Impulse Control Disorders in the Elderly

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Conflict of interest

- National Institute of Health K30
  - Scholars in Patient Oriented Research
Impulse Control Disorder

- The failure to resist an impulse, drive or temptation to perform an act that is harmful to the person or to others.
  - Increasing sense of tension or arousal before committing the act.
  - May or may not be regret, self-reproach or guilt following the act.

DSM IV TR, 2000

Impulse Control Disorders NEC

- DSM IV 2000
  - Intermittent Explosive Disorder
  - Kleptomania (stealing)
  - Pyromania (fire setting)
  - Pathological Gambling
  - Trichotillomania (hair pulling)
  - Not otherwise specified
Intermittent Explosive Disorder

- Recurrent, significant outbursts of aggression
  - Not better explained by other disorder
    - Alcohol, Mood, Personality
- Short, frequent episodes
- Onset in adolescence (age 16)
  - Chronic
- Slight male predominance
- Legal and occupational difficulties

McElroy 1998

Kleptomania

- 1816 Andre Matthey
  - First described Klopemanie (stealing insanity)
- 1838 Jean-Etienne Esquirol, C.C. Marc
  - Renamed Kleptomania
  - Grouped with other mental disorders characterised by involuntary and irresistible actions
    - monomanias

McElroy, 1991
Kleptomania

- Repetitive uncontrollable stealing of items not needed for personal use.
- Onset in late adolescence or early adulthood
- Female predominance
- Legal problems are common

Grant, 2008

Pyromania

- 1845 Esquirol
  - First described “incendiary monomania”
    - Deliberate and purposeful fire setting
    - Arousal before setting fire
    - Fascination with fire
    - Pleasure with fire setting or witnessing fire

Grant 2008
Pyromania

• Onset in late adolescence
• Equal gender distribution
• Reportedly rare
  – 3.3% of arsonists (Lindberg, 2005)
  – 2.8% depressed patients (Lejoyeux, 2002)
  – 3.4% adult inpatient psychiatric (Grant, 2005)
  – 6.9% child inpatient psychiatric (Grant, 2008)
  – 15% kleptomania (McElroy, 1994)
  – 10% compulsive buying (McElroy, 1991)
• Legal problems common

Pathological Gambling

• Legal gambling in 48 states
• 0.4%-3.4% Prevalence in US
• $5 billion direct cost annually
• Increased suicide rate
• Legal and interpersonal distress
• Increase availability of gaming leads to more PG

National Gambling Impact Study 1999
Pathological Gambling

• Persistent and recurrent maladaptive gambling behavior
• First described by ancient Romans
• 0.9-1.6% prevalence in US
• 2/3 male
  – gender specific patterns
• Onset in adolescence or early adulthood
• Relapsing remitting course
• High rates of bankruptcy, divorce, incarceration and suicide attempts

Grant, 2008

Trichotillomania

• Repetitive, intentionally performed hair pulling that causes noticeable hair loss and results in distress
• Accounts found in the Bible, Homer’s Iliad, and Shakespeare’s plays.
• Hippocrates evaluated hair pulling
• 1889, Hallopeau
  – Term Trichotillomania first used

Christenson, 1999
Trichotillomania

• Onset approximately age 13
• 1-3% prevalence
• Female preponderance
• Typically scalp hair
• Waxing and waning course
  – Typically one hour plus per day
  – Ritualized
• 1/3 of hair pullers do not meet DSM IV

Christenson, 1999

Compulsive buying

• Maladaptive preoccupation with or engagement in buying
  – Not needed, not affordable
• 1915, Emil Kraeplin
  – Oniomania
    • Compulsive buying that leads to senseless debt and financial catastrophe

Black, 2006
Compulsive buying

- Onset late adolescence to early adulthood
- Female preponderance
- 5.8% prevalence in US
- Most items purchased are not used or even removed from packaging
- Financial, interpersonal and legal consequences

