



ADVANCED PEDIATRIC CARDIOLOGY

Dysautonomia Clinic

Dr. Shabib Alhadheri, MD

— EXPERT CARE. COMPASSIONATE HEARTS. —



DYSAUTONOMIA DISORDER AND POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME (POTS)

WHAT IS POTS?



POTS is a form of dysautonomia, a disorder of the autonomic nervous system that controls involuntary functions such as heart rate, blood pressure, digestion, and temperature regulation.

When a person with POTS stands up, blood can pool in the lower body. Instead of adjusting properly, the body responds with a very rapid heartbeat and insufficient blood flow to the brain and upper body.

DIAGNOSTIC CRITERIA



1 **Sustained Heart Rate Increase**
≥30 bpm in adults or ≥40 bpm in adolescents within 10 minutes of standing.



2 **Absence of Significant Blood Pressure Drop**
No orthostatic hypotension.



3 **Chronic Symptoms**
Symptoms present for at least 3 months.



4 **Exclusion of Other Causes**
Other conditions (e.g., dehydration, anemia, prolonged bed rest) must be ruled out.

Diagnosis is commonly confirmed with a Tilt Table Test or Standing Test (NASA Lean Test).

COMMON SYMPTOMS



CARDIAC
Palpitations, chest pain, rapid heartbeat (tachycardia)



NEUROLOGICAL
Dizziness, lightheadedness, fainting or near-fainting (pre-syncope), brain fog, headaches



CIRCULATORY
Shakiness, weakness, fatigue, purple discoloration of the legs (blood pooling)



GASTROINTESTINAL
Nausea, bloating, diarrhea, constipation



OTHER
Poor sleep, exercise intolerance, temperature sensitivity, shortness of breath

Symptoms can vary greatly among individuals in type and severity.

WHAT CAUSES POTS?



POST-VIRAL

Commonly happens after a viral illness (e.g., Epstein-Barr virus, influenza, and notably, COVID-19).



SECONDARY TO OTHER CONDITIONS

May occur alongside conditions like Ehlers-Danlos Syndrome (EDS), autoimmune diseases (e.g., lupus, Sjögren's), or diabetes.

TYPES OF POTS



HYPERADRENERGIC POTS

Overactive sympathetic nervous system with high adrenaline levels. Patients may experience increased blood pressure and rapid heartbeat when standing.



HYPOVOLEMIC POTS

Characterized by low blood volume.



NEUROPATHIC POTS

Involves damage to small nerve fibers that control blood vessel constriction in the limbs.

WHO DEVELOPS POTS?



POTS mainly affects women of childbearing age (about 80–85% of patients are female), but it can affect anyone regardless of age or gender.



It is estimated to impact between 1 and 3 million people in the United States.

TREATMENT AND MANAGEMENT

1. LIFESTYLE MANAGEMENT (FIRST-LINE THERAPY)



INCREASE FLUID INTAKE: Drink 2–3 liters of water daily to enhance blood volume.



INCREASE SALT INTAKE: 3,000–10,000 mg of sodium daily (as advised by a doctor) to help retain fluid. This is often achieved through electrolyte drinks.



COMPRESSION GARMENTS: Use compression stockings or abdominal binders to help prevent blood from pooling in the legs.



PHYSICAL THERAPY & EXERCISE: A graded exercise program, often beginning with recumbent activities like swimming or recumbent biking, is crucial for reconditioning the cardiovascular system. The CHOP/Levine Protocol is a recognized example.



DIETARY CHANGES: Eat smaller, more frequent meals to prevent blood from rushing to the gut. Reducing simple carbs can help some people.



PACING & ENERGY CONSERVATION: Learning to manage energy levels to avoid "crashes."

2. MEDICATIONS (USED OFF-LABEL)

Medications are prescribed to target specific issues and may include:



FLUDROCORTISONE: Helps the body retain salt and fluid, increasing blood volume.



MIDODRINE: A vasoconstrictor that tightens blood vessels to increase blood pressure and prevent blood pooling.



