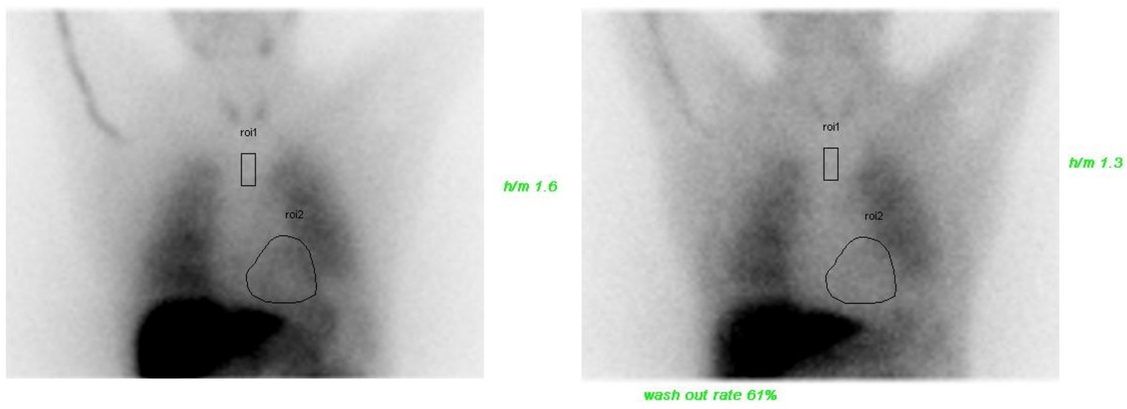
Since 2006 our hospital studied 98 patients through MIBG, 68 of which due to non-neurological related diseases (especially to study myocardial innervation in heart diseases). In 30 patients out of 98 a MIBG analysis was carried out to differentiate between Parkinson's deaseas and other atypical parkisonism symdromes. In 28/30 cases the MIBG confirmed the results of the other examinations and the assumed diagnosis.

Two emblematic cases

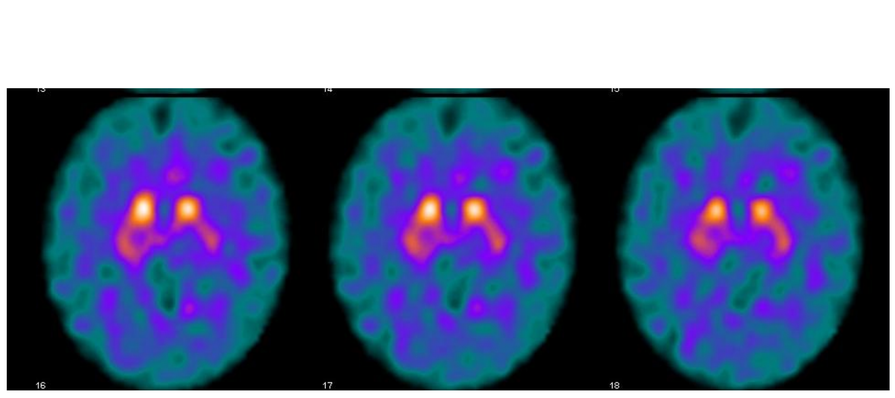
Two case reports have been selected as examples of problematic diagnosis.

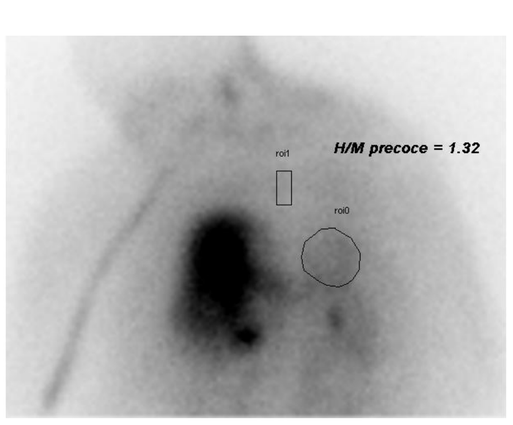
The first case is a 79-year-old man, who was experiencing tremor, mobility deficit at left hand, unstable walking, which started in 2013. Lack of hyposmia. Presence of RBD, orthostatic hypotension, bladder iperactivity, constipation. The SPECT DAT scan was abnormal with a bilateral nigrostriatal degeneration, more severe in the right side. Cerebral MRI showed mesencephalic atrophy suggesting MSA. Levodopa test was negative. MIBG was abnormal with severe heart denervation. In the following months, after adequate treatment, the patient's conditions progressively worsened.

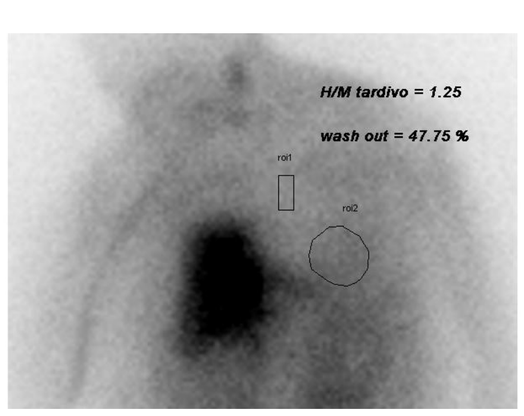




The second case is a 66-year-old woman, suffering from gate instability and axial impairment, rest tremor and mobility deficit at right hand, which started in 2008. Presence of RBD, hyposmia, orthostatic hypotension, constipation but no urinary disorders. The SPECT DAT scan was abnormal. Cerebral MRI showed cortical atrophy and severe basal ganglia's atrophy. MIBG was abnormal with severe heart denervation. In the following months, after changes and intensification of the dopaminergic treatment, the clinical conditions remained unchanged.







Conclusions

In most cases, MIBG is a useful technique to help the physician to differentiate Parkinson's disease from other neurodegenerative parkisonisms. However, it might also lead to a more complicated diagnosis process. In such cases, combining different diagnosis methodologies is essential in order to get to a definitive diagnosis.

Bibliography

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