Tic & Tourette Syndrome

Treatment Clinical Pathway

Disclaimer

This clinical pathway is not intended to replace clinical judgment. It is meant to assist licensed independent practitioners and other health care providers in clinical decision-making by describing a range of generally acceptable approaches to the diagnosis and management of a particular condition. A particular patient's circumstances should always be taken into account when a practitioner is deciding on a course of management.

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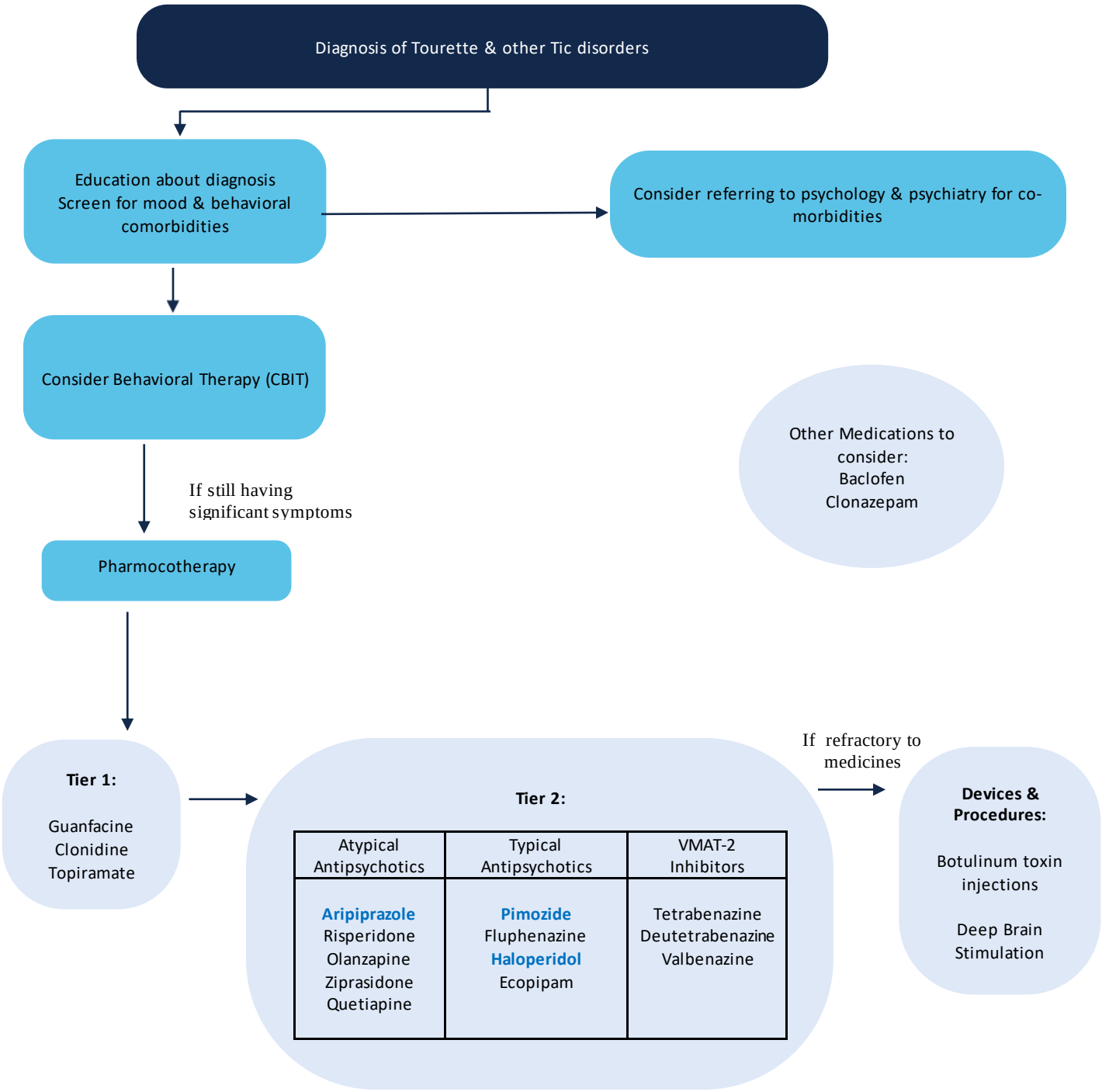
Pathway Flow Diagram



FDA approved for tic suppression:
Pimozide (12 years and older)
Haloperidol (3 years and older)
Aripiprazole (6-18 years)

Scope

Tics are sudden, rapid, brief, non-rhythmic, recurrent motor movements or vocalizations.

