

Tics and Tourette Syndrome - A Complete Review

Abith Baburaj¹, A. R. Shabaraya²

¹Pharm D, ²Principal and Director;
Srinivas College of Pharmacy, Mangalore, India

Corresponding Author: Abith Baburaj

ABSTRACT

Tourette's syndrome is a trivial neurodegenerative condition characterized by repetitive agitation, tics, and motor and phonic constituents. Tourette syndrome, along with amplified striatal dysfunction, has been conceptualized as a disorder which mainly affects basal ganglia. Some forms of co-morbidity follow TS such as Attention Deficit Hyperactivity Disorder (ADHD), Obsessive Compulsive Behavior/Disorder (OCB/D) and Autism Spectrum Disease (ASD); also mental disorder coexists, such as depression, anxiety, Oppositional Defiant Disorder (ODD), CD and Personality Disorder (PD). Individuals with Tourette syndrome are likely to repeat phrases, actions, sounds regularly or can accidentally say words or perform socially inappropriate gestures. Some patients suffering from Tourette syndrome report discomfort with their tics. Aware attempts to reduce tics will help. Both tics and Tourette's syndrome are diagnosed using the medical history of a clinician and the subject's physical examination. No tests are available which will validate the diagnosis. Whether the tics are mild or do not interfere with everyday life there is no need for medication. Depending on the extent of the tics that cause speech or movement issues, attention should be given to both non-pharmacological and pharmacological methods like behavioral treatment or medication. Though there is no permanent cure for TS, the conditions do subside during the late teens and early 20s thus making it favorable for the patients to withdraw medication for tic suppression.

Keywords: Tourette syndrome, Tics, multiple motor and vocal tics, repetitive involuntary movements

1. INTRODUCTION

Tourette's syndrome is a trivial neurodegenerative condition characterized by repetitive agitation, tics, and motor and phonic constituents. Tourette syndrome, along with amplified striatal dysfunction, has been conceptualized as a disorder which mainly affects basal ganglia. Imaging data suggest that in Tourette's syndrome considerable brain abnormalities are seen with functional and structural abnormalities. Tourette syndrome (TS) is primarily a tic disorder and has a prevalence rate of approximately 1% among 5 and 18 age groups.¹ Many patients with disease exhibits complex, tic-like, repetitive behaviors like echo signs, coprophenomena, and socially inappropriate behaviors Non-Obscene (NOSIBs). Some forms of co-morbidity follow TS such as Attention Deficit Hyperactivity Disorder (ADHD), Obsessive Compulsive Behaviour/Disorder (OCB / D) and Autism Spectrum Illness (ASD); also mental disorder coexists, such as depression, anxiety, Oppositional Defiant Disorder (ODD), CD and Personality Disorder (PD).² Cluster and factor theoretical methods are used to determine the severity of the Tourette spectrum.³ Studies believe that TS is not a unitary syndrome and that one form ("Pure TS" [tics only]) exists in approximately 10-14 per cent of patients.⁴ Coexisting attention deficit hyperactivity disorder (ADHD) is the primary determinant of cognitive impairment in TS patients.⁵

2. TOURETTE SYNDROME:

Tics which affect various parts of the body, like face, shoulders or head are called motor tics. Vocal tics affect the muscle that helps to breathe or talk and cause sound or

vocalization. Individuals who have multiple motor and vocal tics suffer from Tourette syndrome. They usually start and progress in infancy.⁶

3. CLINICAL FEATURES:

Motor tics which are common	eye blinking, facial grimacing, movement of the head or neck and movement of the arm or upper body
Vocal tics that are common	grunts, coughs, sniffs, and throat-clearing noises

Individuals with Tourette syndrome are likely to repeat sentences, actions, sounds regularly, or can utter phrases accidentally, or perform gestures that are socially inappropriate. Tics are suppressible at certain occasions but they are not under the control of the person who has them. Mighty emotional states like stress or excitement often cause tics to get worse. Motor and phonic tics are persistent involuntary repeated movements, which are brief in duration. Tics may be basic or complex. Simple tics are short-term, meaningless movements, often involving a single group of muscles. Complex tics are typically sluggish and can include seemingly synchronized or vocalizing gestures. Some basic tics such as 'dystonic tics' are more persistent. As typical myoclonus, tics aren't that quick. Motor tics are characterized by anatomical distribution. Blinking of the eye, rolling of the eye, grimacing, flaring of the nares and other facial movements are commonly found motor tics, as are shrugging of the shoulder and stereotyped motions of the head-neck. Phonic tics include repeated snoring, sniffing, throat clearing and coughing. For people with Tourette syndrome, characteristic subjective experiences are present, patients report a sense of discomfort in the affected region, usually relieved by tic performance; any patient with Tourette syndrome claim obsession with its tics. Conscious efforts to reduce tics can help. Focusing on doing certain tasks can decline tics for patients with Tourette syndrome.⁷

