An Integrative Medicine Approach to PANS/PITAND/PANDAS

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Hill Park Medical Center
UCSF Clinical Instructor
Thank You For Being Here

You are the forefront of change

A special appreciation for Amy Smith and Diana Pohlman
Introduction

- Who I am
- Why we’re having this conference
- Hill Park Medical Center’s program
Introduction to Functional medicine

Why integrative and functional medicine is the optimal approach for PITAND/PANDAS

Background on new proposed classification of PANS/PITAND/PANDAS

Details of integrative medicine diagnosis and treatments for PANS/PANDAS/PITAND

Case presentation
Who I Am

- Grew up in India and Marin with significant exposure to alternative medicine
- UC Berkeley undergraduate
- UC Irvine medical school, leader in integrative medicine curriculum development
- UCSF Santa Rosa residency in family medicine
  - Board Certified
- Founded a UCSF integrative medicine fellowship
- UCSF clinical instructor in integrative family medicine
- Private practice in Sonoma County
  - Hill Park Integrative Medical Center
Integrative Medicine
Integrative medicine

- Focus on the interconnectedness of the whole person with all aspects of their environment
- Examine underlying causes and triggers of illness
- Open multiple avenues for diagnosis and treatment
- The goal is to think broadly
- Focus on the root causes, not just the treatment
- Identify and work on as many leverage points as possible, simultaneously
It is apparent that – in its rush to diagnose – conventional medicine is focused on the branches and leaves of the tree...

and not the trunk and roots.
Fundamental Clinical Imbalances
- Hormonal and Neurotransmitter Imbalances
- Redox Imbalance + Oxidative Stress + Mitochondriopathy
- Detox/Biotransformation/Excretory Imbalance
- Immune Imbalance
- Inflammatory Imbalance
- Digestive/Absorptive and Microbiological Imbalance
- Structural Integrity Imbalance
- Psychological & Spiritual Imbalance

Fundamental Physiological Processes
- 1. Communication
  - Outside the cell
  - Inside the cell
- 2. Bioenergetics/Energy Transformation
- 3. Replication/Repair/Maintenance/Structural Integrity
- 4. Elimination of Waste
- 5. Protection/Defense
- 6. Transport/Circulation

Mind and Spirit
- Genetic Predisposition
  - Experiences, Attitudes, Beliefs

Psycho-social Stress Management
Sleep
Exercise
Trauma
Diet, Nutrients, Air/Water
Xenobiotics
Micro-organisms & Radiation

Environmental Inputs

Cardiology
Pulmonology
Endocrinology
Urology/Nephrology
Gastroenterology
Hepatology
Neurology
Allergy

Signs and Symptoms

Organ System Diagnosis
Diet, Nutrients, Air/Water
Psycho-social Stress Management

Environmental Inputs

Stress Management

1. Communication - Outside the cell
- Inside the cell
2. Bioenergetics/Energy Transformation
3. Replication/Repair/Maintenance/Structural Integrity
4. Elimination of Waste
5. Protection/Defense
6. Transport/Circulation

Fundamental Physiological Processes

Mind and Spirit
Genetic Predisposition
Experiences, Attitudes, Beliefs

Micro-organisms & Radiation
Strep, Myco, Flu and other viruses, Lyme/coinfections, toxins, vaccines

Redox Imbalance + Oxidative Stress + Mitochondropathy
Detox/Biotransformation/Excretory Imbalance
Immune Imbalance/Autoimmunity
Inflammatory Imbalance
Digestive/Absorptive and Microbiological Imbalance
Structural Integrity Imbalance (GUT, BBB)
Psychological & Spiritual Imbalance

Fundamental Clinical Imbalances

PANS/PITAND/PANDAS Diagnosis

Signs and Symptoms

1. OCD
2. Anxiety
3. Anger/Rage/Terrors
4. Insomnia
5. Anorexia
6. Bedwetting

Changes in handwriting, math, etc

OCD

Anxiety

Anger/Rage/Terrors

Insomnia

Anorexia

Bedwetting

Flares with new infections

TICS/ Movement Disorders

Perseveration

Regression

Psychological & Spiritual Imbalance

OCD

Anxiety

Anger/Rage/Terrors

Regression

Perseveration

TICS/ Movement Disorders

Flares with new infections
Classification and Diagnosis
From Research Subgroup to Clinical Syndrome: Modifying the PANDAS Criteria to Describe PANS (Pediatric Acute-onset Neuropsychiatric Syndrome)

