Impulse Control Disorders in Tourette’s Syndrome

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Discussion of off-label and/or investigational use:

yes X no ___

Common Psychiatric Disorders in TS

The Impulse Control Disorders
“Want to do’s”

Obsessive Compulsive Spectrum Disorders
“Have to do’s”
Slide 4

**Impulsivity**

Predisposition to rapid, unplanned reactions to internal or external stimuli without regard to negative consequences for self or others

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By the time I think about what I'm gonna do... I already did it!*

Slide 6

**Compulsivity**

Predisposition to performing actions, often of a trivial and repetitive nature and often against one's will, aimed at reducing unpleasant or anxious internal or external states
Impulsive/ Compulsive Spectrum Disorders

- Intermittent Explosive Disorder
- Self-injurious Behaviors
- Trichotillomania
- Compulsive Gambling
- Eating Disorders
- Kleptomania
- Body Dysmorphic Disorder
- Non-obscene socially inappropriate symptoms (NOSIS)

Impulse Control Disorders (ICDs) in Adults with TS

74.2% of sample (n=33) had at least one ICD

- Intermittent Explosive Disorder 51.6%
- Compulsive Buying Disorder 41.9%
- Compulsive Computer Use 22.6%
- Kleptomania 12.9%
- Trichotillomania 9.7%
- Pyromania 9.7%
- Body Dysmorphic Disorder 6.5%

(Frank et al. 2011)
Causes of Impulse Control Symptoms in Tourette Syndrome

- Psychiatric comorbidity
- Medication side effects/interactions
- Executive dysfunction
- Alcohol/substance abuse
- Home, school, occupational stress
- Tic severity

Neurobiology of Impulse Control Disorders with Repetitive Behaviors

“The Reward Deficiency Syndrome”

Traits characterized by:

- dysfunction in brain's reward cascade
- increased risk for multiple impulsive, compulsive, and addictive behavioral propensities

Neurotransmitters

- Dopamine (DA)
- Norepinephrine (NE)
- Serotonin (5HT)
- GABA
- Glutamate (NMDA)
Neurotransmitters Regulate Different Aspects of Mood, Cognition, and Behavior

Dopamine Pathways
- Functions: 
  - reward (motivation)
  - pleasure, euphoria
  - motor function
  - compulsion
  - perseveration
  - decision making

Serpotonin Pathways
- Functions:
  - mood
  - memory
  - sleep
  - cognition

Aggressive Symptoms in Tourette Syndrome
Adaptive Aggression

Aggressive Behaviors in Animals:

- Dominance Behaviors
- Territorial Aggression
- “Female” Aggression

Developmental Aggression:

Temper Tantrums

Developmental Aggression

“Temper Tantrums”

- Occurs < 1/3 children ages 3-12 years
- Most common: ages 3-5 years (75%)
- Least common: ages 9-23 (4%)
- More common: boys > girls (3:1)
- Hx: trauma, seizure, tics*, hyperactivity, bedwetting, head banging, sleep problems
Pathological Aggression

Aggressive behavior that is:

- Excessive in intensity, duration, frequency
- Inappropriate to expectable social context
- May be directed toward self, loved ones, others
- Age-inappropriate

Types of Pathological Aggression: Proactive / Non-impulsive / Predatory

- Onset around age 6.5 years
- Associated with aggressive role models
- Accompanied by decreased autonomic activation
  - Examples: bullying, delinquency/sociopathy

Psychopathy
Types of Pathological Aggression:
Reactive/Impulsive/"Maladaptive"

- Onset approx. age 4.5 years
- Can be associated with history of abuse/trauma
- Accompanied by increased autonomic activation
  Examples: "rage attacks", affective storms

Overview
Rage and Episodic Dyscontrol:
- occurs in significant number of TS patients
- causes considerable morbidity
- is leading reason for residential placement
- symptoms are poorly understood
- treatments are nonspecific

Neurobiology of Aggression
- DA, opioids, androgens, ACTH facilitate sexual behavior & aggression
- Serotonin (5HT) and NE, possibly via neuromodulators GABA and glutamate mediate inhibitory responses
  - Central 5HT disturbances linked with aggression & impulsivity
  - Low central 5HT associated with violence
  - Lesions of PFC or OFC linked with aggression
Causes of Aggressive Symptoms

• Alcohol/substance abuse
• Medication side effects
• Toxins
• Neurological conditions
• Physical/sexual/emotional abuse
• Pain
• Sleep disorders
• Pre-existing psychopathology

Causes of Aggressive Symptoms

Medications:

• Benzodiazepines
• Steroids
• Psychostimulants*
• Guanfacine
• Neuroleptics
• SSRIs & other antidepressants*
• Anticonvulsants*

