

# THE RELATIONSHIP BETWEEN LOWER URINARY TRACT FUNCTION AND 123I- IOFLUPANE SCINTIGRAPHY IN PARKINSON'S DISEASE.

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## Objectives

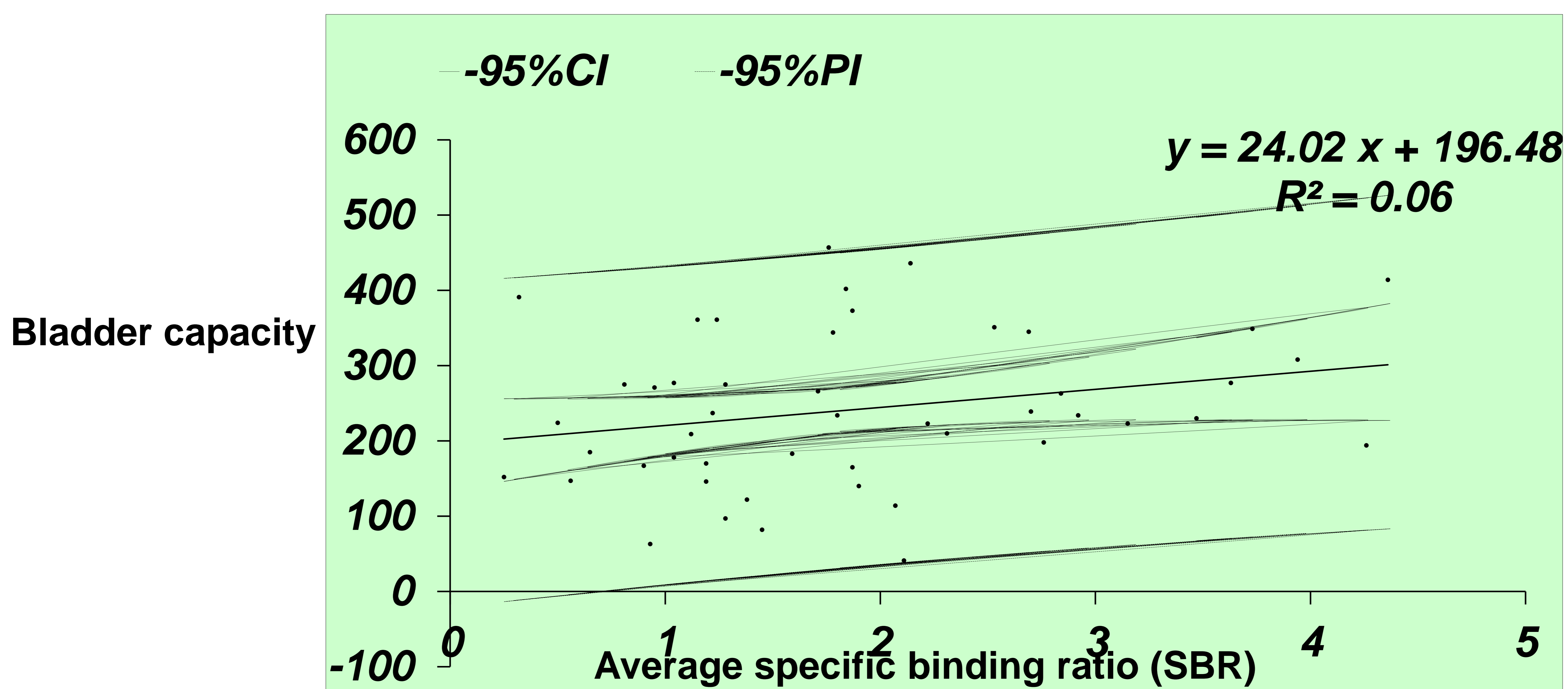
Parkinson's disease (PD) is the most common degenerative cause of movement disorders, and autonomic dysfunction has been recognized in this disorder. However, the lower urinary tract (LUT) function in PD patients has not been fully delineated. We investigated the LUT function in PD by SPECT imaging of the dopamine transporter with [ 123I]- ioflupane and clinical-urodynamic observations.

## Methods

We had 49 patients with Parkinson's disease (PD) who underwent a systematized lower urinary tract symptom (LUTS) questionnaire and a urodynamics, which were performed irrespective of the presence of LUTS. The diagnosis of PD was made according to published criteria. We evaluated all patients with PD using single-photon emission computerized tomography (SPECT) imaging of the dopamine transporter with [ 123I]- ioflupane. (Figure 1). The patients included 25 men and 24 women; mean age 70 (47-79) years; mean disease duration 2.7 (0.4-10) years. All patients had gait difficulty with the mean Hoehn Yahr stage 2.4. Cognitive function was assessed in all patients; and the mean Mini Mental State Examination (MMSE) score was 26.5 (less than 24 indicates cognitive decline). Urodynamics/ sphincter electromyography (EMG) was performed according to the International Continence Society methods.