BETA-BLOCKERS / IVABRADINE: Used to lower and manage heart rate.



PYRIDOSTIGMINE: Can improve nerve transmission and reduce tachycardia.



IMPORTANT NOTES



POTS IS INVISIBLE:
People with POTS often "look fine," which can cause others to misunderstand the condition.



IT'S NOT PSYCHOLOGICAL:
While stress and anxiety can worsen symptoms, POTS is a true physiological disorder.



QUALITY OF LIFE:
POTS can be debilitating and greatly impact daily functioning, work, and social life.



PROGNOSIS

Many people, especially younger patients with a post-viral trigger, see significant improvement over time (months to years) with proper management. For others, it can become a chronic condition.



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LIFESTYLE STRATEGIES FOR MANAGING DYSAUTONOMIA & POTS



HYDRATION & SALT INTAKE

- Drink 2–3 liters (64–100 oz) of fluids daily.
- At least half should be electrolyte-rich (e.g., Pedialyte, Liquid IV, LMNT).
- Clear urine indicates proper hydration.
- Increase salt intake to 4–10 grams daily (~2 tsp) through foods like soups, broths, olives, nuts, or salt tablets.
- Avoid processed snacks as a primary salt source.
- Consult your cardiologist if you have high blood pressure or heart disease.



NUTRITION & EATING HABITS

- Eat balanced meals with protein, vegetables, fruits, and dairy.
- Eat small, frequent meals every 2–3 hours.
- Never skip breakfast—protein helps sustain energy.
- Choose high-fiber, complex carbs to stabilize blood sugar.
- Limit processed foods, sugary drinks, and fruit juices.
- Increase potassium intake to support fluid balance and reduce cramps.



WHAT TO AVOID

- Avoid caffeine, energy drinks, and decongestants ("D" medications) as they can worsen symptoms.
- Avoid alcohol—it promotes dehydration and can intensify symptoms.
- Be cautious with OTC medications that may increase heart rate or blood pressure.



EXERCISE RECOMMENDATIONS

- Focus on aerobic exercise: recumbent biking, rowing, swimming, brisk walking.
- Start Low and Go Slow.
- 4 times per week (every other day)
- ~30 minutes per session
- Avoid prolonged upright exercises.
- Incorporate lower limb and core strengthening to reduce blood pooling.
- Consider the Modified Levine Protocol for POTS.
- Report any fainting episodes during exercise immediately.



POSTURAL & DAILY HABITS

- Avoid prolonged sitting or standing; change positions gradually.
- When standing, cross legs or squat to improve circulation.
- Upon waking: sit up slowly, drink water, eat a small salty snack.
- Elevate the head of the bed 4–6 inches.
- Use compression stockings or abdominal binders if needed.



MANAGING SYMPTOMS

- Recognize early warning signs: dizziness, lightheadedness, nausea, visual changes.
- If symptoms occur:
 - Lie down immediately
 - Elevate your legs
- Remember these key phrases:
 - 1 "I'm not feeling well."
 - 2 "I need to lie down."
 - 3 "Please help me keep my feet elevated."



TEMPERATURE & ENVIRONMENT

- Avoid excessive heat.
- Stay indoors during heat warnings.
- Use cooling vests or neck towels in warm weather.



TRAVEL CONSIDERATIONS

- Avoid high altitudes when possible.
- Stay hydrated, increase salt, and move often.
- Wear compression garments.
- Take breaks during long trips.



SLEEP & RECOVERY

- Prioritize adequate sleep.
- Good sleep hygiene:
 - No naps
 - Avoid caffeine before bed
 - Consistent sleep routine
 - No screens 1 hour before bed
 - Relaxing pre-sleep activities



STRESS & MENTAL WELL-BEING

- Practice breathing and relaxation techniques.
- Minimize stressors.
- Engage in enjoyable activities.
- Positive mindset and biofeedback can help improve well-being.



GENERAL TIPS

- Lift, stretch, and shift your feet while sitting.
- Change positions gradually.
- Be aware of early signs of fainting.