Medication-related Aggression

• Medication-induced activation
• Disinhibition
• Paradoxical reactions
• Behavioral toxicity

Sx: Irritability, anger/rage, excitability
hyperactivity, agitation, mood lability
**DSM-V Diagnostic Criteria for Oppositional Defiant Disorder**

Pattern of angry/irritable mood, argumentative/defiant behavior or vindictiveness lasting at least 6 months with > 1 person non-sibling, including at least 4 of following symptoms:

- Often loses temper
- Touchy, easily annoyed
- Angry/resentful
- Argumentative with authority figures
- Defies or refuses to comply with rules or requests
- Deliberately annoys others
- Spiteful and vindictive at least 2x in past 6 months

**DSM-V Diagnostic Criteria for Intermittent Explosive Disorder (IED)**

Recurrent behavioral outbursts with failure to control aggressive impulses, manifested by either:

Verbal aggression (e.g. temper tantrums, tirades, verbal arguments) or,

Physical aggression toward property, animals, or others occurring 2X weekly for about 3 months without serious damage or,

3 behavioral outbursts in past 12 months that resulted in serious damage of property, physical assault to others or animals

- Magnitude of aggression is grossly out of proportion to provocation/stress
- Outbursts are not pre-meditated
- Outbursts cause marked distress, impairment, or financial/legal consequences
- Chronological age at least age 6 years
- Not better explained by other mental/medical disorder or substance

**Prevalence & Correlates of DSM-IV IED**

The National Co-morbidity Survey Replication

- 9282 people ages 18 and older face-to-face household survey
- Lifetime prevalence: 5.4% - 7.3%
- 12-month prevalence: 2.7% - 3.9%
- Widely distributed in the population
- Usually begins in childhood or adolescence
- Significantly comorbid with mood, anxiety, and substance disorders
- Only 28.8% ever received treatment for their anger

*(Kessler et al. 2006)*
Aggressive Symptoms in TS

- Common in clinical settings
- Impulsive type most typical
- Complex etiology
- Cause severe morbidity
- Treatment still largely non-specific

International TS Database

3,500 TS cases in 22 countries

- 37% anger control problems ever
- 26% anger control problems now
- <10% anger control problems TS only

(Freeman et al. 1999)
Explosive Outbursts in TS:
- Abrupt, unpredictable episodes of severe physical and/or verbal aggression
- Grossly out of proportion to any provocation
- Experienced as uncontrollable & distressing
- Accompanied by physiological activation

Clinical phenomenology of episodic rage in children with TS
48 children with TS + rage ages 7-17 years
Factor and cluster analyses revealed four homogeneous subgroups:
- Specific Urge Resolution
- Environmentally Secure Reactivity
- Nonspecific Urge Resolution
- Labile Non-Resolving

(Budman, Rockmore, Stokes, Sossin 2003)

Prevalence and Clinical Correlates of Explosive Outbursts in TS
218 patients from 2 large samples TS(CR, US)
- 20% had explosive outbursts
- Clinical correlates:
  CR: lower age onset tics, tic severity
  US: ADHD, tic severity, prenatal nicotine exposure

(Chen K et al. 2013)
Explosive Outbursts in TS Children

- Explosive outbursts are **symptoms**
- These symptoms are possibly related to tic severity
- These symptoms appear associated with specific psychiatric disorders, certain current psychotropic usage, environmental factors
  
  (Sukhodolsky et al. 2003; Budman et al. 2003, 2000, 1998; Stephens and Sandor, 1999)

Assessment of Rage Symptoms in TS

Detail nature of outbursts in terms of:

- frequency
- severity
- duration
- triggers
- context

Treatment of Rage Symptoms in TS

**Comprehensive Evaluation**

- Diagnosis: medical, psychiatric, neuropsychological psychosocial assessment
- **Medications**: side effects, drug interactions
- **Psychosocial function**: family, school/work, peers
Treatment of Rage Symptoms in TS

- Atypical antipsychotics:
  - risperidone*, aripiprazole*, olanzapine*, ziprasidone, quetiapine
- SSRIs:
  - fluoxetine, sertraline, fluvoxamine, citalopram, paroxetine*
- Anticonvulsants/Mood Stabilizers:
  - Lithium, divalproex, lamotrigine, carbamazepine, topiramate
- Other:
  - psychostimulants, propranolol, clonidine, mecamylamine, EFAs

* published pilot studies in TS

Treatment of Rage Symptoms in TS

- Psycho-education
- Parent Skills Training
- Family Therapy/Marital Therapy
- Social Skills Training
- Collaborative Problem Solving Strategies
- Anger Management programs
- Dialectical behavioral therapy
- Relapse prevention therapy
- Anti-Bullying Programs
- Physical exercise, nutrition, sleep hygiene