Motor tics are movements.
Simple motor tics include but are not limited to: eye blinking, facial grimacing, jaw movements, head bobbing/jerking, shoulder shrugging, neck stretching, and arm jerking.
Complex motor tics involve multiple muscle groups or combinations of movements and tend to be slower and more purposeful in appearance (e.g., hopping, twirling, jumping).

Vocal (phonic) tics produce a sound.
Simple vocal tics include but are not limited to sniffing, throat clearing, grunting, hooting, and shouting.
Complex vocal tics are words or phrases that may or may not be recognizable but that consistently occur out of context. In 10-15% of cases, the words may be inappropriate (i.e., swear words, ethnic slurs, or other socially unacceptable words or phrases).
This type of vocal tic, called coprolalia, is often portrayed or mocked in the media as a common symptom of TS.

Tourette Syndrome (TS), also known as Tourette's Disorder:
1) At least 2 motor tics and at least 1 vocal (phonic) tic have been present, but not necessarily at the same time.
2) Tics may wax and wane in frequency but have occurred for more than 1 year.
3) Tics started to appear before the age of 18.
4) Tics are not caused by the use of a substance or other medical condition.

Persistent (Chronic) Motor or Vocal Tic Disorder: Either motor tics OR vocal tics have been present for more than 1 year; cannot be both motor and vocal tics.

Tic Disorder not otherwise specified (NOS): Motor and/or vocal tics have been present for less than 1 year, and have not met the criteria for TS, persistent (chronic) motor, or vocal tic disorder.

Pathway Goals

This pathway is for primary tic disorder. It is prudent to differentiate tics from tic-like functional behavior, other movement disorders, and to consider tics secondary to an underlying etiology. Primary tic disorders can be managed by general pediatrician or by neurologists. Referral to Pediatric Neurology can be cosidered for help with the correct diagnosis, and for further management if patient does not respond to tier 1 medications.

Key Clinical Recommendations

Education: First line of treatment

Tics are involuntary and children should not be punished for those

Practice guidelines published by AAN (American Academy of Neurology) in 2019 emphasize that treatment options for tics in Tourette syndrome and chronic tic disorders should be individualized.

- Clinicians should inform patients and families about natural course of disease and evaluate for functional impairment (Level A)
- Watchful waiting is an acceptable approach as the natural course of disease is to improve or resolve over time (Level B)
- Clinicians should also recommend psychoeducation for patient's teachers and peers regarding Tourette Syndrome (Level B): Tourette Association of America (TAA) has resources to help
- Ensure assessment and treatment of ADHD and OCD
- Ensure assessment and treatment of mood disorders

Websites:

- Tourette.org
- TicHelper.com
- TicTrainer.com

Evaluation of Comorbidities:

- 86-90% have at least one neuropsychologic comorbidity
- Assess for presence and burden of comorbidity (Tourette Disorder Scale or TODS available in SCM Neurology notes, referral to psychology and mental health resources)

ADHD: Prevalence 30-50%[2]

- Stimulants do not worsen tics (however there may be individual case exceptions[4])
- Medications more likely than placebo to reduce tic severity and ADHD symptoms
    - Clonidine
    - Clonidine + methylphenidate
    - Methylphenidate
    - Guanfacine
- Medication that does not worsen tics
    - Atomoxetine

OCD (Obsessive Compulsive Disorder): Prevalence 10-50%[2]

- Treatment of OCD with Selective serotonin reuptake inhibitors (SSRIs) may be more successful in patients without tics
- CBT treatment of OCD equally successful in pts with and without tics

Generalized anxiety disorder: Prevalence 20-80%[2]

Mood disorders

- More prevalent in adolescents and adults than children
- More prevalent in greater tic severity
- Increased risk of suicide attempts and death by suicide in patients with TS

Other potential co-morbidities: Disruptive behaviors, learning difficulties, sleep difficulties

- Comorbidities should be appropriately addressed
- PCH has partnered with DeNova Collaborative Health for assessment and management of mental health co-morbidities like anxiety, depression, ADHD, OCD, and other mood or behavior disorders

Treatment Recommendations

Behavioral Therapy:

Should be offered as initial treatment option when applicable. Has good evidence for tic reduction without potential adverse effects of medication[5]

- Comprehensive behavioral intervention for tics (CBIT) if available
    - More likely to have reduced tic severity than psychoeducation and supportive therapy
    - CBIT consists of habit reversal training, relaxation training, and functional intervention for situations that worsen tics
    - 8 session protocol is what has demonstrated efficacy
    - Evidence is for children 9 years and older, though maybe still beneficial in younger patients. Patient needs to have self awareness of tics
- There is some evidence for other therapies also like Exposure and response prevention (ERP) and biofeedback

