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SYDENHAM'S CHOREA

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☐ **Abstract—Background: Sydenham's chorea is the most common acquired movement disorder of adolescence. This clinical manifestation of acute rheumatic fever has a clear and documented relationship with Group A streptococcal infections. The symptoms are involuntary choreiform movements that can affect the face and all extremities. The pathophysiology remains unclear. Case Report: A 12-year-old female was brought to the emergency department with a 2-week history of involuntary muscle spasms of her right arm and leg. Her parents reported intermittent slurred speech and difficulty grasping utensils. Physical examination revealed an awake, alert, age-appropriate female with normal cranial nerves. Patient was found to have choreoathetoid movements on the right extremities with dystonia of right leg with ambulation. Neurology consultation, computed tomography of the head, and magnetic resonance imaging of the brain did not show any acute pathology. Echocardiogram did show mild tricuspid regurgitation, suggestive of rheumatic fever. Anti-streptolysin O titer was markedly elevated, along with DNAse-B antibodies. The patient had marked improvement of movement disorder at just over 1 week later. Why Should An Emergency Physician Be Aware of This?: Sydenham's chorea is a rare but important movement disorder often related to Group A *streptococcus* and rheumatic fever. The incidence of rheumatic fever has been decreasing in North America but continues to be much more prevalent in developing countries as well as immigrant populations. This diagnosis is rare and can occasionally be misdiagnosed as a "fidgety" child or as a psychiatric manifestation. Sydenham's chorea is important to diagnose because acute treatment and prophylactic antibiotics can help improve symptoms and minimize cardiac damage.** © **2019 Elsevier Inc. All rights reserved.**

☐ **Keywords—neurology; Sydenham's chorea; group A *streptococcus***

INTRODUCTION

Sydenham's chorea (SC) is most commonly due to a manifestation of rheumatic fever in children, with a mean age of 11 years (1). The differential diagnosis includes systemic lupus erythematosus, drug intoxication, Wilson's disease, familial chorea, and hyperthyroidism. It is characterized by involuntary choreiform movements, including facial grimacing, hypotonia, muscle weakness, gait disturbance, and difficulty writing/speaking. Involuntary movements are exacerbated by stress and resolve during sleep. Although the exact pathophysiology remains unclear, it is postulated that antibodies against Group A β-hemolytic *streptococcus* (GABHS) cross-react with neurons of the basal ganglia (2). These anti-basal antibodies signal induction of kinase II enzymes, resulting in the release of dopamine with the resultant movement disorder. Serum anti-streptolysin O (ASO) titers are typically elevated and peak at about 3–5 weeks post-infection, declining thereafter (1). Magnetic resonance imaging (MRI) of the brain excludes other etiologies. SC is generally self-limiting, with a mean duration ranging from 2–4 months up to 6–7 months. Treatment includes high-dose corticosteroids, penicillin treatment of GABHS infection, valproic acid, and neuroleptics. Immunotherapy with i.v. immunoglobulin and plasmapheresis is used in severe cases (3,4).

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CASE REPORT

A 12-year-old female presented with a 2-week history of involuntary muscle spasms of her right arm/leg. Her right foot began to "rotate in and out" with ambulation. Her parents reported intermittent slurred speech and difficulty grasping utensils when attempting to eat. Her attention span began to diminish to the point her parents had to repeat things to her. She had no medical history and no recent illnesses. She denied any tobacco, alcohol, or drug use. Family history included rheumatoid arthritis, heart disease, thyroid disease, and diabetes mellitus. Examination revealed the patient to be awake and alert with normal cranial nerves. Choreoathetoid movements were noted in the right arm/leg. Dystonic movement was noted in the right leg with ambulation. Computed tomography (CT) of the head was normal, as was MRI of the brain. Echocardiogram revealed mild tricuspid regurgitation, suggestive of rheumatic fever. ASO titer was markedly elevated at 680 IU/mL. DNAse-B antibodies were also elevated at 960 U/mL. Thyroid-stimulating hormone, rheumatoid factor, ceruloplasmin, and lyme titer were all normal. The patient received corticorsteroids, valproic acid, pimozide, and i.v. immunoglobulin and was markedly improved at discharge just more than 1 week later. She continued to receive monthly penicillin prophylaxis.

