**Impulsive and Compulsive Behaviors in Parkinson’s Disease: A Case Series and a Review of Literature**

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**ABSTRACT**

Parkinson’s disease is a common neurodegenerative disease, with a worldwide incidence of about 10-20 in 100,000. Its diagnosis remains clinical, and it requires bradykinesia plus one of the following: Rest tremor, rigidity or postural instability. Dopaminergic therapy including levodopa and dopamine agonists has allowed a reasonable control over the motor symptoms, but it offered no help for the non-motor manifestations. To the contrary, dopaminergic antiparkinson therapy was the most likely culprit in the emergence of a new set of impulse control disorders including: Pathological gambling, hyper sexuality, compulsive shopping, compulsive eating, punding (complex, repetitive, excessive, non-goal oriented behaviors), walkabout, and dopamine dysregulation syndrome.

A case series of three main impulse control disorders in Parkinson’s disease is presented here with a review of the current thinking regarding diagnosis and treatment.

**Keywords**

Parkinson’s disease, Impulse control, Dopamine agonist

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INTRODUCTION

Parkinson's disease (PD) is clinically diagnosed using the UK Brain bank criteria, which in addition to bradykinesia, require one of the following: Rest tremor, rigidity or postural instability[1]. Levodopa and dopamine agonists have allowed a reasonable control over the motor symptoms, but they offered no help for the non-motor manifestations. To the contrary, dopaminergic antiparkinson therapy was the most likely culprit in the emergence of a new set of impulse control disorders (ICDs) including: Pathological gambling (PG)[2], hypersexuality (HS), compulsive shopping (CS), compulsive eating (CE)[3], punding (complex, repetitive, excessive, non-goal oriented behaviors)[4-6], walkabout, and dopamine dysregulation syndrome (DDS)[7].

The following case series relates to patients with impulsive and compulsive behaviors in Parkinson's disease that were seen at a private neurology clinic.

Patient No. 1

A 47-year-old male patient was diagnosed with PD for eight years, and presented with a left hand resting tremor, bradykinesia and mild rigidity. Pramipexole was started and titrated up slowly to a total of 4.5 mg daily; divided in three doses. He was active; however, dopamine agonist was not enough to keep him going thus, levodopa/carbidopa was added. Additionally, Trihexyphenidyl 2.5 mg three times daily helped with his tremor. Over the next seven years, he was seen twice a year with a minimal change in his doses. Wearing off was developed and he required entacapone 200 mg added to each dose of levodopa/carbidopa. He continued to ride horses and play football with minimal impairment, though freezing was an issue at times. A year ago, he was demanding sex daily at quite inappropriate times and places, for a few months, and his wife started complaining. Pramipexole dose was decreased slowly and this hypersexual distressing behavior improved. His weight went up by 15 kilograms in less than two months. He would pull a chair, and sits in front of the open fridge and eats anything he could get his hands on, whether he was hungry or not. This excessive eating behavior started when pramipexole dose was reduced to 1 mg three times daily. Further reduction was not tolerated and he declined a deep brain stimulation placement. He had a continuous levodopa/carbidopa intestinal gel (LCIG) pump inserted, and his pramipexole was tapered off and discontinued. His excessive eating habit disappeared a few weeks later.

Patient No. 2

A 27-year-old male patient was diagnosed with juvenile PD and maintained on pramipexole for seven years. Pramipexole was slowly titrated to a total of 4 mg daily. Levodopa/carbidopa was added a year later to allow him to keep up with his private business demands after he quits his college studies. Three years later, he developed wearing off and his levodopa/carbidopa was switched to levodopa/carbidopa/entacapone with a good response for a year or so. He was married and his marriage was initially stable. He noticed that he was demanding sex in a compulsive manner in totally inappropriate times and places. His wife was in the later part of her second pregnancy, and his marriage was quite stressed. Attempts to lower his pramipexole dose to control that compulsive behavior were not successful. He had a bilateral deep brain stimulation (DBS) inserted and that allowed him to come off pramipexole, plus his hypersexual compulsive behavior disappeared. Almost a year after his DBS was inserted; he started using smaller extra doses of levodopa/carbidopa to avoid his off-time state, which was dramatically improved with DBS insertion. Later on, his use of levodopa/carbidopa was escalated further to help with his symptoms. During his last visit, he was using levodopa/carbidopa as much as he used before the DBS was inserted. Furthermore, his father informed me that he was turning more aggressive with the increased doses of levodopa/carbidopa, and his marriage was falling apart.

