

Clinical short communication

## Pathological Gambling in Parkinson's disease patients: Dopaminergic medication or personality traits fault?

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## ABSTRACT

Impulse control disorders (ICDs) are clinically relevant in Parkinson disease (PD) patients, with an established association with PD medication. Aim of our study was to study whether the increased frequency of pathological gambling (PG), reported in subgroups of PD patients, is related to specific personality traits additional to dopaminergic medications.

Thirty-seven PD patients with a personal history of PG where enrolled. Twenty one PD patients, matched for disease and dopaminergic therapy, never experiencing PG, were enrolled as controls. All subjects were tested with the Minnesota Multiphasic Inventory Personality scales (MMPI-2).

Our data showed that PD group with PG exhibited significantly higher mean values of the three validity scales in comparison to the non-PG-PD group, demonstrating an higher tendency to lie. Content scales showed a significant increase of cynicism and bizarre ideation scales score in the PG-PD group, not exhibiting pathological values at the validity scales, ( $p: 0.02$ ) in comparison to non-PG PD patients.

According to our results, PG seems to be associated with precise personality traits. Personality profiles of cluster A personality disturbances - Axis 2 according with DSM-5 TR (paranoid type) at MMPI-2 might be a warning index helpful in selecting dopaminergic treatment, to avoid subsequent ICDs appearance.

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## 1. Introduction

Impulse Control Disorders (ICDs), including compulsive gambling, buying, sexual behavior and eating show larger incidence in drug treated Parkinson's disease population in comparison to normal subjects [1], while ICDs are equally prevalent in de novo untreated PD patients and in normal population (approximately 20%) [2]. This finding supports the hypothesis that ICD develop because of antiparkinsonian drug use, but does not rule out the hypothesis that specific personality characteristic, interacting with drug use, may be involved in developing ICD or the specific type of ICD. PG subjects not affected by PD present specific personality characteristics that differ from control subjects and may resemble those of Patients with substance addiction [3]. Aim of our study was to evaluate personality traits, by means of Minnesota Multiphasic Personality Inventory-2 (MMPI-2) [4], in a population of Parkinson's disease patients affected by Pathological gambling in comparison with a group of PD patients, matched for clinical, pharmacological history and demographic characteristics, not affected by impulse control disorders.

## 2. Methods

Thirty-seven PD patients with a personal history of PG (as reported by care givers and confirmed by QUIP [5]) resolved at the time of the inclusion from at least six months by changing dopaminergic medications, were enrolled. Twenty one PD patients, matched for disease and dopaminergic therapy history, never experienced any ICDs (and thus no PG) as personally stated and confirmed by care givers and by QUIP scale were enrolled as controls. The study was approved by our local Ethics Committee, and all participants provided informed consent.

Inclusion criteria were: adequate educational level (>8 years of education); no dementia (according to a complete neuropsychological evaluation and MMSE >28/30); stable dopaminergic medications for at least six months before evaluation without clear on-off phenomenon although mild fluctuations may be present, no use of antidepressant or antipsychotic medications. Levodopa equivalent doses in the two groups were similar and DA and LD doses were matched in the two groups at the time of ICD presentation and at the time of the present assessment.

All subjects were asked to fill the MMPI-2 questionnaire, one of the most commonly used assessment tool in mental health to evaluate personality characteristics. It consists in 567 true/false questions that assess a broad range of self reported psychopathology. Within the 567

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questions three validity scales were calculated and 10 clinical scales with the related sub-scales, along with 14 content scales.

The score, ranging from 45 to 55, is within normal limits in all the scales and indicate that the individual shows an effective emotionality and responds to stress without crippling neurotic defenses or psychotic decompensation. As the standard scores increase and approach 65 and above, the individual is usually found to have an emotional disorder. The nature of the disorder is predicted by the profile or pattern of the elevated scores. Moreover, the three validity scales (F,K,L: lying, lying frequency and defensive behavior) if pathological (>65) invalidate the test results, showing a patient tendency to pathological lying and thus impairing test reliability.

All patients were tested in the morning under their usual dopaminergic medication in on state, although none of them, according to their H&Y stage, exhibited profound motor or non-motor fluctuations able to affect their MMPI responses.

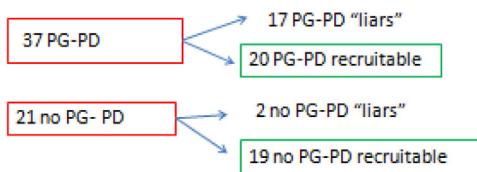
Results obtained by MMPI-2 for the two PD groups (PD with PG and PD without PG) were compared by Mann Whitney test. Bonferroni correction was applied. Frequency of liars in the two groups was tested by Fisher test. The Mini International Neuropsychiatric Interview (M.I.N.I.) was administered to PD patients with pathological gambling (PG-PD) [6].