LIFESTYLE STRATEGIES FOR MANAGING HEADACHES

SEEDS FOR SUCCESS

S

Sleep hygiene

E

Exercise regularly

E

Eat healthy and keep regular meals

D

Drink water & track symptoms (headache diary)

S

Stress reduction



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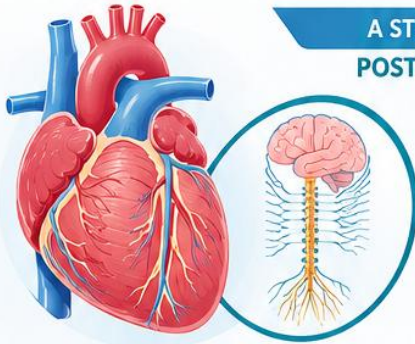


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MODIFIED LEVINE PROTOCOL FOR POTS

A STRUCTURED EXERCISE PROGRAM FOR PATIENTS WITH
POSTURAL ORTHOSTATIC TACHYCARDIA SYNDROME (POTS)



WHY EXERCISE HELPS IN POTS

Research has shown that many POTS patients have:

- Reduced blood volume
- Reduced stroke volume
- Cardiovascular deconditioning
- Reduced exercise tolerance
- Excessive heart rate increase when standing

A gradual exercise program can help:

- ✓ Increase blood volume
- ✓ Improve circulation
- ✓ Strengthen the heart and muscles
- ✓ Reduce dizziness and fatigue
- ✓ Improve quality of life

PHASE 1 (MONTHS 1-2) BUILD THE FOUNDATION

RECOMMENDED CARDIO



Recumbent
Bicycle



Rowing
Machine



Swimming or
Water Exercise



FREQUENCY

- 3-4 days per week
- Start with 20-30 minutes
- Gradually increase to 40 minutes

STRENGTH TRAINING (2 DAYS/WEEK)

Focus on:

- ✓ Core muscles
- ✓ Gluteal muscles
- ✓ Thigh muscles
- ✓ Calf muscles

Examples:

- Bridges
- Clamshells
- Leg Raises
- Seated Leg Press
- Planks



AVOID

- ✗ Running
- ✗ Prolonged standing exercises
- ✗ High-intensity upright workouts

PHASE 2 (MONTHS 3-4) TRANSITION TO UPRIGHT ACTIVITY

CARDIO



Upright
Bicycle



Treadmill
Walking



Elliptical
Trainer



FREQUENCY

- 4-5 days per week
- 30-45 minutes per session

STRENGTH TRAINING

Add:

- ✓ Squats
- ✓ Lunges
- ✓ Calf Raises
- ✓ Resistance Band Exercises



PHASE 3 (MONTHS 5-7) RESTORE EXERCISE CAPACITY

CARDIO



Incline
Walking



Elliptical
Training



Light Jogging
(if tolerated)



FREQUENCY

- 5 days per week
- 45-60 minutes per session

ADD INTERVAL TRAINING



1-3 minute
moderate-intensity
intervals
followed by
recovery periods

CONTINUE

- ✓ Lower-body strengthening
- ✓ Core stability exercises
- ✓ Functional strength training

DAILY POTS SUPPORT STRATEGIES



Drink
2-3 liters
of fluids
daily



Increase
salt intake as
recommended
by your
physician



Wear
waist-high
compression
garments



Exercise in
a cool
environment



Change
positions
gradually



Warm up and
cool down for
5-10 minutes



Do not stop
exercise
abruptly



Progress
slowly and
consistently



IMPORTANT REMINDERS



DURING THE FIRST FEW WEEKS

Symptoms may temporarily worsen.

**"Start Horizontal,
Progress Slowly,
Stay Consistent."**



SUCCESS DEPENDS ON

- ✓ Consistency
- ✓ Gradual Progression
- ✓ Adequate Hydration
- ✓ Salt Supplementation
- ✓ Regular Follow-Up



KEY MESSAGE

The Modified Levine Protocol remains one of the most effective non-pharmacologic treatments for improving symptoms and functional capacity in patients with POTS.



Always consult your healthcare provider before starting any exercise program.
This program should be individualized based on your symptoms and medical condition.