4. CAUSE:

The helping reasons for most tics, as well as the Tourette syndrome, are, according to researchers, a mixture of

factors linked to human genes and their environment. Some studies have shown that abnormal connections between parts of the brain which control motion are also a predisposing factor for TS. Brain damage, illness or a side effect will rarely cause tics.

Animal models: Studies in a rodent model have found that dorsal striatum with dopaminergic hormone disproportion has resulted in a phenotype that is tourette-like.⁸ A updated Yale Global Tic Severity Scale (YGTSS) was developed for the evaluation of tic-like behaviors based on the duration, intensity and extent of disability. Immunohistochemical tests revealed that decreased expression of D1 and D2 receptor RNA at the lesion site could be important to TS pathophysiology, resulting in striatal expression of D1 and D2 receptors seen in human post mortem TS research.⁹

Electrophysiology: Transient changes in the tic-related firing rates have been recorded in Patients undergoing DBS electrode implantation. Recordings of external and internal globus pallidus (GP) from individual cells.¹⁰

Research of neuroimaging: Research using 7T spectroscopy to examine concentrations of glutamate and GABA in children with TS found elevated concentrations of glutamate in the premotor region, positively linked to inhibitory control.¹¹

Pharmacological studies: A meta-analysis of positron emission tomography (PET) and single-photon emission computed tomography (SPECT) studies testing dopamine transporter (DAT) or D2-like dopamine receptors did not reveal any definitive differences in patients, however the sample sizes and methodological limitations may explain these negative findings.¹²

Clinical and neuropsychological studies: Autoimmunity which is a potential role that plays in the pathology of TS remains disputed. But several population studies are still being performed to identify a confirmable autoimmune risk factor for TS predisposition and 40 specific autoimmune diseases in Swedish individuals.¹³

5. DIAGNOSIS:

Both tics and Tourette's syndrome are diagnosed using the medical history of a clinician and the subject's physical examination. No tests are available which will validate the diagnosis. The Fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), published by the American Psychiatric Association (APA), suggests that the criteria to be present for diagnosis as:

- The person has two or more motor tics, and it is doubtful that at least one voice.
- The person has had tics a year earlier, and has tics in and off fashion every day.
- The person is having tics at his / her early age, i.e. before age 18.
- The symptoms did not occur because of taking medicine or other medicines or taking medication for any medical condition such as seizures;

Many medical conditions which may have the same symptoms include:

- Various allergies, with sniffing and coughing
- Dystonia, which is a neurological deficit involving involuntary muscle contraction that leads to twisting body movements, tremors and abnormal body posture.
- Restless leg syndrome if portions of the legs are compromised
- Visual impairment, when the patient is blinking a lot blood, skin, eye and imaging tests can be helpful in diagnosis the medical condition.¹⁴

6. PROGNOSIS:

During childhood itself tics often affect people. Variations in the frequency

and severity of tics are observed relative to the time. People who are diagnosed with the disease in their earlier stage of life are found to lack the symptoms or to have fewer symptoms when they grow up to adults. Although there is no definitive cure for TS, symptoms worsen in late adolescents and early. TS is not a degenerative disease because it is a chronic and lifelong disease. Individuals with TS have a good life expectancy just like most average people. TS will not be cutting back on intelligence. While tic symptoms tend to decrease with age, the corresponding neurobehavioral comorbidities such as ADHD, OCD, depression, generalized anxiety, etc. remain and continue to cause adult life impairment.¹⁵

7. TREATMENT:

Whether the tics are mild or do not interfere with everyday life there is no need for medication. Depending on the severity of the tics that cause speech or activity problems, consideration should be given to both non-pharmacological and pharmacological including behavioral therapy and medication. Conduct treatment ordinarily offers individuals guidance to be mindful to the feelings that emerge before a tic and to perform other counter developments which make trouble for the tic to occur. Along with other drugs such as clonidine, guaiphenasine, medications that block dopaminergic transition are commonly prescribed. If a person has Tourette syndrome along with other conditions such as OCD or ADHD, it is suggested to prescribe a medication which treats both disorders.