Patient No. 3

A 65-year-old right-handed man was diagnosed with PD around a year ago. He presented with a right sided resting tremor, bradykinesia, masked facies and a shuffling gait. These symptoms were going on for the previous four months. He had some right shoulder pain and stiffness for five months prior to his presentation, and he ascribed that to possible arthritis. Pramipexole was started at 0.125 mg three times daily and titrated up slowly every week to 0.5 mg three times daily. On his next follow up, six months later, his son secretively handed me a small piece of paper that he wrote, “My father is demanding sex every day, most of the time, for the last two months, and mom is quite distressed. Please help”. There was no history of other compulsive behaviors elicited during the interview. Pramipexole dose was lowered slowly and he was started on levodopa/carbidopa. In the next follow up visit, three months later; his hypersexual behavior has greatly improved. For months prior to his initial visit, he was on treatment with citalopram 20 mg daily for depression and he has been followed up by a psychiatrist.

DISCUSSION

The impulse control disorders in Parkinson disease study of 3090 patients (the DOMINION study) was the largest and most detailed study of the frequency and correlates of ICDs in PD. It reported the six months prevalence of any ICDs in PD as (13.6%), including CS (5.7%), PG (5%), HS (3.5%) and CE (4.3%)[8].

In the DOMINION study, more than one fourth of ICD patients had two or more ICDs. A finding that replicates an earlier case series reporting that comorbid ICDs commonly occur in PD patients[9,10].

Main ICDs in this series include HS (patients 1, 2, 3), CE (patient 1) and DDS (patient 2), and they will be reviewed in this article.

Impulse control disorders (ICDs) in PD are mostly secondary to the use of dopamine agonists. Overall and individual ICD frequencies in the DOMINION study
were similar for patients taking both dopamine agonists pramipexole and ropinirole. The problem is a class effect and it is not specific to any single agent\[^6-9\].

Impulse control disorders (ICDs) can occur in a patient taking a stable dose of dopaminergic therapy (patients 1 and 2) or when treatment with an agonist was initiated (patient 3)\[^10,11\].

Impulse control disorders (ICDs) are mostly the result of excessive dopamine receptors stimulation. Dopamine is linked in the brain to increased impulsivity\[^12\].

Hypersexuality (HS) is not defined at the DSM IV manual\[^2\] but Voon \textit{et al.}\[^12\] provided a set of diagnostic criteria (Table 1).

Management of ICDs is suboptimal and recognition by health care providers is usually late. Impulse control disorders (ICDs) symptoms should be inquired about in all patients taking dopaminergic therapy and family NFNCFSTTIPVMECFJOWPMWFEJOUIFEJTDVTTJPO1BUJFOUTPOIJHIFSEPTFTPGEPQBNJOFSHJDUIFSBQZ
FBSMZPOTFU1%
family or personal history of addiction or early appearance of dyskinesia are all clues to possible emergence of DDS. Pharmacological interventions include reduction of dopamine agonist dose, switching to another agonist or totally eliminating dopamine agonist. Donepezil, risperidone and selective serotonin reuptake inhibitors (SSRI) have all been reported to treat ICDs in PD\[^20, 21\]. Deep brain stimulation (DBS) of the subthalamic nucleus (STN), which typically leads to reduction of the total dopamine replacement therapy, may help ICDs, though

TABLE 1.
Proposed set of diagnostic criteria for pathologic hypersexuality.

| A. The sexual thoughts or behaviors are excessive or an atypical change from baseline marked by one or more of the following: |
| --- |
| 1. Maladaptive preoccupation with sexual thoughts |
| 2. Inappropriately or excessively requesting sex from spouse or partner |
| 3. Habitual promiscuity |
| 4. Compulsive masturbation |
| 5. Telephone sex lines or pornography |
| 6. Paraphilias. |
| B. The behavior must have persisted for at least 1 month |
| C. The behavior causes at least one or more of the following: |
| 1. Marked distress |
| 2. Attempts to control thoughts or behavior unsuccessful or result in marked anxiety or distress |
| 3. Are time consuming |
| 4. Interfere significantly with social or occupational functioning |
| D. The behavior does not occur exclusively during periods of hypomania or mania. |
| E. If all criteria except C are fulfilled, the disorder is subsyndromal. |
Patient No. 2 had his DDS symptoms appeared after his DBS was inserted\(^\text{20}\). Early detection and prevention remain the most useful intervention.

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السلوكيات القهرية والاندفاعية لمرضى باركنسون: عرض لثلاث حالات مرضية ومراجعة للأدبيات الطبية

عبدالرحيم بن معاضة الشهرى
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