

Pathological Gambling Associated with Treatment of Parkinson's Disease

Founded in 1983, the Massachusetts Council on Compulsive Gambling is a private, non-profit public health agency dedicated to providing leadership to reduce the social, financial, and emotional costs of problem gambling and to promote a continuum of prevention and intervention strategies including: information and public awareness, community education and professional training, advocacy, and helpline / referral services for problem gamblers, their loved ones and the greater community.

Parkinson's disease (PD) is a movement disorder that causes tremor and decreased coordination. Unfortunately, some of the drugs used in its treatment have behavioral side effects for some individuals. This fact sheet describes how these drugs work to treat PD and discusses potential explanations about why these side effects develop.

TERMS: The following section provides definitions of gambling-related and impulse control-related disorders.

- **Pathological gambling:** *The American Psychiatric Association* classifies pathological gambling as an impulse control disorder and defines it as the "persistent and recurrent maladaptive gambling behavior that disrupts personal, family or vocational pursuits" (p. 615).¹ **Compulsive gambling** is the original lay term for pathological gambling.²
- **Sub-clinical pathological gambling** is used to describe gambling behavior that does not meet the criteria for pathological gambling but results in harmful effects to a gambler or others.² **Disordered gambling** is a term used to describe the combination of pathological and sub-clinical pathological gambling.²
- **Impulse control disorders (ICDs):** According to the *American Psychiatric Association*, ICDs are characterized by "the failure to resist an impulse, drive, or temptation to perform an act that is harmful to the person or to others" (1994). ICDs typically involve compulsive or excessive performance of behaviors that are not problematic under normal circumstances. ICDs reported among those being treated for PD include PG, compulsive sexual activity, compulsive buying, binge eating, and others, such as excessive hobbyism.^{3,4}

CAUSE AND TREATMENT OF PARKINSON'S DISEASE (PD): The following section describes PD, the cause of the symptoms of PD and the types of drugs commonly used in the treatment of the condition.

- **Parkinson's Disease (PD):** A movement disorder caused by reduced activity of dopamine producing cells in a part of the brain called the substantia nigra. The resultant lack of dopamine causes motor symptoms such as tremor and decreased coordination. PD is a degenerative disease, meaning it gets worse over time. Currently, treatment for PD is focused on managing symptoms instead of stopping or reversing the underlying cause (the death of neurons in the substantia nigra).
- **Dopamine:** A neurotransmitter—a naturally occurring chemical in the brain that allows neurons to communicate with each other. Insufficient dopamine in the brain is the main cause of the symptoms of PD. Dopamine is also found in other parts of the body. The main functions of dopamine are listed below.
 - Control of voluntary movement: Dopamine helps us to move in a smooth, controlled manner.
 - Hormonal regulation: Dopamine inhibits the release of a hormone called prolactin.
 - Cognition: Dopamine is important for important functions such as memory and attention.
 - Reward and motivation: Dopamine is involved in an important neural pathway that helps us to feel pleasure associated with stimuli such as food and sexual activity. Many drugs of abuse, such as cocaine and amphetamines, also affect this pathway by prolonging the action of dopamine.
 - Systemic effects: Dopamine acts throughout the body, affecting the kidneys, gastrointestinal system, and blood pressure.
- **Treatments For PD:** Treatments for PD that try to compensate for a lack of sufficient dopamine are listed below:
 - **Levodopa** (L-dopa) is a building block that the brain can use to make dopamine. It is usually given in conjunction with **carbidopa** (eg as Sinemet), which helps it last longer.

- Dopamine agonists, such as *pramipexole* (Mirapex) and *ropinirole* (Requip), are another widely used class of drugs in the treatment of PD. These drugs mimic the action of dopamine in the brain by binding to the same types of receptors.
- *Monoamine oxidase B inhibitors* (MAO-B inhibitors) are another class of drugs used to treat symptoms in PD. MAO-B inhibitors prevent the breakdown of the body's natural dopamine. These drugs are not currently thought to cause impulse control disorders in patients.