DISCUSSION

SC, or rheumatic chorea, is one of the clinical manifestations of acute rheumatic fever. This is the most common acquired chorea of adolescence. SC is a movement disorder that is characterized by involuntary choreiform movements, which can include facial grimacing, hypotonia, muscle weakness, gait disturbance, and difficulty with writing and speaking. Affected patients can develop tics, dysarthria, hypotonia, muscular weakness, and vocalizations. SC is often accompanied by psychologic symptoms, such as emotional lability, obsessive-compulsiveness, anxiety, and depression. The chorea generally develops subacutely and is usually bilateral, although 20–30% can have hemichorea. The patient's mental status is typically normal, however, SC is often misdiagnosed as mental or psychiatric disease.

SC has a clear and documented relationship to group A streptococcal (GAS) infections, however, its exact pathogenesis is not completely understood (5). It is believed that antibodies directed against part of the Group A *streptococcus* that then cross-reacts with the lysoganglioside of the neuronal cell (6,7). These antibodies then trigger a signaling cascade that leads to the pathologic movements.

SC usually occurs 1–8 months after the inciting infection (8). This is in direct contrast to the other common clinical manifestations of acute rheumatic fevers, such as carditis and arthritis, which typically happen within 3 weeks. The symptoms of SC are often seen without other symptoms of rheumatic fever (9,10). Chorea often occurs insidiously, but worsens over hours to days. Patients often state that the movements are involuntary and not driven by compulsion. The patients are often described as restless in appearance. Cranial nerve function is not affected.

Physical examination typically consists of four different motor tests: spooning, touchdown, milkmaid's grip, and darting tongue (11). These four maneuvers typically expose the characteristic movements of SC. Generally, there should be no sensory loss on examination. Gait is typically described as unsteady due to the chorea in the muscles that enable movement. Diagnostic evaluation should be aimed at diagnosing acute rheumatic fever. Testing should be completed to look for GAS infection, along with cardiac evaluation. Throat cultures are often obtained along with blood test for streptococcal antibodies, such as ASO and anti-deoxyribonuclease B. Cardiac testing should include electrocardiogram and echocardiogram. Neurologic evaluation, such as CT scan of the head or MRI of the brain and lumbar puncture, can also help to rule out other neurologic and psychiatric mimics.

The clinical diagnosis is made based on the characteristics of the disease, along with the absence of other diagnostic causes. The presence of recent GAS infection or carditis on examination help support the diagnosis, but is not necessary to establish the diagnosis. Differential diagnosis includes many other autoimmune diseases, such as viral or autoimmune encephalitis, cerebrovascular accident, hyperthyroidism, or reaction to drugs, especially those interacting with dopamine receptors.

Treatment of patients diagnosed with SC typically consist of chronic antibiotic therapy. This helps to both prevent recurrence and minimize cardiac damage. Some patients can also benefit from medications designed to treat the movement symptoms or steroids to inhibit the immune system. Antibiotics are generally chosen for their ability to treat GAS infections. Dopamine 2 receptor blocking agents have been used to treat the movement disorder symptoms with or without anticholinergics.

Treatment of SC is based on severity of symptoms. Given the low incidence, large double-blinded placebo-controlled trials are lacking. Treatment side-effect profiles remain an important consideration. The most appropriate treatment strategy is with penicillin, carbamazepine/valproic acid, and steroids. Immunomodulatory therapy, using i.v. immunoglobulin/plasmapheresis, should be reserved for refractory cases (12).

SC typically improves gradually, with most patients reaching full recovery. Mean duration of symptoms are typically 12–15 weeks (13,14). Chorea does re-occur in

15–30% of patients (15,16). This most often occurs within 1 to 3 years, but delayed cases have been as late as 10 years (17). Relapses occur most often in patients not receiving continuous antibiotic therapy. Recurrent GAS infection and SC does increase the risk for chronic rheumatic heart disease.

WHY SHOULD AN EMERGENCY PHYSICIAN BE AWARE OF THIS?

SC is a rare but important movement disorder often related to Group A *streptococcus* and rheumatic fever. The incidence of rheumatic fever has been decreasing in North America, but continues to be much more prevalent in developing countries as well as immigrant populations. This diagnosis is rare and can occasionally be misdiagnosed as a "fidgety" child or as a psychiatric manifestation. SC is important to diagnose because acute treatment and prophylactic antibiotics can help improve symptoms and minimize cardiac damage.

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