In patients with Parkinson’s, can DaTSCAN predict prognosis and therapeutic response?

Appraised by Kevin Galbraith, 11 February 2016

Update due 2019

Clinical question

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Background

Parkinson’s can be difficult to differentiate from other parkinsonian syndromes oressential tremor. DaTSCAN, which measures the density of nigrostriatal dopamine transporter sites, may in some cases help the clinician make the correct diagnosis. This CAT looks at the evidence contributing to our understanding of whether DaTSCAN can also predict the prognosis or therapeutic response.

Clinical bottom line

1. No evidence was found to suggest DaTSCAN can predict prognosis or therapeutic response.

2. One good quality study (strength of evidence level 2) found no correlation between DaTSCAN uptake and motor symptoms over three to seven years. The study cites a previous study (not found in this CAT), which did find such a correlation, but over 12 to 15 months. The reason for the lack of consistency in findings is unclear.

Search terms

(Ioflupane OR FP-CIT OR DaTSCAN OR DaTscan OR DaT–SPECT OR dopaminergic imaging) AND (prognosis OR therapeutic response)

Search strategy

Ovid Medline, adapted for Embase and Cochrane Library from 1996 to February 2016.

Evidence

The search yielded 105 articles. Of these, only one was relevant to the clinical question, and is critically appraised below.¹

Summary

A sample of 40 patients were diagnosed as suffering idiopathic Parkinson's by two independent neurologists at baseline visit. They all underwent DaTSCAN and assessment for motor symptoms. 38 patients who remained in the study were assessed again for motor symptoms by the same investigator, blind to the baseline DaTSCAN result, between three and seven years later. The striatal DaTSCAN uptake – measured at baseline – correlated significantly (and inversely) with the severity of axial symptoms (only in the putamen), bradykinesia and rigidity, but not with the severity of tremor at follow-up three to seven years later. However, there was no significant correlation between DaTSCAN uptake at baseline, and the progress of any single motor symptom. The conclusion was that an initial DaTSCAN does not predict the velocity of progress in Parkinson's motor symptoms within an interval of three to seven years. The following points should be noted:

• The aim of the study was clearly stated.
• There was no attempt to calculate the sample size that would be needed to overturn a null hypothesis.
• Parkinson's was diagnosed according to the criteria of the UK Parkinson's Disease Society Brain Bank (a suitable and valid instrument).
• There was no comparison of the characteristics of the study sample with those of the wider population of people with Parkinson's. This could impair the external validity (generalisability) of findings.
• DaTSCANs were assessed semiquantitatively. Great technical detail was provided on the DaTSCAN procedure. One might assume that all patients underwent an identical procedure, in the same conditions, with identical settings, though this was not explicitly stated.
• All DaTSCAN measurements were evaluated by the same observer, who was blinded to the clinical findings.
• DaTSCAN was abnormal in all patients, indicating a dopaminergic deficit.
• All patients took antiparkinsonian medications, though it was unclear at which stage these were started.
• Motor assessments were carried out using the motor component of the Unified Parkinson's Disease Rating Scale (UPDRS). This is a suitable, valid standard. They were assessed during an ‘off’ phase from medication (in which the various medications were withdrawn for differing durations, presumably depending on their pharmacodynamic properties).
• All UPDRS tests at baseline and follow-up were conducted by the same investigator, and blinded to the baseline DaTSCAN result.
• Two patients were excluded from the analysis: one developed a serious disease independent of Parkinson’s, and was not confirmed at follow-up to have Parkinson’s. The other was diagnosed as having multiple system atrophy.
• The discussion refers to one other study that found significant correlations between striatal DaTSCAN uptake and the progression of motor symptoms over 12 to 15 months.2 This study was not found among the 105 articles generated in the search for this CAT. The reasons for different findings are not clear.
• Overall, the quality of this study is reasonable. Reference standards were consistently applied, and blinding was employed appropriately. Generalisability of findings is questionable given the lack of comparison between the characteristics of subjects, and those of the general population of people with Parkinson’s.

Strength of evidence

level 2 (1=strongest; 5=weakest)*


References


The UK Parkinson’s Excellence Network is the driving force for improving Parkinson’s care, connecting and equipping professionals to provide the services people affected by the condition want to see.

The tools, education and data it provides are crucial for better services and professional development.

The network links key professionals and people affected by Parkinson’s, bringing new opportunities to learn from each other and work together for change.

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