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²Child Study Center, Yale University, New Haven CT, USA
³Center for Autoimmune Disease Research, Johns Hopkins School of Medicine, Baltimore MD, USA

Abstract

Despite continued debates about the role of Group A streptococcal infections in the etiopathogenesis of PANDAS (Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections), experts on both sides of the controversy agree that a subgroup of children with obsessive-compulsive disorder (OCD) have an unusually abrupt onset of symptoms, accompanied by a variety of comparably severe and acute neuropsychiatric symptoms. The acuity of symptom onset is the hallmark feature of their clinical presentation and the basis for the name proposed for an expanded clinical entity: Pediatric Acute-onset Neuropsychiatric Syndrome (PANS). Modifying the PANDAS criteria to eliminate etiologic factors and to clarify the initial clinical presentation produced three potential diagnostic criteria for PANS. These three criteria are discussed in detail. The article also proposes strategies for applying the PANS criteria in clinical settings and evaluating their validity and reliability through prospective research investigations.

Introduction

When the initial description of Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS) was published in 1998, it was a compilation of more than a decade of research by clinical investigators in the intramural research program of the National Institute of Mental Health (NIMH) [1]. Establishing a connection between childhood-onset obsessive compulsive disorder (OCD) and preceding infections with Group A streptococcal (GAS) infections was the result of two parallel lines of research - longitudinal studies of OCD and a series of investigations of Sydenham chorea (SC) [2-4]. Prospective evaluations of children with OCD revealed that a subgroup had an atypical symptom course, characterized by an unusually abrupt onset (from no symptoms to maximum intensity within 24-48 hours), a relapsing-remitting symptom course, and significant neuropsychiatric comorbidity, including separation anxiety, ADHD-like symptoms and motor tics [1,2]. Often, the OCD symptoms were preceded by a bacterial or viral infection, such as influenza, varicella and Group A streptococcal (GAS) pharyngitis. The first case series suggested the name, "Pediatric Infection-Triggered Autoimmune Neuropsychiatric Disorders (PITANDS) "to reflect the variety of infectious organisms that had been observed [5]. Cases with onset of OCD symptoms following a GAS infection were of greatest interest to the NIMH investigators because of their concomitant research findings in SC which demonstrated that obsessions and compulsions were present in 60 – 75% of the affected children [3,6,7].

antineuronal antibodies [12-15], responses to immunomodulatory therapies [16-17] and vulnerability to non-GAS recurrences [18-20]. Despite these commonalities, it is important to note that PANDAS is not equivalent to a "mild case of SC", as the presence of chorea, rheumatic carditis or any of the other major manifestations of rheumatic fever (RF) is an exclusionary criterion for PANDAS [1,21]. By ruling out RF and SC before considering a diagnosis of PANDAS, decisions about antibiotic prophylaxis can be made appropriately. Clinical practice guidelines from the American Heart Association require antibiotics prophylaxis for all cases of RF, including those presenting only with chorea [22]. In contrast, antibiotics prophylaxis is not generally recommended for children in the PANDAS subgroup. Although two separate clinical trials in PANDAS demonstrated that...
PANS/PITAND/PANDAS

Prototype Disorder:
Sydenham Chorea

Group A Streptococci
(PANDAS)

Other Microbes
(Lyme, Mycoplasma, others?)

Environmental factors
Metabolic disorders
Others

Infectious Triggers
(PITANDS)

Non-Infectious Triggers

PANS
Pediatric Acute-onset
Neuropsychiatric Syndromes
## Diagnostic Criteria

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<thead>
<tr>
<th>Criterion</th>
<th>Description</th>
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<td>I.</td>
<td>Abrupt, dramatic onset of obsessive-compulsive disorder or severely restricted food intake</td>
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<td>II.</td>
<td>Concurrent presence of additional neuropsychiatric symptoms, with similarly severe and acute onset, from at least two of the following seven categories (see text for full description):</td>
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<td>1.</td>
<td>Anxiety</td>
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<td>2.</td>
<td>Emotional lability and/or depression</td>
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<td>3.</td>
<td>Irritability, aggression and/or severely oppositional behaviors</td>
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<td>4.</td>
<td>Behavioral (developmental) regression</td>
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<td>5.</td>
<td>Deterioration in school performance</td>
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<td>6.</td>
<td>Sensory or motor abnormalities</td>
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<td>7.</td>
<td>Somatic signs and symptoms, including sleep disturbances, enuresis or urinary frequency</td>
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<td>III.</td>
<td>Symptoms are not better explained by a known neurologic or medical disorder, such as Sydenham chorea, systemic lupus erythematosus, Tourette disorder or others.</td>
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</table>

