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Paediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections (PANDAS): Scope and approach in homeopathy

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Abstract

Paediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal Infections (PANDAS) are clinical conditions characterized by the sudden onset of obsessive compulsive disorder and/or tics, often accompanied by other behavioral symptoms in a group of children with streptococcal infection.

Keywords: Paediatric autoimmune neuropsychiatric disorders associated with streptococcal infections, PANDAS, homoeopathy

Introduction

It is an autoimmune disorder associated with group A beta haemolytic streptococcal infection. PANDAS appears in childhood from age 3 to puberty. • infection commonly referred to as “strep” or “strep throat”. Following infection with strep, children with PANDAS syndrome develop severe physical, neurological, and psychological symptoms that interfere with their daily lives.

- Possible PANDAS/PANS symptoms can include:
- Sudden, acute onset of OCD.
- Restrictive eating habits.
- Irritability or aggressive behavior.
- Loss of bladder control
- Separation anxiety
- Extreme moodiness or depression.
- Deterioration of motor skills

The five clinical characteristics that define the PANDAS

1. Presence of OCD and/or tic disorder.
2. Prepubertal age of onset (3 year-13y)
3. Abrupt onset and relapsing-remitting symptom course,
4. Association with neurological abnormalities during exacerbations (adventitious movements or motoric hyperactivity), and a temporal association between symptom exacerbations and a Group-A beta-hemolytic streptococcal (GAS) infection

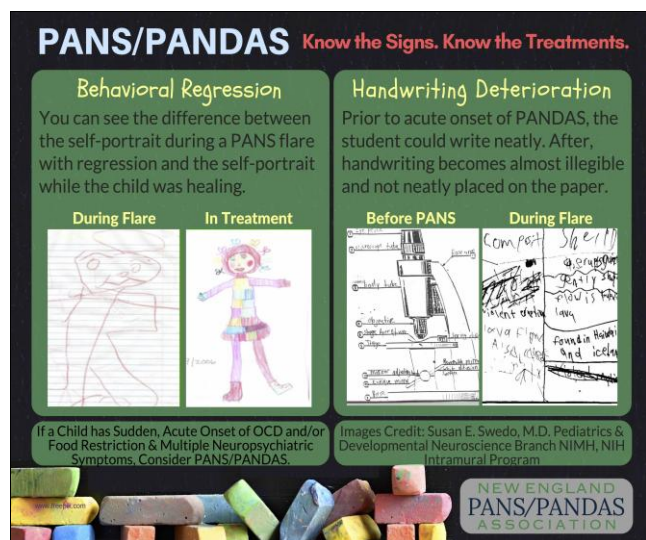
Obsessive-Compulsive Disorder (OCD), tic disorder, or both suddenly appear following a streptococcal (strep) infection, such as strep throat or scarlet fever. The symptoms are usually dramatic, happen “overnight and out of the blue,” and can include motor or vocal tics or both and obsessions, compulsions, or both.

Common compulsions may involve

- Excessive checking
- Excessive washing and/or cleaning
- Counting (e.g., doing things a certain number of times, counting items to certain numbers)
- Ordering or arranging things
- Excessive reassurance seeking (e.g., often asking “Are you sure I’m going to be okay?”)

Obsessive Compulsive Disorder (OCD)

Debilitating neuropsychiatric disorder. Obsessive Compulsive Disorder (OCD) is a mental health condition characterized by a cycle of obsessions, intrusive thoughts, or images that leave the patient with uncontrollable worry, anxiety, and doubt. Common obsessions may include: Fears of contamination or cleanliness, pathological doubt, unwanted thoughts and/or images of an aggressive, sexual nature, the need for symmetry, order. OCD caused by an autoimmune response to streptococcal infections, that is, a similar biological mechanism to that associated with Sydenham's chorea.



