# GENDER DIFFERENCES IN HEART RATE VARIABILITY IN PATIENTS AFFECTED BY PARKINSON'S DISEASE

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## BACKGROUND

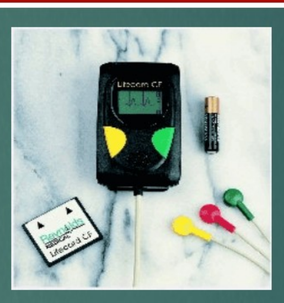
Previous studies have reported the presence of gender differences in motor and non-motor symptoms of Parkinson's disease (PD) patients. Among non-motor symptoms, autonomic cardiovascular disturbances represent a frequent cause of disability. To date, specific differences between male and female PD patients in cardiovascular modulation have not been extensively examined.

## OBJECTIVE

To investigate gender differences in cardiovascular dysmodulation in PD patients, we performed a study using heart rate variability (HRV) analysis.

## METHODS

An HRV study with a 24-hour ambulatory ECG recording was performed in two groups of PD patients subdivided for sex (13 male and 12 female patients) matched for age and duration of disease (Table 1). A control group of 24 healthy subjects matched for age and gender was also enrolled. Among the HRV spectral parameters in the frequency domain, the values of low frequency (LF) and high frequency (HF), were assessed and expressed in normalised units (nu). The ratio of LF/HF power was also evaluated. Circadian differences were assessed.



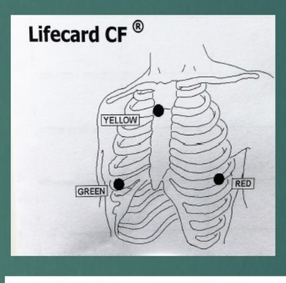



**Table 1. Characteristics of PD patients enrolled in this study**

| | |
|---|---|
| **PD patients: 25** | |
| **Age at observation, mean, years (SD)** | 63.3 (5.8) |
| **Disease duration, mean, years (SD)** | 5.4 (2.8) |
| **Male PD patients: 13** | |
| **Age at observation, mean, years (SD)** | 63.5 (6.7) |
| **Disease duration, mean, years (SD)** | 5.4 (2.8) |
| **Female PD patients: 12** | |
| **Age at observation, mean, years (SD)** | 63.1 (5.2) |
| **Disease duration, mean, years (SD)** | 5.3 (3.1) |

## RESULTS

PD patients showed a significant decrease of LF/HF ratio and LF nu in comparison with healthy controls (Table 2) Male PD [MPD] patients showed a significant reduction of LF values both with respect to the control male group [CMG] (LF nu 46,75±12,95 vs 62,22±14,79; p<0,01) and to the group of female PD patients [FPD] (LF nu 46,75±12,95 vs 55,28±9,81; p<0,01). Furthermore, HRV study showed a significant reduction of LF/HF in MPD with respect to FPD (1,64±0,72 vs 2,36±0,85; p<0,01). No significant differences were detected among MPD and FPD in HF parameters in the 24 hours and among FPD and female control group [FCG] (Table 3).

**Table 2. Circadian HRV parameters in PD patients compared with healthy controls.**

| HRV parameters | PD patients (25) | Healthy Controls (24) | P< |
|---|---|---|---|
| **LF/HF (24 hours)** | 1,98±0,85 | 2,93±1,42 | **0,01** |
| **LF/HF (diurnal)** | 2,31±1,18 | 3,33±1,67; | **0,02** |
| **LF/HF (nocturnal)** | 1,43±0,80 | 2,26±1,23 | **0,001** |
| **HF nu (24 hours)** | 33,64±6,99 | 28,10±8,84 | **0,02** |
| **HF nu (diurnal)** | 30,31±8,35 | 25,35±9,29 | 0,05 |
| **HF nu (nocturnal)** | 39,84±8,04 | 34,21±12,62 | 0,07 |
| **LF nu (24 hours)** | 50,84±12,12 | 60,42±12,50 | **0,01** |
| **LF nu (diurnal)** | 52,95±14,93 | 62,94±12,50 | **0,01** |
| **LF nu (nocturnal)** | 47,75±11,22 | 55,98±12,26 | **0,01** |

**Table 3 Circadian HRV gender differences in PD patients and compared with healthy controls.**

| HRV parameters | MPD vs CMG P< | CMG | MPD | MPD vs FPD P< | FPD | FCG | FPD vs FCG P< |
|---|---|---|---|---|---|---|---|
| **LF/HF (24 hours)** | **0,01** | 3,18±1,71 | 1,64±0,72 | **0,01** | 2,36±0,85 | 2,69±1,08 | 0,41 |
| **LF/HF (diurnal)** | **0,01** | 3,60±1,94 | 1,77±0,89 | **0,01** | 2,90±1,20 | 3,05±1,39 | 0,78 |
| **LF/HF (nocturnal)** | **0,04** | 2,44±1,48 | 1,42±0,69 | 0,96 | 1,43±0,53 | 2,09±0,99 | 0,05 |
| **HF nu (24 hours)** | **0,03** | 27,99±10,05 | 36,04±7,29 | 0,08 | 31,25±6,02 | 28,21±7,90 | 0,29 |
| **HF nu (diurnal)** | **0,04** | 25,36±11,31 | 34,01±7,81 | **0,02** | 26,61±7,39 | 25,34±7,21 | 0,67 |
| **HF nu (nocturnal)** | **0,46** | 35,81±13,61 | 39,35±9,25 | 0,76 | 40,34±6,97 | 32,75±12,04 | 0,06 |
| **LF nu (24 hours)** | **0,01** | 62,22±14,79 | 46,75±12,95 | **0,01** | 55,28±9,81 | 58,62±7,64 | 0,36 |
| **LF nu (diurnal)** | **0,01** | 63,90±15,82 | 47,14±14,82 | **0,01** | 59,25±12,80 | 61,99±8,62 | 0,55 |
| **LF nu (nocturnal)** | **0,04** | 58,69±14,15 | 46,42±13,01 | **0,01** | 49,19±9,26 | 53,50±10,23 | 0,29 |

## DISCUSSION AND CONCLUSIONS

We have identified the presence of specific gender differences in cardiovascular modulation among PD patients without orthostatic hypotension. These results confirm the importance of the accurate detection of gender differences in PD patients. In this regard, the presence of specific gender differences in cardiovascular dysmodulation might be useful to better predict the onset of possible dysautonomic symptoms and to improve pharmacological treatment, preventing cardiovascular side effects of dopaminergic drugs

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