We're here to support your
journey to better health.





DYSAUTONOMIA & POTS

TREATMENT OPTIONS THAT HELP

Individualized Care. Better Symptom Control. Improved Quality of Life.



MEDICATIONS USED IN THE MANAGEMENT OF DYSAUTONOMIA & POTS



VOLUME EXPANSION

- Fludrocortisone (Florinef)
- Desmopressin (DDAVP)

Help the body retain fluid and increase blood volume.



BLOOD VESSEL SUPPORT

- Midodrine (ProAmatine)
- Droxidopa (Northra)

Help improve blood pressure and reduce dizziness on standing.



HEART RATE CONTROL

- Ivabradine (Corlanor)
- Beta-Blockers
 - Atenolol
 - Metoprolol
 - Propranolol
 - Nadolol

Help reduce excessive heart rate (tachycardia).



AUTONOMIC NERVOUS SYSTEM MODULATION

- Pyridostigmine (Mestinon)
- Clonidine

Support balance of the autonomic nervous system and may help with heart rate, fatigue, and symptoms.



GASTROINTESTINAL SUPPORT

- Prucalopride (Motegrity)

Helps improve GI motility, constipation, and may help with gastroparesis.



MAST CELL STABILIZATION

- Cromolyn

Helps reduce symptoms related to mast cell activation such as flushing, nausea, abdominal pain, itching, and hives.



ASSOCIATED ANXIETY & SYNCOPE

- SSRIs / SNRIs
 - Fluoxetine (Prozac)
 - Sertraline (Zoloft)
 - Paroxetine (Paxil)
 - Citalopram (Celexa)
 - Duloxetine (Cymbalta)

May help reduce fainting spells, improve mood, and reduce reflex tachycardia.



OTHER IMPORTANT NOTES

- Medications are chosen based on your main symptoms.
- Doses vary; some medications may be used in combination.
- Close follow-up with your physician is essential.



POSSIBLE SIDE EFFECTS

Every medication has potential side effects. Your doctor will monitor you closely and adjust treatment to maximize benefits and minimize risks.



IMPORTANT

Do not start, stop, or change any medication without consulting your physician.



NON-PHARMACOLOGICAL MANAGEMENT THAT MAKES A DIFFERENCE



EXERCISE & PHYSICAL THERAPY

- ✓ Follow the Modified Levine Protocol
- ✓ Aerobic exercise + lower extremity strength training
- ✓ 4 times per week
- ✓ 30 minutes per session
- ✓ Start with recumbent bike, rowing machine, elliptical, or swimming
- ✓ Avoid prolonged upright exercise initially

Exercise improves circulation, conditioning, and quality of life.



HYDRATION & VOLUME SUPPORT

- ✓ Increase fluid intake
- ✓ Increase sodium intake (as recommended)
- ✓ Use compression stockings
- ✓ IV Saline therapy may benefit selected patients with severe symptoms and low blood volume

Proper hydration and volume support help reduce symptoms and improve orthostatic tolerance.



SLEEP OPTIMIZATION

- ✓ Maintain a consistent sleep schedule
- ✓ Practice good sleep hygiene
- ✓ Consider a sleep study if indicated

Better sleep can lead to better energy, focus, and symptom management.



NUTRITIONAL SUPPORT

- ✓ Balanced nutrition
- ✓ Adequate calories
- ✓ Proper hydration
- ✓ Adequate salt intake (as recommended)

Good nutrition and hydration support better energy and overall well-being.



MENTAL HEALTH SUPPORT

Living with a chronic condition can be challenging.

Support may include:

- ✓ Counseling
- ✓ Cognitive Behavioral Therapy (CBT)
- ✓ Treatment for anxiety and depression when needed

Emotional well-being is an important part of healing.



IVIG THERAPY

Intravenous Immunoglobulin (IVIG) has shown benefit in selected patients with autoimmune-related dysautonomia and POTS. Discuss with your physician if this may be an option for you.

Used in carefully selected patients under specialist supervision.