**3. Results**

Our data demonstrated that PD group with Pathological gambling exhibited significantly higher mean values of the three validity scales in comparison to the non-PG-PD group (K: 72 + 9 vs 51 + 4, p. 0.001; L: 61 + 6 vs 47 + 5, p: 0.01, F 42 + 6 vs 63 + 8, p: 0.01). These patients were seventeen subjects from the PG-PD group but only two subjects from the 21 non-PG-PD group (see Table 1). The difference was statistically significant (p < 0.001 X squared). Those patients with pathological values (>65) at least in one of the validity scales, were separately analyzed because they were lying: however the finding of a lie tendency was the first important finding of the study. The remaining twenty PG-PD patients, not exhibiting pathological values (>65) showed, nevertheless, a significantly (p 0.02) higher value (61 + 3) of K scale

**Table 1**  
Patients clinical characteristics. PG-PD: Parkinson's disease patients affected by pathological gambling; non-PG-PD: Parkinson's disease patients not affected by pathological gamblings.  
UPDRS: Unified Parkinson's disease rating scale.

**Patients clinical characteristics**



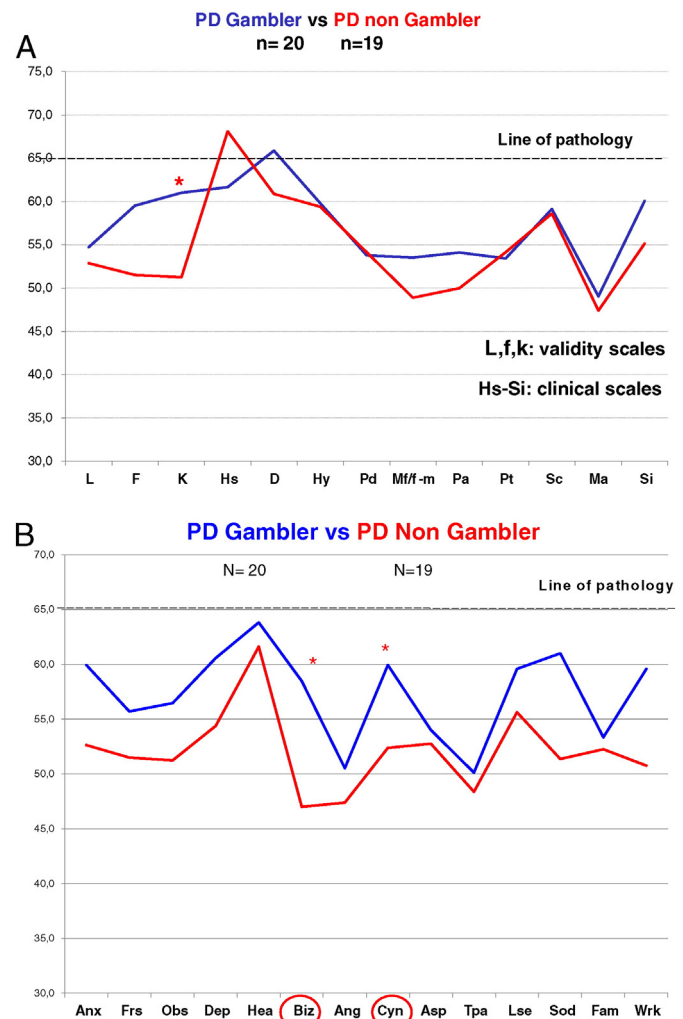
	PG - PD	Non -PG PD
Pts number	20	19
Gender (m/f)	11/9	10/9
Mean age (years)	68 ± 5.3	67 ± 4.1
Mean Disease Duration (years)	6.5 ± 3.2	6.3 ± 1.4
L-Dopa equivalent daily dose at evaluation (mg)	480 ± 125	525 ± 100
Mean UPDRS section III in on state at evaluation	19 ± 2	22 ± 3

(one of the validity scales) in comparison to non-PG PD (51 + 4), although subjects with pathological values in any of the three validity scales had been already excluded (Fig. 1A).

With regard to the clinical scales, no significant differences were obtained between the two groups (PG-PD vs non-PG-PD) when comparing the different variables (Fig. 1A).

On the contrary a significant increase of PG-PD group score was observed in the content scales concerning: anxiety (p = 0.04), bizarre ideation (p = 0.02), cynicism (p = 0.02), social discomfort (p = 0.005). However, after Bonferroni correction, only cynicism and bizarre ideation remained significantly higher in the PG-PD group (see Fig. 1B). Moreover, a trend, although not significant, to show an higher score at the scale for depression (p = 0.06) was found in PG-PD group. Notably, no pathological scores were reached by the two groups (Fig. 1B).

The presence of bizarre ideas and thoughts as well as a tendency to depression was confirmed by MINI plus assessment [6] revealing



**Fig. 1.** Minnesota Multiphasic Personality Inventory-2 profile of validity clinical and content scales in patients with and without pathological gambling (PG). A: Validity scales: L = defensive behavior; F = lying; K = lying frequency. Clinical scales: Hs = Hypochondriasis; D = depression; Hy = hysteria; Pd = psychopathic deviance; Mf/f-m = masculinity/femininity; Pa = paranoia; P = psychastenia; Sc = schizophrenia; Ma = hypomania; Si = Social Introversion. A significant difference was observed concerning K scale higher in PG-PD group. No significant differences were found regarding clinical scales when comparing clinical scales. B: Content scales: Anx = anxiety; Frs = fear; Obs = obsession; Dep = depression; Hea = health anxiety; Biz = bizarre ideation; Ang = anger; Cyn = cynicism; Asp = anti-social behavior; Lse = low level of self confidence; Sod = social discomfort; Fam = family problems; Wrk = work difficulties. A significant difference was found concerning Biz and Cyn when comparing the two groups. \* p < 0.01.

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