Note: The diagnostic work-up of patients suspected of PANS must be comprehensive enough to rule out these and other relevant disorders. The nature of the co-occurring symptoms will dictate the necessary assessments, which may include MRI scan, lumbar puncture, electroencephalogram or other diagnostic tests.

Table 2: Diagnostic Criteria Proposed for Pediatric Acute-onset Neuropsychiatric Syndrome (PANS).
Older kids/adolescents (adults) count too

Our oldest patient, 28 yo, had elevated CAM Kinase, benefit from IVIG, complicating factors

Another 19 yo (now 20) significantly better post IVIG and antibiotics

Discussion in the literature about PITAND/PANDAS variants in adults too
Symptoms and Pathophysiology
Symptoms

- Extremely abrupt onset (frequently able to pinpoint exact date)
- Episodic or saw-tooth symptom flares
- OCD: Thoughts, movements, contamination fears, handwashing etc
- Anxiety, separation anxiety
- Anger, behavior outbursts
- Tics, complex movement disorders
Comorbid Symptoms of 108 Patients with PANDAS (from Dr. Kovacevic, Hinsdale IL)

- Terror stricken look (mydriasis) or Hyper-alert appearance 83%
- Urinary frequency, urgency, enuresis (night and daytime) 88%
- Deterioration in handwriting 89%
- Tics 72%
- Short-term memory problems 62%
- Sensory hypersensitivity or insensitivity 39%
- Sleep disorders 84%
  - Insomnia, night terrors, refusal to sleep alone
- Behavioral regression, Separation anxiety (98%), baby talk, tantrums
- Inability to concentrate 87%
- Hyperactivity, inattentiveness 71%
- Aggressiveness 62%
- Learning difficulties (esp math) 62%
- Eating disorder 17%
- Hallucinations 9%
Central Mechanism

- Immune system dysregulation
- Stealth infections that body cannot clear
  - Strep, Mycoplasma, Mono (EBV), Flu, Lyme and coinf, more
- Inflammation and cytokines
  - (Central to whole problem)
- Leaky Blood Brain Barrier (BBB)
- Antibody cross reaction and development of autoimmunity
Autoimmunity in PITAND/PANDAS

- Body gets confused
- Antibodies that originally targeted the infection now start to attack our tissues
  - Heart: Rheumatic heart disease
  - Brain: PITAND/PANDAS
“It's an autoimmune issue. Mady Hornig at Columbia University has a mouse model that shows how it works. They give strep to mice, then give them another agent that breaks down the blood–brain barrier, and that induces a neuropsychiatric syndrome: the mice have trouble running mazes, and so on. Then they purify the antibodies from those mice, inject them in another mouse that never had strep, and that mouse gets the neuropsychiatric symptoms, too. That shows it's the antibodies doing the damage.”

Michael Jenike, Professor of Psychiatry at Harvard Medical School
Adjuvant given to
break blood brain barrier
The blood–brain barrier (BBB)
Heal BBB: Holy Grail

- Treat infections
- Control inflammation
- Modulate immune system
- Remove triggers
- Heal leaky gut

Looking forward to talk by Dr. Agalliu
Goals
GOALS: Summary

- Kill the bad guys
- Flush/remove the toxins
- Down regulate inflammation
- Heal BBB
- Heal the Gut
- Balance hormones and neurotransmitters
- Regulate the immune system, down shift autoimmunity
- Stress management
- Clean up the environment
  - Media/screentime, EMFs, mold, pesticides, toxins, etc
- Like a web, or a symphony.
  - These things are all interconnected
  - The more we work with, the better our kids do
Diagnosis and Testing: Bugs

- Strep
- Mycoplasma
- Lyme and co-infections
  - Antibodies, PCR, culture
- Viruses
- More
Diagnosis and Testing: Gut