CBIT available at PCH through Occupational Therapy department:

- Main Campus: Katie Appelbe, Sarah Cunningham
- Mercy Gilber Campus: Ashley Olshoff

CBIT is available online: www.tichelper.com

CBIT is also available via the following community providers: (*non-exhaustive list)*

Mary Shouse, OT Optimal kids 623-628-7806 mary@optimalkidsz.com	Lori Nisson, LCSW Banner Sun Health Research Institute 10515 W Santa Fe Dr, Bldg B Sun City, AZ 85351 623-832-7148	Marina Reade, RN Banner Sun Health Research Institute 10515 W Santa Fe Dr, Bldg B Sun City, AZ 85351 623-832-6530
Alicia J Goodman, PhD, NCSP Licensed Psychologist Educational assessments, 504s and IEPs, CBIT (602) 428-2838	Michelle Dillon, Speech Pathologist Speech Sounds Pediatric Therapy 250 N. Litchfield Rd Site 103 Goodyear, AZ 85395 623-694-6601	
Megan Schwallie, LCSW Doorways (602) 997-2880 megan@doorwaysarizona.com	Elizabeth E Ventura-Cook, PhD (480) 845-0351	

Pharmacotherapies:

- Only pimozide (>12yo), haloperidol (>3yo), and aripiprazole (6-18yo) are FDA approved tic-suppressing agents[2] . However, they are often not used as Tier 1 due to side effect profile.
- Risk and benefit of medication versus severity of Tourette's symptoms should be considered
- Treatment is symptomatic. If tics are well controlled, consider gradual taper during nonstressful time (not during school year or holidays).

Tier 1 Medications

- **Guanfacine:** α_2 agonist[1]
  - Possibly more likely than placebo to reduce tic severity
    - Demonstrated to have benefit on both tics and ADHD symptoms
  - Dose: 1.5 to 3 mg/day (max 4 mg/day) in 2-3 divided doses[5]
    - Trials specifically studying extended release do not show any clear benefit
  - Adverse effects include hypotension, bradycardia, and sedation
    - Abrupt withdrawal may cause rebound hypertension

- **Clonidine:** α_2 agonist[1]
  - Probably more likely than placebo to reduce tic severity
  - Beneficial for tics and ADHD symptoms
  - Can be more sedating than guanfacine
  - Dose: Initial: 0.025 to 0.05 mg/day in 1 to 2 divided doses; gradual titration to a 3- to 4-times-daily schedule using small increments (0.025 mg); usual daily dose: 0.1 to 0.4 mg/day in 3 to 4 divided doses; reported maximum daily dose: 0.6 mg/day
    - Clonidine patch has been shown to be safe and effective in children age 6 and older[5]
  - Adverse effects include hypotension, bradycardia, and sedation
    - Abrupt withdrawal may cause rebound hypertension

- **Topiramate:** enhances GABA(A) activity
  - Was found to possibly have some benefit compared to placebo[1]
  - Dose: Initial 25-50 mg/ day in 1 to 2 divided doses; could increase by 25-50 mg weekly, effective dose range 50-600 mg/ day
    - Generally, well tolerated at low doses (25-150 mg/day), divided 1 to 2 times a day
  - Adverse effects at higher doses: cognitive and language problems, somnolence, weight loss, increased risk of renal stones
  - Can be first choice if there is co-morbid headache/migraine

Tier 2 Medications

Antipsychotics

- Potential benefit for behavioral comorbidities, anxiety, mood, disruptive behaviors
- Antipsychotics have increased risk of side effects which is usually the limiting factor for their use. Thus despite FDA approval, these are not used first line of treatment.
- Various side effects include drug-induced movement disorders, tardive dyskinesia, drug-induced parkinsonism, akathisia, acute dystonia, tardive dystonia, weight gain, adverse metabolic side effects, prolactin increase, and QT prolongation with both 1st and 2nd generation antipsychotic

Atypical antipsychotics

Aripiprazole and risperidone are most studied for treatment of tics

- **Aripiprazole**
  - FDA approved for tic suppression in children 6 years and above
  - Dose: Initial 2mg once daily (max 10mg/day for <50kg, max 20mg/day for >50kg)

- **Risperidone**
  - Limited data available
  - Dose: 7 years and older: Initial dose 0.25-0.5 mg at bedtime, then gradually titrate (max 6 mg/day divided in twice daily doses)

- **Other atypical antipsychotics**: olanzapine, quetiapine, and ziprasidone

Typical antipsychotics

- **Pimozide: (Non-formulary)**
  - FDA approved for tic suppression
  - Dose: Initial: 0.05 mg/kg/dose once daily (max 0.2 mg/kg/day, not >10 mg/day)