Psychological intervention: Group-based psychotherapeutic ticking promises a reduced burden of treatment. These are very promising ways of taking care and some recent studies explore this alternative for treatment. The long-term effects of group therapy were studied, according to a study in 2016. The severity and quality of life of 28 children with TS 12 months after training or education in Habit Reversal Training

(HRT) was completed and positive long-term effects were observed.¹⁶ Thus studies were performed by reducing the length and intensity of the session and thereby making it more successful, if not more, than the classic format. Preliminary results from an online behavioral therapy for TS supported by a therapist, parent-guided, produced great improvement in patients and the recovery persisted a year later. The total therapist time was just 25 minutes a week.¹⁷

Medication: Various studies have found that ADHD drugs, antidepressants and hypnotics / sedatives have all been prescribed more than antipsychotics, as they show better and stronger evidence of efficacy. Studies contrasting pharmacotherapy with behavioral therapy in children and adolescents with TS / CTD indicate that both approaches have been used in a concomitant manner to minimize tics and boost QOL.¹⁸

Centromedic Nucleus (CM-Pf), Anterior Globus Pallidus Interna (GPi), or Posterior GPi, there was no statistically significant difference in the stimulation sites. Yet one-third of patients have had side effects, mostly due to pain and not from surgery. Specific large-scale collaboration groups use 3D analytical techniques to figure out the best location for DBS. Children and DBS appear to face controversy. Before treating a patient who is under 18 with DBS, ethical consideration must be taken into account.

Other treatment: Bilateral Cathodal Transcranial Direct Current Stimulation (tDCS) over motor cortex was done in three patients with TS as an experimental technique for relieving tics. One of the patients reported a remarkable 35% improvement in tic frequency, but the other two subjects aggravated the symptoms. However, all three patients registered a decrease in negative effect and a certain relief, i.e. a small increase in positive effect.²⁰

Table 1. Medications for Tics

Typical Antipsychotics		
Medication	Usual Starting Dose	Usual Treatment Dose
haloperidol	0.25-0.5 mg	1-5 mg
pimozide	0.5-1.0 mg	1-6 mg
fluphenazine	0.5-1.0 mg	1.5-10 mg
tiapride	50-150 mg	150-500 mg
sulpiride	100-200 mg	200-1000 mg
Atypical Antipsychotics		
risperidone	0.125-0.5 mg	1-3 mg
ziprasidone	20 mg	20-100 mg
olanzapine	2.5-5 mg	5-20mg
quetiapine	50-100 mg	100-400 mg
aripiprazole	1-2.5 mg	5-20 mg
tetrabenazine	25 mg	37.5-150 mg
Adrenergic Agonists		
clonidine	0.025-0.05 mg	0.1-0.3 mg
guanfacine	0.25-0.5 mg	1-3 mg
Benzodiazepines		
clonazepam	0.025-0.5 mg	0.5-6 mg

Other TS-related medical conditions are treated accordingly, based on their guidelines for treatment. The same medicines may also be used to treat the patient.

Neurosurgery: Deep brain stimulation (DBS) has a large-scale database for Tourette treatment.¹⁹ The mean change based on the overall YGTSS score was 40% 6 months after the surgery and 45% year after the procedure. Whether it is the

8. CONCLUSION

People with TS should receive supporting environments, guidance on recovery, as well as good emotional, behavioral and learning supports so that they gain the courage to overcome the challenges they face in their life ahead. Community education as well as awareness programs should be implemented along with research in order to gain a better understanding of the factors which help to achieve better long-term outcomes. Future research should therefore examine the potential influence of successful methods of treatment to lead to a decline in symptoms whether it is a pharmacological or non-pharmacological method of treating the disease. A personal building of excellence skills using comprehensive behavioral intervention for tics (CBIT) should be conducted in parallel with research to improve the quality and effectiveness of initial support services for a better quality of life for the patients in the future.

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How to cite this article: Baburaj A, Shabaraya AR. Tics and Tourette syndrome - a complete review. *International Journal of Research and Review*. 2020; 7(6): 4-8.