- Gut infections
- Food sensitivities and allergies
- Autoimmune markers
  - Gluten
Diagnosis and Testing: Hormones and NTs

- Adrenals
- Thyroid
- Neurotransmitters
Misc

- Inflammation markers
- Heavy metals: esp lead, mercury
- Genetic polymorphisms: MTHFR, COMT, other SNPs (affects detox pathways)
- Vitamin and mineral levels (D, B12, Fe, etc)
- RBC Zinc (sensory and OCD support)
Treatment:
1. Kill the bad guys

- Antibiotics for Strep, Mycoplasma
- Lyme, Babesia, Bartonella
- Antimicrobial herbs for all of above

- Antimicrobials usually help but frequently not enough on own
  - Clear or decrease infection pool
  - But do not clear antibodies
Bugs

- Strep titers
- Mycoplasma titers
- Viruses: EBV (Mono), Herpes viruses, CMV more
- Lyme tests
  - WB
  - PCR
  - CD 57 (marker of CMI, literature talks about it low in chronic Lyme, but low in HUGE percentage of our PANS kids
    - New finding?? Preparing to publish on this
  - Culture: Potentially a game changer
  - ITT with cyto
  - Borrelia Hermsii
  - Coinfections: Babesia, Bartonella, Erlichia
- Gut/Stool
  - H. Pylori, E. Histolytica, Cryptosporidium, Klebsiella, Strep, Yeast, more
2. Treatment: Remove the Antibodies

- Goal of IVIG or Plasmapharesis
  - Body keeps antibodies around, recycles
  - IVIG floods the antibody pool and has two main effects
    - Dilutes
    - Flush
  - Plasmapharesis
    - Removes the offending antibodies

- Once diagnosis established and evidence of benefit from antibiotics and/or steroids, need to clear the antibodies with IVIG or plasmapharesis
3. Treatment: “4 R” Gut Healing

- Identify and Remove triggers
  - Food allergens and sensitivities, infections, parasites, toxins
  - Testing and elimination diets
- Replace
  - Digestive enzymes
- Re-inoculate
  - Pre and probiotics, extremely important
  - Balance the use of antibiotics and decrease side effects
- Repair
  - Gut mucosa integrity and healing herbs and nutrients
Microbiome

Colonization begins with birth and breastfeeding and continues through life, leading to:

- 100 trillion bacteria
- 10x bodies total cells
- Accounts for half of the volume of contents in the colon
- 70% of human immune system localized in digestive tract
Investigators do not know every detail of how the immune system wreaks havoc with the intestinal lining of celiac patients, but they have identified a number of likely processes (below). Colored arrows indicate events that might be blocked by interventions now being investigated [see table on opposite page].

1. Indigestible fragments of gluten induce enterocytes to release the protein zonulin, which loosens tight junctions.

2. Gluten fragments cross the intestinal lining in abundance and accumulate under epithelial cells (enterocytes).

3. The gluten induces enterocytes to secrete interleukin-15 (IL-15), which arouses immune cells called intraepithelial lymphocytes against enterocytes.

4. Tissue transglutaminase (TTG), an enzyme released by the damaged cells, modifies the gluten.

5. Antigen-presenting cells of the immune system join the modified gluten to HLA molecules and display the resulting complexes to other immune cells: helper T cells.

6. Helper T cells that recognize the complexes secrete molecules that attract other immune cells and can directly damage enterocytes.

7. Helper T cells spur killer T cells to directly attack enterocytes.

8. B cells release antibody molecules targeted to gluten and TTG. Those antibodies might cause further damage when they hit their targets on or near enterocytes, but the role of antibodies in the disease is unclear.

Diet (hard work!)

Immune system strengthening, support, and reprogramming

This can be the missing link

- Several of our patients both pre and post IVIG, finally got well once the diet was cleaned up

- Gluten free for most, dairy free for many
  - Others based on testing for sensitivities and allergies

- Regulate the immune system, down shift autoimmunity
# Food Sensitivities

## Antibody Array 3

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<th>Antibody Array 3</th>
<th>Normal</th>
<th>Equivocal</th>
<th>Out of Range</th>
<th>Numeric Value</th>
<th>Reference (ELISA Index)</th>
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<td>Glutamic Acid Decarboxylase (GAD65) IgG</td>
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## Antibody Array 4