THE RELATIONSHIP BETWEEN TREATMENT FOR PD AND DISORDERED GAMBLING AND OTHER IMPULSE CONTROL

DISORDERS: Many scientific studies have demonstrated that PD patients being treated with these drugs develop disordered gambling or other ICDs at a higher rate than the general population.⁴ A recent study of a large number of patients being treated with any medication for PD found the following risks:⁵

- 10-15% of patients being treated with any medication for PD developed one or more ICDs.
 - Disordered gambling occurred in about 5% of patients, at similar frequencies to other ICDs including compulsive buying, compulsive sexual behavior, and binge-eating disorder.
- Levodopa therapy increased the risk for developing disordered gambling or another ICD.
 - Patients taking levodopa therapy were 1.5 times more likely to develop an ICD, with higher doses of levodopa increasing the risk.
- Dopamine agonist therapy also increased the risk for developing disordered gambling or another ICD.
 - Patients on dopamine agonist therapy were 2.7 times more likely to develop an ICD than those not taking a dopamine agonist. The dose of dopamine agonist did not seem to affect this risk.
- These side effects are related to the different functions of dopamine in the brain.
 - Levodopa and dopamine agonists are effective in reducing the symptoms of PD because they can mimic the action of the missing dopamine in the substantia nigra.
 - PG and other ICDs occur as a side effect of treatment when levodopa or dopamine agonists act on pathways elsewhere in the brain, influencing a patient's ability to control behavior.

OTHER RISK FACTORS FOR DEVELOPING ICDs AMONG PD PATIENTS USING DOPAMINE AGONISTS: Other risk factors may predispose PD patients to developing disordered gambling or another ICD. Patients with these traits should talk with their doctor about their increased risk of developing an ICD as a side effect of dopamine agonist therapy. These risk factors may include:^{3,5}

- Younger age
- Unmarried
- Smoker
- Longer PD duration
- Personal or family history of gambling problems or alcohol abuse

OTHER CLINICAL USES FOR DOPAMINE AGONISTS: Dopamine agonists are also used to treat other conditions, including:

- Restless Legs Syndrome (RLS): A condition in which patients experience uncomfortable or painful sensations in their legs accompanied by a strong urge to move them to relieve the symptoms.
 - Similar problems with gambling or compulsive sexual behavior have been reported in patients with RLS taking a dopamine agonist.⁶
- Certain tumors of the pituitary known as prolactinomas.

HELP FOR THOSE WITH GAMBLING PROBLEMS:

Help for people experiencing problems with gambling, their family members, and the greater community is available:

- The Massachusetts Council on Compulsive Gambling operates a free, confidential Helpline (800-426-1234) and website: www.masscompulsivegambling.org. In addition, the Mass. Council trains clinicians and maintains a list of professionals who have earned their Massachusetts Problem Gambling Specialist Certificate (MAPGS).
- The Massachusetts Department of Public Health funds treatment centers throughout the state. Many clinicians have earned the Massachusetts Problem Gambling Specialist Certificate and understand both the differences and similarities among problem gambling and alcohol and other substance use disorders (<http://www.mass.gov/dph/bsas>).

- Many people experiencing problems with gambling can attend meetings through Gamblers Anonymous (GA; <http://www.gamblersanonymous.org>) or Bettors Anonymous (BA; <http://www.bettorsanonymous.org/>).
- Spouses, significant others, and family members of people experiencing problems with gambling can attend Gam-Anon (<http://www.gam-anon.org/>), a fellowship that meets to share experiences about living with a disordered gambler.

For more information or to have a packet of materials sent to you, please visit www.masscompulsivegambling.org, call the Mass. Council Helpline (800-426-1234), e-mail the Council at gambling@aol.com, or visit 190 High Street, Suite 5, Boston, MA 02110-3031.

References

1. American Psychiatric Association. *DSM-IV: Diagnostic and statistical manual of mental disorders*. Fourth ed. Washington, D.C.: American Psychiatric Association; 1994.
2. National Research Council. *Pathological gambling: a critical review*. Washington D.C.: National Academy Press; 1999.
3. Evans AH, Strafella AP, Weintraub D, Stacy M. Impulsive and compulsive behaviors in Parkinson's disease. *Mov Disord*. Aug 15 2009;24(11):1561-1570.
4. Bostwick JM, Hecksel KA, Stevens SR, Bower JH, Ahlskog JE. Frequency of new-onset pathologic compulsive gambling or hypersexuality after drug treatment of idiopathic Parkinson disease. *Mayo Clin Proc*. Apr 2009;84(4):310-316.
5. Weintraub D, Koester J, Potenza MN, et al. Impulse control disorders in Parkinson disease: a cross-sectional study of 3090 patients. *Arch Neurol*. May 2010;67(5):589-595.
6. Tippmann-Peikert M, Park JG, Boeve BF, Shepard JW, Silber MH. Pathologic gambling in patients with restless legs syndrome treated with dopaminergic agonists. *Neurology*. Jan 23 2007;68(4):301-303.