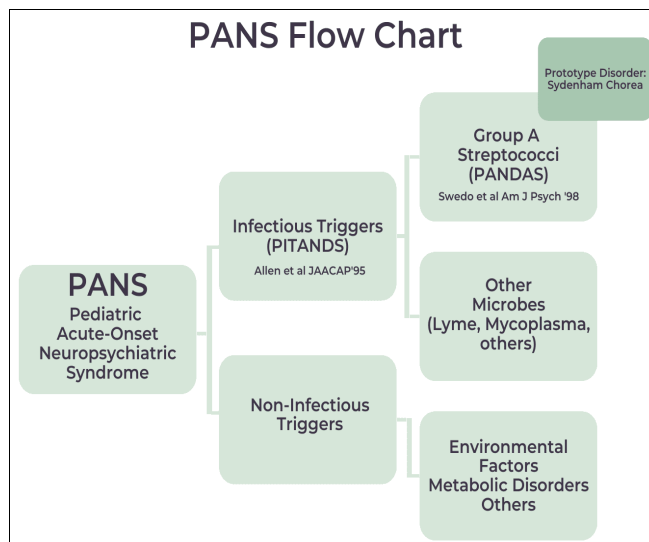
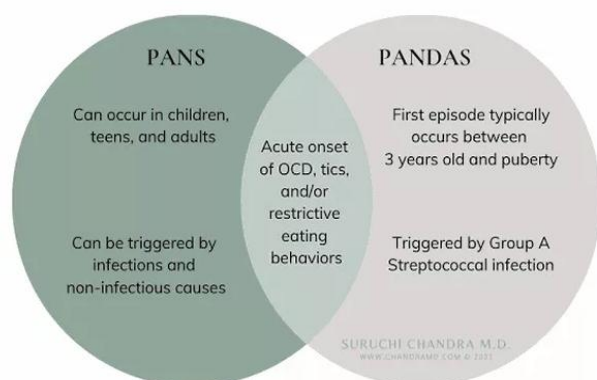
Epidemiology

The mean age of symptom onset for children diagnosed with PANDAS and exhibiting tics is approximately 6.3 years, whereas those presenting with OCD tend to experience symptom onset at around 7.4 years of age. The prevalence of the disease appears to be higher in males, with a male-to-female ratio estimated to be between 2.6 and 4.7 to 1. PANDAS is a condition of low occurrence, and most of the cases are misdiagnosed.

PANDAS including related disorders

1. Paediatric Acute-Onset Neuropsychiatric Syndrome (PANS)
2. Paediatric Infection Triggered Autoimmune Neuropsychiatric Disorders (PITANDS)

What is the difference between PANS & PANDAS?



Pediatric Infection Triggered Autoimmune Neuropsychiatric Disorders (PITANDS)

In the 1980s, a group of doctors at the National Institutes of Health (NIH) studied children with Obsessive-Compulsive Disorder (OCD). They found that some of these children suddenly developed OCD after having an infection. The infections could be caused by different germs like *Streptococcus pyogenes* (a type of bacteria), the chickenpox virus (Varicella), or *Mycoplasma pneumoniae* (a type of bacteria that causes lung infections).

These children were diagnosed with a condition called "Paediatric Infection Triggered Autoimmune Neuropsychiatric Disorders" (PITANDS), this means their OCD was triggered by an infection that caused their immune system to react in a way that affected their brain and behavior.

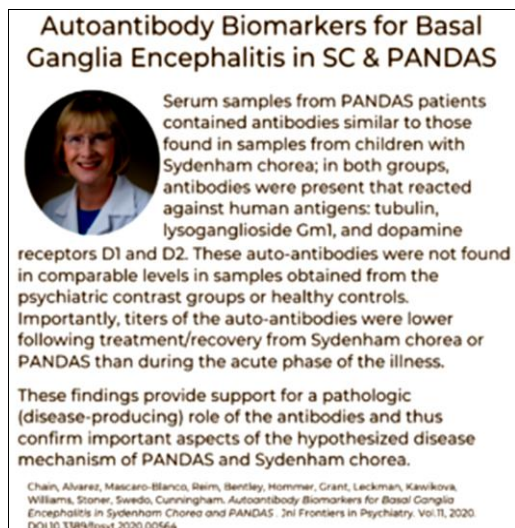
Systematic clinical investigations of Sydenham's chorea and OCD led to discovery of a subgroup of OCD patients whose symptoms were triggered by GAS infections and labeled "Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections" (PANDAS).

Streptococcus

Streptococcus pyogenes, also called group A beta-hemolytic *Streptococcus* or group A strep (GAS), is a type of bacteria that is round in shape, can be found everywhere, and spreads easily from person to person through skin contact or respiratory droplets.

The bacteria only live on human skin and mucous membranes. GAS commonly causes infections in the throat (pharyngitis) and skin (cellulitis), impetigo etc. GAS infections can lead to autoimmune diseases, such as acute rheumatic fever, vasculitis, and neuropsychiatric disorders like Sydenham chorea, PANDAS.

PANDAS was first described in 1998 in a clinically homogeneous cohort of children with OCD or tic disorders. This condition was first reported by Swedo and his team in 1998 to describe children affected by a set of clinical signs linked to group-A-beta-hemolytic streptococcal infection (GABHS). Parallel studies of Sydenham's chorea and childhood-onset OCD at the National Institute of Mental Health formed the basis for describing the association between GAS and PANDAS.