Black, 1996
Christenson, 1994

Famous compulsive buyers

Mary Todd Lincoln
Marie Antoinette
William Randolph Hearst
Historical perspective

• Lust, Gluttony, Greed and Wrath

Temperance and prohibition encompassed more than alcohol
Treatment of ICD in General Adult population

• Antidepressants 20+ trials
  – SSRI, Bupropion, Nefazadone
  – Early positive studies uncontrolled
  – Recent controlled studies negative
    • Kim, 2002 Paroxetine study positive
    • High placebo response

• Mood Stabilizers
  – Lithium positive in bipolar (Hollander, 2001)

• Antipsychotics
  – Olanzapine negative study (McElroy, 2008)

Treatment of ICD in General Adult population

• Opioid antagonists
  – Naltrexone 150-200mg (Kim, 2001)
  – Nalmafname 25-50mg (Grant, 2006)

• N-acetyl-cystiene
  – Open label pilot positive (Grant, 2006)
    – 1800mg per day

• Antipsychotics
  – Olanzapine negative study (McElroy, 2008)
Treatement of ICD in General Adult population

- 12 Step Programs
  - 8% of Gamblers Anonymous members achieve 1 year of abstinence (Petry, 1999)
- Group therapy
  - Uncontrolled report (Ladouc)
- Cognitive Behavioral Therapy
  - Ongoing gambling trial at University of Minnesota
  - Uncontrolled reports (Ladouc, Sylvan)
- Habit Reversal

Non DSM Impulse Control D/O

- Pathological skin picking
- Compulsive buying
- Compulsive internet Use
- Nonparaphilic compulsive sexual behavior
- Binge eating
- Hoarding

Grant, 2008
Definitions

• Appetite
  – a desire for food or drink: *I have no appetite for lunch today.*
  – a desire to satisfy any bodily need or craving.
  – a desire or liking for something; fondness; taste: *an appetite for power; an appetite for pleasure.*
  – an instinctive physical desire

Definitions

• Drive
  – to send, expel, or otherwise cause to move by force or compulsion: *to drive a person to desperation.*
  – to force to work or act
  – to impel; constrain; urge; compel.
Definitions

- Disorder (DSM III, III-R, IV and IV-R)
  - A clinically significant behavioral or psychological syndrome or pattern that occurs in an individual and that is associated with present distress or disability or with a significantly increased risk of suffering death, pain, disability or an important loss of freedom.

Appetitive Drive Disorder

- A clinically significant behavioral syndrome which is considered the result of an instinctive physical desire
  - Hypoactive as well as hyperactive
  - prompted by or resulting from or as if from instinct; natural; unlearned: *an instinctive will to survive.*
Appetitive Characteristics
(non-pathologic)

• Motivates flexible instrumental behavior
• Behavior is goal expectant
• Modulated by both intrinsic and extrinsic factors
• Made up of an appetitive phase and a consummatory phase
• Accompanied by an affective reaction to the goal itself
• “Alliesthesia”
  – changes in appetite change the subjective pleasure of the goal.

Berridge, 2004

Appetite Examples

• Thirst
• Hunger
• Libido

• Chemical substances
• Physical items
• Behavioral
Appetitive Drive Disorders

- Psychogenic polydipsia
- Eating disorders
- Hypersexuality (non-paraphilic)
- Chemical dependence
- Pathologic Behavioral Disorders
  - Pathologic Gambling, Compulsive Shopping, Hoarding, Compulsive Internet Use

DSM IV

- Substance Dependence
- Impulse Control Disorders
- DSM does not recognize a general hypersexual disorder
- Eating disorders
  - Research criteria for Binge Eating disorder
  - No general disorder of overeating
Impulse Control Disorder
(DSM IV paraphrased)

- Preoccupation
- Loss of Control
- Consequences
  - Tolerance?
  - Withdrawal?

