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QUANTITATIVE LOWER-GASTROINTESTINAL AUTONOMIC TEST (QL-GAT): BOWEL ASSESSMENT BEFORE AND AFTER LEVODOPA IN DENOVO PARKINSON'S DISEASE

Hypothesis / aims of study

Idiopathic Parkinson's disease (iPD) is a common movement disorder associated with the degeneration of dopaminergic neurons in the brain and the peripheral myenteric plexus; the latter contributing to the common occurrence of constipation in this disorder. Levodopa is the gold standard to treat motor disorder in iPD. However, previously, no reports have been available to see whether levodopa might alter bowel function in denovo PD patients.

Study design, materials and methods

Patients – Six denovo PD patients were prospectively enrolled in the study. All patients fulfilled the British brain bank diagnostic criteria, and all patients underwent brain MRI, SPECT and MIBG cardiac scintigraphy. They were 3 men and 3 women; mean age, 66 years old (54-77 years); mean disease duration, 1.9 years (0.5-4 years), mean Hoehn Yahr motor grading, 2.5 (1-4).

Methods – We started the patients on 200 mg/day levodopa with 20 mg/day carbidopa for 3 months. Bowel questionnaire including bowel habit, difficult defecation and faecal incontinence, and quantitative lower-gastrointestinal autonomic test (QL-GAT) were made before and 3 months after administration of levodopa. QL-GAT consisted of colonic transit time by repetitive capsule ingestion method and rectoanal videomanometry. Statistical analysis was made using Student's paired *t*-test. All patients provided informed consent before participating in the study.

Results

All patients responded well to the levodopa treatment in terms of motor disorder. None was dropped out from the study. The first assessment (before levodopa) showed a mildly prolonged total colonic transit time; smaller spontaneous phasic rectal contraction (SPRC), smaller rectal contraction on defecation, and tendency of paradoxical sphincter contraction on defecation (PSD) as compared with normal controls in our laboratory (**Figure 1**).

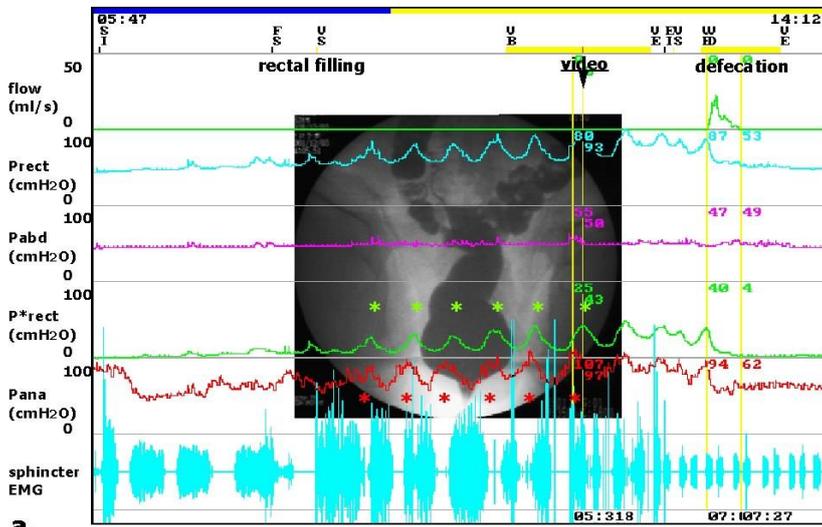
The second assessment (3 months after levodopa) showed that mean bowel habit slightly improved from 4.5 to 6.5 per week; total colonic transit time unchanged, 44.9 to 50.4 hours; videomanometry storage, first sensation decreased from 231 to 107 ml ($p < 0.01$), rectal capacity slightly decreased from 465 to 385 ml, SPRC slightly increased from 15.1 to 18.3 cmH₂O; defecation, rectal contraction slight increased from 7.2 to 14.0 cmH₂O, abdominal strain slight decreased from 49.7 to 23.5 cmH₂O, tendency of PSD decreased from 18.8 to -10.3 cmH₂O, post-defecation residual decreased from 228 to 73 ml ($p < 0.05$) (**Table 1**).

Interpretation of results

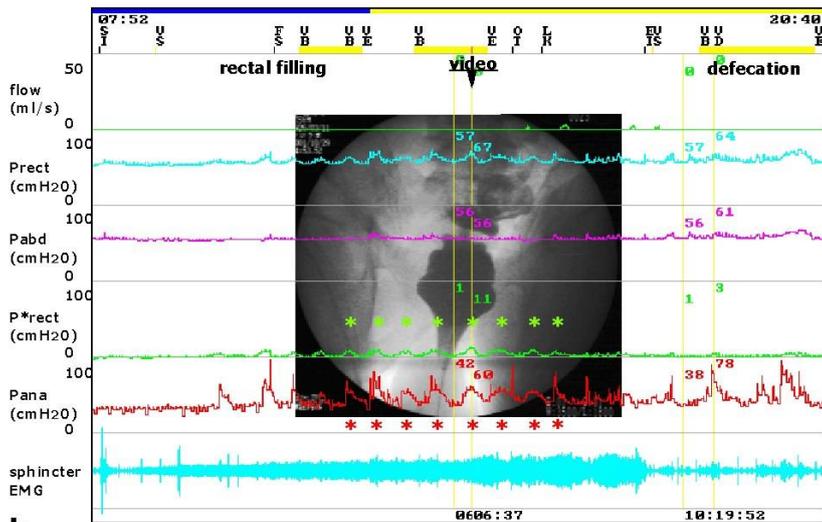
Experimental studies indicated that endogenous dopamine may inhibit intestinal motility. In contrast, exogenously administered dopamine may facilitate gut motility, particularly in the caudal part (colon) via complex mechanisms. As a result, clinical reports of dopamine on the gut motility have produced conflicting results. In the present study, QL-GAT showed that levodopa treatment might alter bowel function in denovo PD; particularly facilitating defecation.

Concluding message

QL-GAT showed that levodopa treatment might alter bowel function in denovo PD; particularly facilitating defecation.



a.



b.

Figure 1 Examples of rectoanal videomanometry. a. normal control, b. iPD.

transit (hours)	recto-sigmoid			anal manometry at rest				rectoanal videomanometry				defecation phase				
	right	left	total	anal pressure (cmH2O)	abdominal pressure (cmH2O)	storage phase (mi)	defecation phase (cmH2O)	defecation phase (cmH2O)	defecation phase (cmH2O)	defecation phase (mi)						
				rest	squeeze	cough	strain	first sensation	rectal capacity	SPRC	anal pressure	rectal pressure	anal pressure	abdominal pressure	post defecation residuals	
before	3.6	9.4	24.4	44.9	71.2	76.0	67.8	28.8	231.0	465.0	15.2	4.5	7.2	18.8	49.7	228.3
after	5.2	12.2	24.6	50.4	57.3	85.5	83.2	23.8	107.0	385.5	18.3	10.3	14.0	-10.3	23.5	73.3
paired t-test									p<0.01							p<0.05

SPRC: spontaneous phasic rectal contraction

Table 1 Results of QL-GAT before and after levodopa treatment in PD.

Specify source of funding or grant	No funding or grant
Is this a clinical trial?	No
What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	Yes
Specify Name of Ethics Committee	Toho University Sakura Medical Center, Ethics Committee
Was the Declaration of Helsinki followed?	Yes
Was informed consent obtained from the patients?	Yes