Rheumatic fever

Rheumatic fever (acute rheumatic fever or ARF) is an autoimmune disease that may occur after a group A streptococcal (GAS for strep throat) throat infection. Such a reaction causes inflammatory lesions in the connective tissue, heart, joints, and blood vessels of various organs and subcutaneous tissue. The bacterium causes an autoimmune (antibodies that attack the host's own cells) inflammatory response in some people, which leads to the myriad signs and symptoms of rheumatic fever.

Sydenham's chorea

Sydenham chorea, or St. Vitus dance, is a major manifestation of rheumatic fever in up to 40% of patients with rheumatic fever. SC affects girls more often than boys, and usually happens between ages 5 and 15.

Symptoms can happen slowly over time or all at once. SC can also happen up to six months after a child has a fever, or the strep throat infection goes away involuntary movements of the limbs and trunk and frequently accompanied by muscle weakness and emotional instability.

Milk maids grip is appreciated as an alternating squeezing and releasing of the finger like a milking motion, when asked to maintain a constant, firm grip of examiner's fingers. This may reflect a combination of Chorea and Motor impersistence.

What causes PANDAS?

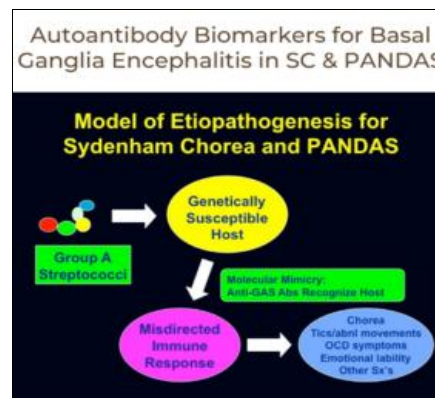
An autoimmune attack of healthy brain tissue after a strep infection.

PANDAS/PANS is a rare and lesser-known disorder, and doctors often mistake it for other conditions.

What is autoimmunity? Autoimmunity is a group of immune responses that attack our own healthy cells, tissues, and other normal body components. At the cellular level, autoimmunity is characterized by the presence of antibodies or T cells that attack healthy tissue. This phenomenon is present in all people at near undetectable levels, even in those who are healthy. Autoimmune diseases are only diagnosed when the immune system attack on healthy tissue resulting in physiological changes in the body.

Strep bacteria are very ancient organisms that survive in the human host by hiding from the immune system as long as possible, they hide themselves by putting molecules on their cell wall so that they look nearly identical to molecules found on the child's heart, joints, skin, and brain tissues, this

hiding is called "molecular mimicry" and allows the strep bacteria to evade detection for a long time, because of the molecular mimicry by the bacteria, the immune system reacts not only to the strep molecules but also to the human host molecules that were mimicked; antibodies "attack" the mimicked molecules in the child's own tissues.



Auto-antibodies might be responsible for targeting brain structures, such as dopamine D1 and D2 receptors, leading to the alteration of dopaminergic transmission. Brain inflammation (mainly basal ganglia) occurs when the body's immune system mistakenly attacks healthy brain cells, leading to autoimmune processes that affect central nervous system function. PANDAS is result from cross-reactive antibodies. cross-reactive antibodies Recognize and bind to two or more antigens that are highly homologous or possess the same epitope.

| EFFECTS OF BASAL GANGLIA INFLAMMATION | |
|---|--|
| "Seeing Your First Child with PANDAS/PANS" by Margo Thienemann, MD and The PANDAS Physicians Network Diagnostics and Therapeutics Committee | |
| Basal ganglia is a relay station through which run neurons that control: | Inflammation may cause: |
| Mood and emotion | OCD, Mood lability, Anxiety |
| Behavior | OCD, Rage, Developmental regression |
| Procedural learning | Handwriting changes, Clumsiness |
| Motor Movements | Tics, Choreiform Movements |
| Cognition | Slow processing speed, Memory issues specific Sensory learning deficits (often Math) |
| Sensory | Sensitivity to light, sounds, smells, tastes, textures |

Investigation

Lab tests

A throat swab (rapid and culture) to test for strep can be done when symptoms first appear. If the throat swab does not show any signs of strep, a blood test for an antibody called ASO (Anti-Streptolysin O) can also be done.

Viral/bacterial testing,

Strep throat culture (48 hour culture or perianal culture)

Antistreptolysin O (ASO)

Anti dNase B

Basic blood work

IgE

IgA

IgM

IgG

CBC

ANA

Ferritin B-1

Cunningham panel

Patients with high anti-dopamine D1 antibodies often report having psychiatric symptoms such as OCD behaviors and tics.