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<th>Antibody Array 4</th>
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<td>Yassa IgG+IgA Combined</td>
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<td>Tapioca IgG+IgA Combined</td>
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<td>Oats IgG+IgA Combined</td>
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<td>Coffee IgG+IgA Combined</td>
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<td>Rice IgG+IgA Combined</td>
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<td>Potato IgG+IgA Combined</td>
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AI disorders poorly understood but we know well that one leads to more

Diet manipulation offers opportunity to turn off at source in those who show AI activation
4. Treatment: Control Inflammation

- Steroids are the big gun, non selective
  - In emergencies
  - Can be diagnostic
- Adrenal support and testing
  - Natural cortisol pathway support
  - Bring the immune system back online
- Other anti-inflammatory nutrients
  - Bromelain, boswellia, curcumin, fish oil, etc
5. Treatment: Adrenal, Neurotransmitters, Thyroid

- Three legs of a stool
- All three systems need simultaneous support and balancing for optimal function
Adrenal Anatomy
Physiological Aspects of Cortisol and DHEA
(The Adrenal Glands’ Roles in Body Function Modulation)
6. Treatment: Stress Management

- Stress reduction (both for the child AND the parents, as well as the family unit)
- Phenotype of PANDAS Family: High autonomic activation overall, parents and kids
- Psychological and social support (HeartMath, CBT, Patty Wipfler, Amy Saltzman, MD, etc)
  - How to approach and be with kids who are out of control
- Limited media (TV, video games, etc)
Stress Management

- Stress effects kids as well
- Both physical and emotional
Additional Treatments

- Detox and methylation, GSH (can test too)
- Mitochondrial support Coq10, etc
- Antioxidants
- Herbs: Antimicrobial, detox, anti-inflammatory
- Vitamin D
- RBC Zinc (sensory and OCD support)
- Immune modulation: Low Dose Naltrexone, Transfer Factor
- Structural: Osteopathy, chiropractic neurology
Putting It All Together

A Recent Case
Putting It All Together

A.S. 15 yo male
- 12/07 Strep throat followed by joint muscle pain
  - Culture Positive, PCN resistant
- Knee arthritis, pain all joints on exam
- GI complaints, pain, nausea, decreased appetite
- EKG, ECHO normal
- ASO high, Anti DNAse B normal, later both positive
- Prophylactic PCN for 1.5 years 2008
2/11 Likely repeat strep (no culture done): Fever, rash, sore throat, HA

- Began having jerking movements R arm
  - “Three hours of R upper extremity jerking on Feb 16, 2011.”

- Went away for a couple weeks and then reappeared
  - “The symptoms then recurred around 10:00 am on March 7, 2011 and have persisted since that time.”

- Neuro: “Motor tic, vs myoclonus, poss due to infection.”

- Clonazepam and Keppra given
Insomnia, severe and not responsive to many meds
Irritability
Moaning episodes
Hostility
Poor memory
Difficulty concentrating
“Shocks down spine”
All symptoms flare when he gets sick
A.S.

Has history of multiple tick bites with fever and bull’s eye rash
Normal ASO, Anti DNAse B pending
Previously both have been high at different times
Mycoplasma IgM and IgG positive
Elevated C4A (inflammation)
Positive IgM Western blot for Lyme disease by CDC criteria
IgG Western blot negative, but shows several significant bands
Low CD57 cell count (36)
Elevated IgG antibodies to WA-1 (babesia)
Ehrlichia negative, bartonella negative, borrelia hermsii negative
A.S. Labs: Immune

- Total IgG low, low normal subclass one and three
- Low IgA level
A.S. Labs: Other

- Elevated antibodies to wheat and gluten, including autoimmune markers
- Yeast overgrowth in GI track
- Low levels of Lactobacillus and Bifidobacterium probiotics
- Neurotransmitter imbalances
- Depressed adrenal gland function
- MTHFR normal
- Vitamin D low
# GI Function Panel

## 2100 Gastrointestinal Function Profile

<table>
<thead>
<tr>
<th>Predominant Bacteria</th>
<th>Percentile Ranking by Quintile</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20%</td>
<td>40%</td>
</tr>
<tr>
<td>Obligate anaerobes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteroides sp.</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Clostridia sp.</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Prevotella sp.</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Fusobacteria sp.</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Streptomyces sp.</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>Mycoplasma sp.</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Facultative anaerobes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactobacillus sp.</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Bifidobacter sp.</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Obligate aerobes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escherichia coli (E. coli)</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Opportunistic Bacteria</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No clinically significant amounts.
Neurotransmitters

