Slide 1

Impulse Control Disorders in Tourette's Syndrome

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Slide 2

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Medical Advisory Board: LI-TSA, LI-CHADD, TSA-CDC

Discussion of off-label and/or investigational use:
yes _X_ no ___

Slide 3

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

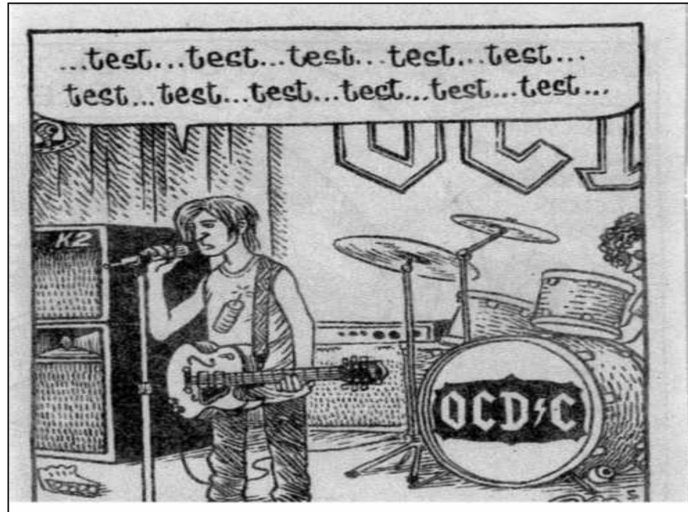
Slide 5

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

Slide 7



Slide 8

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)

Slide 9

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)

Slide 10

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

Slide 11

Neurobiology of Impulse Control Disorders with Repetitive Behaviors

"The Reward Deficiency Syndrome"

Traits characterized by:

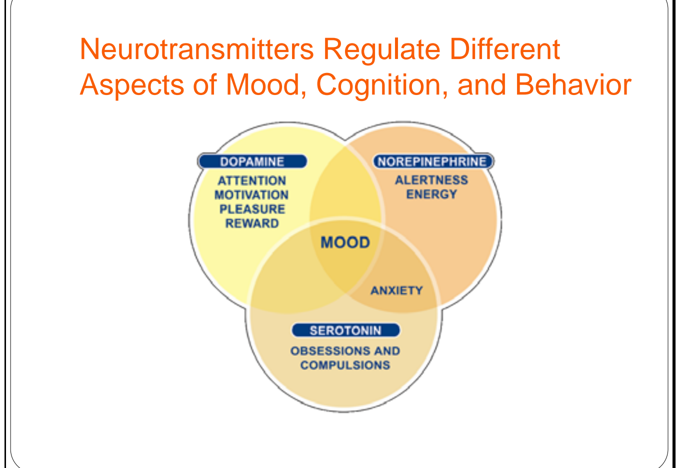
- dysfunction in brain's reward cascade
- increased risk for multiple impulsive, compulsive, and addictive behavioral propensities

Slide 12

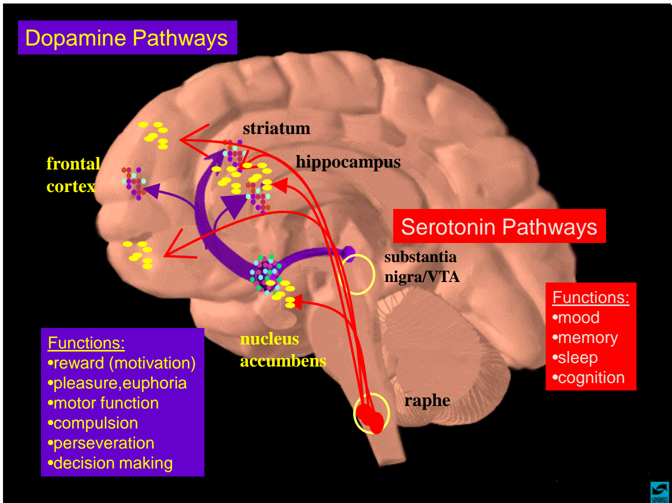
Neurotransmitters

- **Dopamine (DA)**
- **Norepinephrine (NE)**
- **Serotonin (5HT)**
- **GABA**
- **Glutamate (NMDA)**

Slide 13



Slide 14



Slide 15

Aggressive Symptoms in Tourette Syndrome

Slide 16

Adaptive Aggression

Aggressive Behaviors in Animals:

- Dominance Behaviors
- Territorial Aggression
- "Female" Aggression

Slide 17

Developmental Aggression:

Temper Tantrums

Slide 18

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

Slide 19

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

Slide 20

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

Slide 21

Pathological Aggression: Proactive Type

Psychopathy

Slide 22

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

Slide 23

Slide 24

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

Slide 25

Causes of Aggressive Symptoms

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

Slide 26

Causes of Aggressive Symptoms

Medications:

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

Slide 27

Medication-related Aggression

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

Sx: Irritability, anger/rage, excitability hyperactivity, agitation, mood lability

Slide 28

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

Slide 29

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

Slide 30

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)

Slide 31

Aggressive Symptoms in TS

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

Slide 32

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)

Slide 33

Slide 34

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

Slide 35

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)

Slide 36

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)

Slide 37

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)

Slide 38

Assessment of Rage Symptoms in TS

Detail nature of outbursts in terms of:

- frequency
- severity
- duration
- triggers
- context

Slide 39

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

Slide 40

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

Slide 41

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)

Slide 42

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

Slide 43

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	

Slide 44

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

(Mathews et al. 2004)

Slide 45

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, comorbity especially OCD

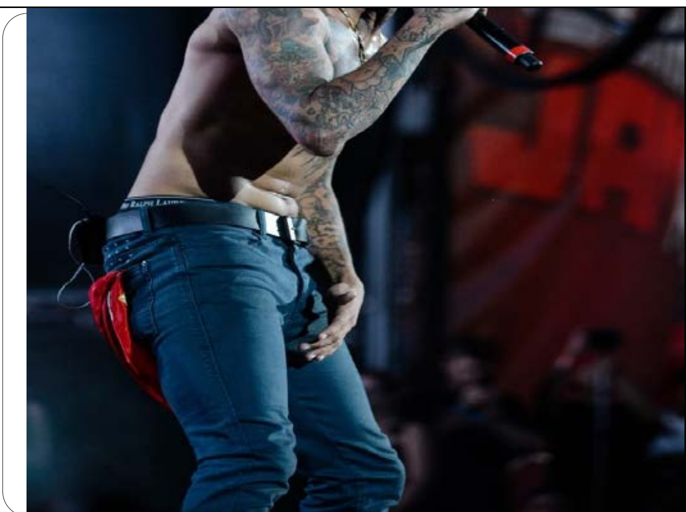
(Freeman et al. 2008)

Slide 46

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

Slide 47



Slide 48

Copropraxia

Occurs in 1- 6% of patients with TS

- Grabbing genitals
- Touching others sexually
- Pelvic Thrusting
- Picking at buttocks
- Obscene gestures

Slide 49

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)

Slide 50

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)

Slide 51

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)

Slide 52

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?

Slide 53

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?

Slide 54

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