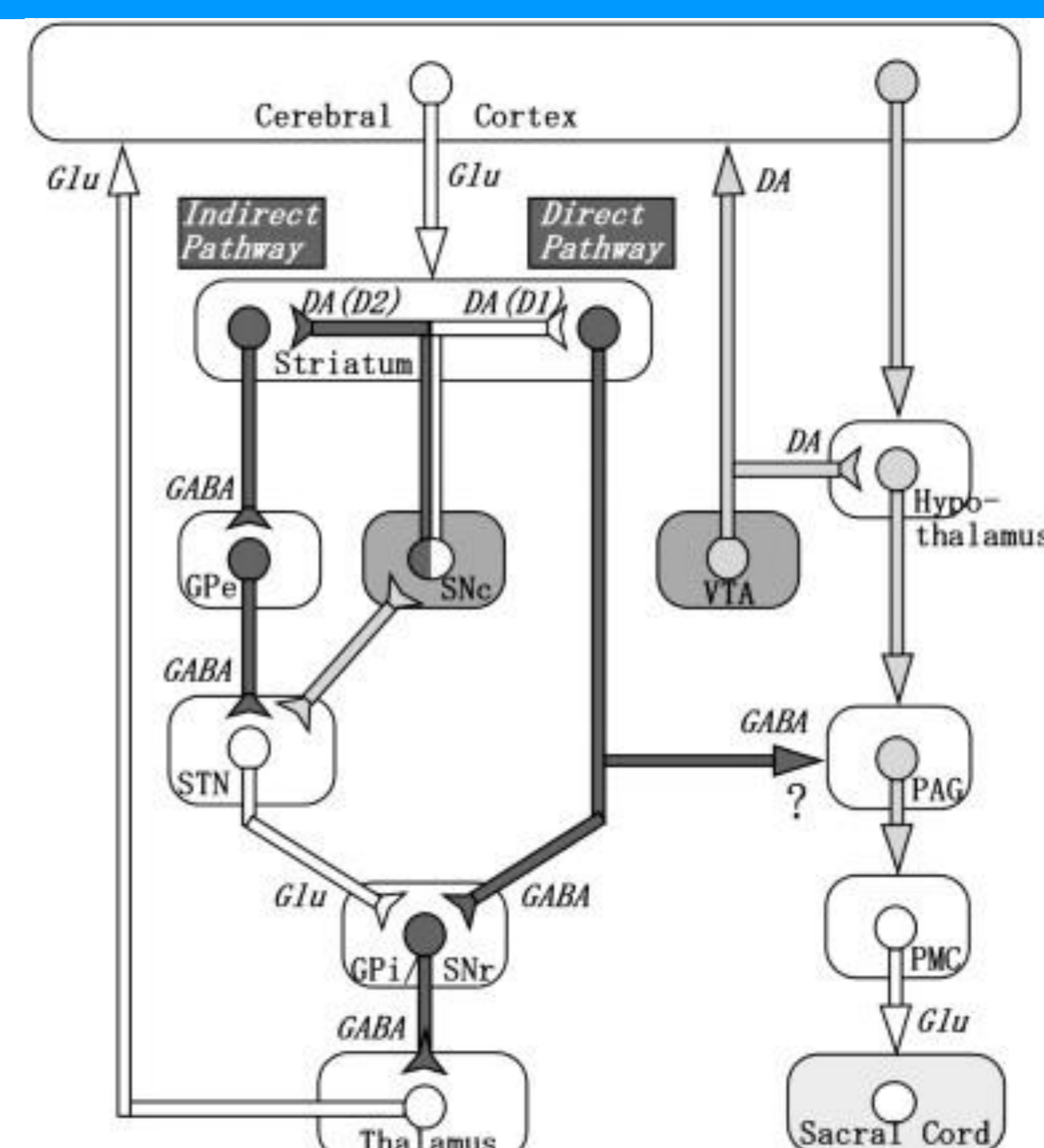
## Results

A questionnaire revealed that all patients had LUTS; comprising night-time urinary frequency in 57.8 %, urinary incontinence in 15.6 %, daytime urinary frequency in 75.6 % and urinary retention (post-void residual > 100 ml) in 2 %. A urodynamic study revealed a mean volume at the first sensation 114.9 ml (42-306 ml; 100< normal <300 ml); bladder capacity 241.7 ml (63-414 ml, 200< normal <600 ml); and detrusor overactivity in 43.6 %. Sphincter electromyography (EMG) revealed neurogenic change in 10 % on whom the test was performed. Average specific binding ratio (SBR) of 123I-ioflupane scintigraphy had significant correlation with bladder capacity (Spearman's correlation coefficients  $p < 0.05$ ).



## Interpretation & Conclusion

■ In the present study, EMG-cystometry revealed DO in 46.3% of the patients studied. The result was less than those in the previous reports. This presumably reflected early (short disease duration) PD in the present study. For the first time to our knowledge, average SBR had significant correlation with bladder capacity in the present study. Noninvasive neuroimaging of PD patients by PET/SPECT has been performed to correlate the images with postmortem nigral cell counts, to measure a progression of degenerating nigrostriatal cells in vivo, and to correlate reduced nigrostriatal dopaminergic function in PD. This result reflects PD's brain pathology in the striatum, which was relevant to the higher control of storage in micturition.



Possible relationship between basal ganglia circuit (left-side) and micturition circuit (right-side). (Modified from Sakakibara, Tateno et al.2012).

■ PD has common lower urinary tract dysfunction as indicated by urinary incontinence and detrusor overactivity. Our study results revealed PD's brain pathology in the striatum, which was relevant to the higher control of storage in micturition.