(Scahill et al. 2006; Green et al. 2003)

Trichotillomania

Occurs in .02 – 3% patients with TS

- Repetitive hair pulling
- More common: TS + OCD >TS only or OCD only
- Treatment: Habit Reversal Therapy, tic suppressants
Self-injurious Behaviors (SIB)

- Non-suicidal self-injury/ deliberate destruction of one’s body in the absence of intent to die
- Often associated with:
  - Mood Disorders
  - Autism/PDD
  - PTSD
  - Personality Disorders
  - Substance Abuse
  - Eating Disorders
  - Disruptive Behavior Disorders

Self-injurious Behaviors (SIB)

- Occur in 14-60% of patients with TS
- Mild SIB appear associated with OCS
- Severe SIB associated with affective and/or impulse dysregulation:
  - head banging
  - punching
  - slapping
  - orifice digging
  - self-biting
  - pinching
  - hitting
  - picking

(Copeland et al. 2004)

Coprophenomena in TS

- International Tic Consortium
- 15 sites, 7 countries world-wide
- 597 prospectively entered consecutively patients seen between 2005-2008
- 506 children<18 years, 91 adults
- Coprolalia: 19.3% males, 14.6% females, mean age onset = 11 years
- Copropraxia: 5.9% males, 4.9% females
- Coprophenomena: associated with number of other repetitive behaviors, spitting, reported tic severity, comorbidity especially OCD

(Freeman et al. 2008)
Coprophenomena

- Socially/contextually inappropriate verbal expressions, gestures, or complex behaviors
- Typically vulgar, profane, insulting, but not expressed out of conscious anger or frustration
- Occurs in 17.6% children, 28.6% adults
- Not necessary for diagnosis of TS

Copropraxia

Occurs in 1-6% of patients with TS

- Grabbing genitals
- Touching others sexually
- Pelvic Thrusting
- Picking at buttocks
- Obscene gestures
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**Non-obscene Complex Socially Inappropriate Behaviors in TS**

Surveyed 87 adolescent or adult outpatients with TS

- 22% reported insulting other
- 5% reported making other non-obscene comments
- 14% other socially inappropriate behaviors
- Most often associated with comorbid ADHD and ODD

*(Kurlan et al. 1996)*

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**Non-obscene socially inappropriate symptoms (NOSIS) and TS**

Study of 60 patients with TS at specialty clinic found that approx 2/3 experience NOSIS

NOSIS associated with:

- obsessions, attention problems, coprolalia, conduct disorder
- Increased premonitory urges
- Increased tic severity
- Decreased quality of life (QOL)

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**Non-obscene socially inappropriate symptoms (NOSIS) and TS**

20 adults with TS-alone compared with 20 aged-matched controls on two social judgment tasks:

- Regulation of behavior during emotional self-disclosure tasks
- Mental judgment of others’ behavior on a “faux pas test”

- No differences in ratings of inappropriateness on self-disclosure task
- Adults with TS-alone impaired relative to controls in detecting socially inappropriate behaviour on faux pas test
- Some evidence of executive dysfunction in the TS-alone group.

*(Channon S et al. 2012)*
Clinical Case Example:
Jillian is a 12 year old female with TS/OCD/ADHD who lives with her mother during the weekdays and spends every other weekend with her father, her step-mother, and her 17 year old step-brother. She is taking Concerta, Intuniv, and was recently started on Zoloft. Jillian has been experiencing explosive outbursts at her mother’s home only, usually in response to limit-setting and when her requests are met with “no” by her mother.

What factors must be considered when evaluating Jillian’s symptoms?

Clinical Case: Points of Discussion
How often do these episodes occur?  
What is happening before, during, and after these outbursts occur?  
What time of day do these episodes occur?  
How does Jillian feel afterwards?  
Is this a medication side effect or drug interaction?  
Does Jillian have any additional psychiatric comorbidities?  
Is Jillian being bullied at school?  
Is Jillian being abused physically or sexually?

Additional Information  
TS and Related Disorders
- National Tourette Syndrome Association (TSA)  
  42-40 Bell Boulevard, Bayside, NY 11361  
  tel. 718 224-2999  
- New Jersey Center for Tourette Syndrome (NJCTS)  
  50 Division Street  
  Somerville, New Jersey 08876  
  tel. 908-575-7350  
- Children and Adults with ADHD (CH.A.D.D.)  
  81 Professional Place, Suite 201  
  Landover, MD 20785  
  tel. 301-306-7070  
- Obsessive Compulsive Foundation, Inc. (OCF)  
  90 Depot St., P.O. Box 70  
  Milford, CT 06460-0070  
  tel. 203-878-5669