- **Haloperidol**
  - FDA approved for tic suppression
  - Dosing: Initial: 0.25 to 0.5 mg/day in 2 to 3 divided doses (max 15mg/day)
  - Typically, has more serious side effects compared to other antipsychotics

- **Other typical antipsychotics** – Fluphenazine

Other dopamine antagonist

- **Ecopipam** (investigational drug): selective D1 receptor antagonist (fewer metabolic and EP side effects)
  - An open-label study demonstrated that ecopipam was safe and led to significant tic reduction and a follow-up placebo-controlled trial demonstrated similar result[5]
    - A phase IIb trial called the D1AMOND demonstrated efficacy
    - Phase III trial currently ongoing and actively recruiting (PCH is a participating site)

VMAT-2 Inhibitors

- **Tetrabenazine**
  - In small open-label studies, tetrabenazine has reduced tics[5]
  - Dose: Initial: 6.25 mg 2 to 3 times daily, titrate as tolerated
  - Adverse effects: drowsiness, sedation, depression, EPS, fatigue, akathesia, anxiety

- **Deutetrabenazine (Non-formulary)**: an isomer of tetrabenazine with a longer half-life and less risk of side effects
  - Early studies have demonstrated its safety and effectiveness for tic disorders
    - Phase 2 and 3 trials failed to reach primary endpoint of tic reduction but smaller studies do show improvement in symptoms
    - Consider if symptoms refractory to other medications or if potential side effect profile prevents use of other agents
  - Dose: no pediatric dosing, consider ½ of adult dose
  - Adverse effects: Overall better side effect profile compared to tetrabenazine common side effects include drowsiness, fatigue, insomnia, depression

- **Valbenazine (Non-formulary)**: Prodrug of isomer of tetrabenazine
  - Long half-life, about 24 hours
    - Phase 2 and 3 trials failed to reach primary endpoint of tic reduction, but smaller studies do show improvement in symptoms
    - Consider if symptoms refractory to other medications or if potential side effect profile prevents use of other agents
  - Dose: no pediatric dosing, consider ½ of adult dose
  - Adverse effects: Overall better side effect profile compared to tetrabenazine. Common side effects include drowsiness, fatigue, insomnia, depression

Other medications

- **Clonazepam:** benzodiazepine: enhance GABA A activity
  - Poor efficacy, limited studies demonstrating tic suppression, has been empirically used for acute treatment of tic attacks[1]
  - Dose: Initial 0.01 to 0.03mg/kg/day divided 3-4x per day, max 0.2mg/kg/day[6]
  - Adverse effects: resp depression at higher doses, dependency, drowsiness, fatigue
  - Can be helpful in a tic attack

- **Baclofen** enhances GABA B activity; helps with pain, muscle spasm due to tics

Devices/Procedures

Deep Brain Stimulation: Approximately 5% of patients with TS are refractory, thus DBS may be a treatment option.

- Guidelines for DBS candidate selection for TS were published in 2015[5] :
    - Diagnosis of TS which fulfills DSM V criteria made by clinician with expertise in tic disorders
    - Tics cause significant disability in daily life
    - YGTSS severity is >35 for at least one year OR tics leading to >2 emergency department visits OR 1 hospitalization for tics
    - Patients have tried and failed conservative treatment in at least 3 different medication classes and behavioral therapy
    - Comorbid symptoms such as ADHD and OCD are stable for at least 6 months
    - DBS has been used in patients as young as 12 years of age. Early treatment may reduce risk of tic-induced social isolation, minimize harm from malignant tics, and minimize impact of tics during crucial developmental years.
    - It has been performed at PCH, and is an option that continues to be available to patients (however must be evaluated by Movement Disordesr team).

Botox for targeted treatment of a severe motor tic, dystonic motor tic, or vocal tic [6] (to be ordered by Movement Disorder specialist)

- More likely than placebo to reduce tic severity and adolescents and adults
- Premonitory urges may be improved
- Adverse effects of weakness, hypophonia (with injection of laryngeal muscles for vocal tics)
- Effects of Botox last 12-16 weeks, after which injections need to be repeated
- Performed by Neurology or PM&R

Admission Criteria

Management is usually outpatient. Please talk to the on call neurology team for concern for tic attack.

Discharge Criteria

Management is usually outpatient

Patient and Family Education/Discharge Planning

- Emily center handout(PCH)
- Tourette.org
- TicHelper.com
- TicTrainer.com

References

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Pathway Champions & Committee Approvals

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