Evolutionary Theory

- Appetite is the biologic mechanism to ensure energy is directed toward behaviors which will confer a survival advantage.
  - Eating, drinking, stockpiling supplies and procreating

Bernard, 2006
Evolutionary Theory

• “Self-control is hypothesized to delay behavior, permitting more thorough if-then emotion-referenced searches and increasing the probability that behavioral responses are adaptive in the local environment”

Bernard, 2006

Early Medical Perspective- Kraepelin

• Monomania -circumscribed disturbance of an otherwise healthy life
  – Kleptomania
  – Pyromania
  – Oniomania
  – Trichotillomania

Kraepelin 1907
Neurobiology-Papez

- Emotion is a physiologic process and depends on an anatomic mechanism and substrate
  - The limbic system plays a major role in emotion and motivational activity
  - Hypothalamus, anterior thalamic nuclei, cingulate gyrus and hippocampus

Papez, 1937

Top Down vs Bottom Up

- PFC structures
  - biasing circuit towards inhibitory control
  - Dopamine stimulation improves signal to noise ratio, better cognition

- Ventral Striatum (NA)
  - biasing circuit toward approach or driven behavior
  - Dopamine stimulates wanting/liking
Bottom up

- Opioid signaling in VTA/NA
  - Mu opioid receptor stimulation release tonic GABA inhibition of dopamine neurons
  - Bi-directional

- Opioid Antagonists
  - Blocking opioid receptors inhibits dopamine release in VTA/NA
  - Nalmefene and naltrexone proven effective in general population

Neural circuitry

Neural circuitry mediating the activation of goal-directed behavior

Kalivas and Volkow 2005
Dopamine and Motivation

- Dopaminergic stimulation of Ventral Tegmental Area-Nucleus Accumbens-medial Orbital Frontal Cortex
- Reward Theory vs Incentive Motivation Theory
  - Liking vs Wanting

Reward Theory

- Dopamine release into the Nucleus Accumbens mediates the primary reinforcing characteristics of environmental stimuli.
- Stimulation of Mesolimbic Dopamine system induces a positive hedonic state and enhances the pleasure derived from consummatory behavior
  - Learning theory
- Drugs of abuse act by turning on the brain’s natural “reward system”

Wise, 1978
**Reward Theory**

- Dopamine is released into the Nucleus Accumbens for both aversive as well as reinforcing stimuli
- Dopamine levels are higher in the appetitive phase than the consummatory phase
- Dopamine blockade or depletion does not reduce the reinforcing property of food in lab animals
- Reward Theory relies on experience and learning

Salamone and Correa, 2002
Blackburne, 1987

**Incentive Motivation-Effort Regulation**

- Dopamine system is the fundamental drive for the expression of appetitive behaviors
  - Dopamine facilitates behavioral activation “Wanting”

Berridge and Robinson, 1998
“Liking” versus “Wanting”

• Liking is the hedonic impact of a stimulus
• Wanting is the incentive salience of a stimulus
• Wanting and liking can occur in isolation from each other

Impulse control disorders in elderly

• Case reports
  – Kleptomania secondary to NPH
    • McIntyre 1990
  – Kleptomania associated with dementia
    • Mendez 1988
    • Khan 1977
  – Hypersexuality associated with dementia
    • Bradford 2001
    – General disinhibition syndrome
### Impulse Control Disorders in Elderly

**– Pathologic gambling in geriatric patients**  
– Grant et al 2001

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<tr>
<th>Similar</th>
<th>Difference</th>
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<tr>
<td>• symptom severity,</td>
<td>• Begin gambling later in life</td>
</tr>
<tr>
<td>• Impairment</td>
<td>• Longer latency</td>
</tr>
<tr>
<td>• resultant problems</td>
<td>• Almost exclusively slot machine</td>
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<tr>
<td>• family history</td>
<td></td>
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<td>• treatment response</td>
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### Impulse Control Disorders in Parkinson’s Disease

