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Clinical predictors of outcome in brain dopamine transporter imaging for parkinsonism

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INTRODUCTION

Clinical [^{123}I]FP-CIT SPECT imaging is commonly used to evaluate the integrity of the mesostriatal dopaminergic neurons. In clinical practice, the method is used for a large variety of clinically uncertain parkinsonian syndromes in heterogeneous patient populations and some clinical scans may be unnecessary. In the present study, we investigated whether there are factors, demographic or clinical, that could predict the outcome of [^{123}I]FP-CIT SPECT imaging in an unselected large sample of clinical patients.

METHODS

We investigated a sample of 538 consecutive patients from a single center during a six-year period. The demographical data and indications for SPECT scanning were obtained from the hospital records. The patients were divided into two groups according to imaging conclusion, i.e. if the scan was normal or abnormal. Binary logistic regression analyses were performed to investigate whether the demographical variables had an independent association with the outcome of the scan.

RESULTS

Out of 538 patients, 303 (56.3%) patients had abnormal scans indicating dopaminergic deficit. Patients with abnormal scan were significantly older (p=0.012), had shorter symptom duration (p<0.001), were more likely men (p=0.014), and had more often asymmetrical symptoms (p=0.017). In addition, two scanning indications were associated with outcome. The re-evaluation of previously established Parkinson's disease diagnosis was associated with abnormal scan (74.4%, p=0.004) whereas the differential diagnosis between PD and medication-induced parkinsonism was associated with normal scanning result (35.4% abnormal%, p=0.036) compared to patients that were scanned for clinically uncertain parkinsonism.

Table 1.

Indication	All patients (n=538)	normal (n=235)	%	abnormal (n=303)	Chi-Square p
1. cups	190	93	48.95	97	<0.001
2. suspected PD	175	64	36.57	110	
4. PD or medication related	48	31	64.58	17	
3. re-evaluation of PD diagnosis	39	10	25.64	29	
7. PD or essential tremor	31	19	61.29	12	
6. suspected LBD	19	9	47.37	10	
8. suspected PSP	11	0	0.00	11	
5. suspected MSA	10	5	50.00	5	
9. suspected parkinsonism plus	9	3	33.33	6	
11. PD or vascular parkinsonism	3	0	0.00	3	
10. PD with acute akinesia	2	0	0.00	2	
12 .suspected CBD	2	1	50.00	1	

Table 2. Binary logistic regression analyses.

Dependent variable		Sig.	OR
conclusion			
	sex	0.073	0.71
	age at scan (10 years)	0.002	1.3
	indication for imaging	0.001	
	suspected PD	0.165	1.37
	re-evaluation of PD diagnosis	0.004	3.56
	PD or medication related	0.036	0.48
	suspected MSA, PSP or parkinsonism plus	0.062	2.34
	PD or essential tremor	0.863	0.93
	symptom duration (years)	<0.001	0.87
	predominant side of symptoms	0.005	0.51

DISCUSSION

Our results demonstrate that the abnormal outcome of clinical dopamine transporter imaging is linked to same epidemiological factors that are associated with increased risk for Parkinson's disease (higher age, male sex) and to asymmetrical presentation of motor symptoms. Long duration of uncertain motor symptoms, reflecting lack of progression, is associated with normal dopamine transporter binding.

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