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>Result</th>
<th>Collected</th>
<th>Inter-Quintile Range</th>
<th>Reference Range</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serotonin</td>
<td>95.4</td>
<td>03/27/2012 (12:15PM)</td>
<td>99 - 203</td>
<td>57 - 306</td>
<td>µg/gCr</td>
</tr>
<tr>
<td>5-HIAA</td>
<td>2,324.0</td>
<td>03/27/2012 (12:15PM)</td>
<td>1800 - 5900</td>
<td>800 - 13000</td>
<td>µg/gCr</td>
</tr>
<tr>
<td>GABA</td>
<td>4.7</td>
<td>03/27/2012 (12:15PM)</td>
<td>3.9 - 7.9</td>
<td>2.4 - 12.7</td>
<td>µmol/gCr</td>
</tr>
<tr>
<td>Taurine</td>
<td>860.8</td>
<td>H</td>
<td>156 - 535</td>
<td>92 - 1023</td>
<td>µmol/gCr</td>
</tr>
<tr>
<td>Glycine</td>
<td>508.0</td>
<td>03/27/2012 (12:15PM)</td>
<td>441 - 1258</td>
<td>182 - 2225</td>
<td>µmol/gCr</td>
</tr>
<tr>
<td>Glutamate</td>
<td>19.6</td>
<td>03/27/2012 (12:15PM)</td>
<td>13.5 - 36.8</td>
<td>6.9 - 71.8</td>
<td>µmol/gCr</td>
</tr>
<tr>
<td>Histamine</td>
<td>10.9</td>
<td>03/27/2012 (12:15PM)</td>
<td>10 - 32</td>
<td>4 - 71</td>
<td>µg/gCr</td>
</tr>
<tr>
<td>PEA</td>
<td>23.6</td>
<td>03/27/2012 (12:15PM)</td>
<td>29 - 83</td>
<td>15 - 167</td>
<td>nMol/gCr</td>
</tr>
<tr>
<td>Dopamine</td>
<td>108.6</td>
<td>03/27/2012 (12:15PM)</td>
<td>106 - 191</td>
<td>64 - 261</td>
<td>µg/gCr</td>
</tr>
<tr>
<td>DOPAC</td>
<td>120.0</td>
<td>L</td>
<td>300 - 1000</td>
<td>100 - 2100</td>
<td>µg/gCr</td>
</tr>
<tr>
<td>Norepinephrine</td>
<td>12.6</td>
<td>L</td>
<td>28 - 51</td>
<td>19 - 76</td>
<td>µg/gCr</td>
</tr>
<tr>
<td>Epinephrine</td>
<td>6.2</td>
<td>L</td>
<td>7.1 - 13.6</td>
<td>4.7 - 20.8</td>
<td>µg/gCr</td>
</tr>
</tbody>
</table>

Red or light red bars indicate results out of Inter-Quintile Range.
Adrenals

Adrenal Hormones

Cortisol Graph

Note: Reference range can be found between the two gray lines.
Summary: A.S.

- PANDAS
- PITAND: Strep, Lyme, Babesia, Mycoplasma
- GI Imbalances: Gluten reaction (AI), yeast overgrowth, low beneficial bacteria
- Low adrenal function (chronic stress)
- Low neurotransmitters
- Low IgG levels
- IgA deficiency
- Low vitamin D

- So much going on, but so many good directions to go
Plan

- Change Azithro to Clarithro (Mycoplasma)
- Support adrenals
- Support Neurotransmitters, esp calming
- Yeast treatment
- Fine tune probiotics
- Gluten free diet
- Vit D
- Check IgA antibodies and subclasses

Future:
- Additional treatment for Lyme and coinfections
- IVIG
Summary
PANS/PITAND/PANDAS is an extremely complex disorder

- Infection
- Immune dysregulation
- Autoimmunity
- Inflammation
- Many body systems involved
  - Brain, gut, hormones, neurotransmitters, detox
The more angles we work from, the better the outcome

Integrative medicine opens many new avenues for diagnosis and treatment
You are doing incredibly hard work with your kids who have these illnesses.

It is scary, overwhelming, and SO much work.

Take time to recognize and appreciate your efforts.