- 1961-1966 intravenous and oral L-dopa experiments in Parkinson’s disease
- 1969 FDA rejects L-Dopa application
- June 1970 FDA grants L-Dopa licensed for treatment of motor symptoms of Parkinson’s Disease
- 1969-1970 reports of increased Libido with L-Dopa
- 1974 Bromocriptine introduced as first dopamine receptor agonist
Impulse Control Disorders in Parkinson’s Disease

- 1997 Thalamic Deep Brain Stimulation approved for Parkinson’s disease
- 2000 First reports of Pathological Gambling associated with Parkinson’s Disease
- 2001-2002 Reports of hypersexuality after DBS
- 2004 Reports of explosive aggression after DBS
- 2006 Large studies of ICD in PD

Impulse Control Disorders with Dopamine Agonists

- Gambling associated with DA for RLS
  - Evans 2007
  - Tippmann-Peikert 2007
  - Quickfall 2007
  - Driver-Dunkley 2007
- Hypersexuality associated with DA for RLS
  - Driver-Dunkley 2007
Do I have a case??

Side effects that distort the emotions
Some drugs used to restore muscle control in patients with Parkinson's disease can also affect emotions, including pleasure and reward-seeking behavior.

ICD in PD

- Typically associated with treatment
- May be some specificity with treatment modality
- Risk factors;
  - Younger age of onset PD
  - Prior substance or ICD behavior
  - Dopamine agonist (DA) treatment

Weintraub, 2006
Basal Ganglion Circuits

- BG functions can be divided in a dorsolateral to ventromedial fashion
- Multiple circuits with overlapping cognitive and motor functions
- Dorsal = sensory motor
- Ventral = limbic
  - Appetitive behavior and reinforcement

Voorn, 2004

Hypersexuality

- First described in the 1970’s in association with L-Dopa treatment
- Also reported with DA and Deep Brain Stimulation (DBS)
- Estimate of 2.4% of PD patients.

Bowers, 1971
Voon, 2006
Hyperphagia

- Somewhat common with DBS
- Case reports with DA
- Weight gain appears target specific
  - 6-100% with STN DBS
  - 26-96% with GPi DBS
  - No report with Vim GBS

Deuschl, 2006
Nirenberg, 2006

Pathologic Gambling

- Most Extensively studied
- Prevalence of 2-8% for all PD
  - Doubles when only patients taking DA are considered
- Prevalence estimate in general population is 1-2% but currently extensively debated

Voon, 2006
Compulsive Shopping

- Lifetime prevalence in PD of 0.4 to 1.5%
  - Increases when only DA patients considered
- General population estimates of 2-8%

Weintraub, 2006
Voon, 2006
Black, 2001

Punding and Hobbyism

- Repetitive, purposeless handling and examining of self and objects
- Prevalent in 3-34% of PD patients
- Hobbyism generally a reflection of a pre-existing interest
Compulsive Medication use

- The need for increasing doses of dopamine replacement therapy in excess of those normally required to relieve Parkinsonian symptoms
- Results in a pattern of pathologic use such as significant dyskinesias, drug hoarding, drug seeking and social and occupational impairment

Giovannoni, 2000

Risk Factors

- Younger Age of PD Diagnosis
- Male Sex
- Dopamine Agonist
- Depression
- Personal or Family History of Alcohol Abuse
- Pre-Parkinson’s ICD behavior
- Impulsive, novelty seeking traits
Dopamine Overdose

- Supplemental dopamine in the depleted dorsal striatum reverses the cognitive inflexibility associated with PD
- Excess dopamine in the relatively intact ventral striatum leads to increased impulsivity and behavioral activation

Cools, 2006

Two distinct basal ganglion dopamine circuits

- Ventral BG- mesolimbic dopamine
  - Emotions, behavior, rewards
  - Projects to prefrontal cortex
- Dorsal BG- nigrostriatal
  - Motor
  - Projects to premotor areas
Dopaminergic pathways

Dopamine overdose

Cools, 2006
Available Treatment

- Taper and discontinue suspect offending medications
  - Dopamine agonists
  - Neurology assistance
- No reports of successful pharmacologic treatment of ICD associated with dopamine agonist