Those with elevated anti-dopamine D2L antibodies report symptoms such as hyperactivity, impulsivity and other uncontrolled motor movements.

Patients with elevated anti-lysoganglioside-GM1 antibodies often report obsessions/compulsions, sleep disturbances and aggression.

Those with elevated anti-tubulin levels experience brain fog, OCD-like symptoms and cognitive impairment.

Patients with elevated CaM kinase II levels report having involuntary movements, cognitive interference, emotional lability and other neuropsychiatric symptoms.

Treatment

Immunomodulatory therapies. They include treatments that increase or decrease your immune response. Immunomodulators treat various conditions, including cancer and autoimmune diseases.

Plasma exchange

IVIG Intravenous immunoglobulin (IVIg) is a treatment that can boost antibody levels in people with immunodeficiencies, autoimmune diseases, or inflammatory conditions effective in lessening of symptom severity for children with infection-triggered OCD and tic disorders function. Symptoms may return in future weeks or months, warranting additional surveillance for and treatment of infectious agents.

Anti-Inflammatories or corticosteroids.

Homoeopathic approach in disease prevention In aphorism 33 footnote

A clear example of this is that, before 1801, when Sydenham's smooth scarlet fever still spread among children, it always affected those who hadn't had it during previous outbreaks. However, during a similar outbreak I saw in Konigslutter, all the children who took a small dose of belladonna on time didn't catch the disease. If a medicine can protect against a widespread illness, it must have a very strong effect on our body's vital energy

Aphorism 73

After the year 1801, a condition similar to purpura miliaris (roodvonk), which originated in the West, was mistakenly identified by physicians as scarlet fever, despite the fact that the two diseases had entirely different symptoms. Scarlet fever could be prevented and treated with belladonna, while the other condition responded to aconite. Additionally, the former was typically sporadic, while the latter was consistently epidemic

Role of homoeopathy in pandas**Belladonna**

A high feverish condition with little to no toxemia. With a fever, there is no thirst. Shooting aches running up and down the limbs. Swollen, red, shining joints with red streaks radiating. Walking with a stumbling gait. Rheumatic aches that shift. Legs jerk with spasms. Involuntary limping is a condition that occurs when a person is unable to walk. Extremely cold extremities., agitated mental state, hyperaesthesia of all senses, delirium, restless sleep,

convulsive movements, dry mouth and throat with aversion to water, and acute neuralgic pains.

Hallucinations: Sees monsters

Tarentula hispanica

Sudden alteration of mood. Destructive impulses, formication, sensitive to music, must constantly busy herself or walk, desire to run about to dance /jump, inflammation of throat and tonsils of right side.

Aconitum napellus

Great fear, anxiety, fear death believes that he will die soon. Delirium- unhappiness worry, fear, raving. Restlessness, tossing about. Thinks his thoughts come from stomach. Fever-cold stage most marked. Cold sweat, evening chilliness soon after going to bed.

Stramonium

The entire force of this drug is expended on brain. Fever-profuse sweat which does not relieve violent fever. Delusion about his identity. Thinks himself tall, double, a part missing. Delirium with desire to escape. Sees ghost, hears voices, talks with spirits.

Veratrum album

Fever- chill with extreme coldness and thirst, hoarse weak voice, sits in a stupid manner; notices nothing, loquacity, rapidly

Attacks of pain with delirium or driving to madness, aimless wandering from home. Mania with desire to cut or tear things

Rubrics

Mind - delirium - muttering - apis, bell, hyos, stram, ph-ac

Mind - delirium - during- acon, bell, Bry, hyos, stram

Mind - delusion - during-bell, calc

Mind - delirium - cold catching after- opium

Extremities - formication - fever: during - aco, arnica, rhus tox, sep, stram

Skin - formication -fever: during-croc, puls, rhus t, spig, sulph, thuja

Mind - thoughts - compelling - anac, ars, hyos, med

Conclusion

Paediatric Autoimmune Neuropsychiatric Disorder Associated with Streptococcal Infections (PANDAS) involves sudden onset of neuropsychiatric symptoms like OCD and tics following streptococcal infection. It reflects a complex autoimmune response affecting the brain. While conventional treatment includes antibiotics and psychiatric drugs, these may have limitations. Homoeopathy offers a holistic, individualized approach that may help in immune modulation and symptom relief. Remedies such as *Belladonna*, *Stramonium*, and *T. hispanica* have shown promise in similar conditions. Though more clinical research is needed, homoeopathy holds potential as a supportive therapy in managing PANDAS, especially when integrated with a multidisciplinary treatment strategy.

Conflict of interest: Nil.

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