TREATMENT OF DYSAUTONOMIA & POTS IS HIGHLY INDIVIDUALIZED.
Most patients achieve significant improvement through a combination of lifestyle modifications, exercise training, hydration, and carefully selected medications.



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SPECIALIZED CARE

• COMPASSIONATE SUPPORT

• BETTER OUTCOMES

Understanding POTS

(Postural Orthostatic Tachycardia Syndrome)

A simple explanation for patients



What is POTS?

POTS is a condition that affects the **autonomic nervous system** – the system that automatically controls heart rate, blood pressure, **breathing**, and digestion.

When a person with POTS stands up;

- The heart rate increases *abnormally* fast
- Blood tends to pool in the lower body
- The **brain** may temporarily receive *lesser* flow

This causes symptoms – but **the heart itself is usually structurally normal.**



Common Symptoms

- Fast heartbeat (palpitations)
- Dizziness or lightheadedness
- Near-fainting
- Fatigue
- Brain fog
- Headache
- Nausea
- Exercise intolerance

Symptoms often worsen with:



Heat



Illness



Dehydration

Prolonged standing



What happens in the body?

Normally when you stand:

- Blood vessels tighten
- Heart rate increase slightly
- Blood flow to the brain stays stable

In POTS:

- Blood vessels don't tighten enough
- The heart **compensate** by beating much faster

→ • Symptoms appear



Typical finding:

→ Heart rate increase by **30+ beats per minute (40+ in adolescents)** within 10 minutes of standing.



Who Gets POTS?

Most common in **teenager and young adults**

- More common in females
- Can occur after viral illness
- May be associated with hypermobility or **autoimmune** conditions



How Is It Managed ?

Treatment focuses on:

- Hydration
- Increased salt **intake** (when appropriate)
- Exercise **rehabilitation**
- Compression garments
- Medications if needed

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Dysautonomia Clinic
Advanced Pediatric Cardiology

Understanding Postural Orthostatic Tachycardia Syndrome (POTS)

— Patient Education Flyer —



POTS is a real
and treatable condition.
You are not alone.



WHAT IS POTS?

Postural Orthostatic Tachycardia Syndrome (POTS) is a condition that affects the autonomic nervous system — the part of the nervous system that automatically controls heart rate, blood pressure, breathing, digestion, temperature, and circulation.

WHEN A PERSON WITH POTS STANDS UP:

- Heart rate increases excessively
- Blood pools in the lower body
- Less blood briefly returns to the heart and brain
- Symptoms appear



IMPORTANT FACTS

- The heart structure is usually normal
- The condition is not life-threatening
- Symptoms are real and physiological



WHAT HAPPENS IN THE BODY?

IN A HEALTHY PERSON:



- Gravity pulls blood downward
- Blood vessels constrict (tighten)
- Heart rate increases slightly
- Blood pressure usually does not decrease significantly



COMMON SYMPTOMS

- Rapid heartbeat (palpitations)
- Chest discomfort
- Exercise intolerance
- Fatigue
- Weakness
- Tremors
- Nausea
- Dizziness
- Lightheadedness
- Near-fainting
- Brain fog
- Headaches
- Blurred vision



COMMON TRIGGERS (MAY INCLUDE)

- Dehydration
- Prolonged standing
- Viral illness
- High-carbohydrate meals
- Menstrual cycles
- Stress
- Lack of sleep



WHO IS MOST COMMONLY AFFECTED?

- Teenagers and young adults
- More common in females
- May develop after a viral illness
- Associated with autoimmune conditions
- May be associated with mast cell activation disorders



HOW IS POTS TREATED?

- Hydration
- Increased salt intake
- Compression therapy
- Structured exercise program
- Medications when needed:
 - Beta-blockers
 - Ivabradine
 - Pyridostigmine



DIAGNOSTIC FEATURES

- Heart rate usually increases by **30+ beats per minute or more** within 10 minutes of standing.
- In adolescents, heart rate typically increases by **40 beats per minute or more**.
- Blood pressure usually does not decrease significantly.



GOOD DAILY HABITS CAN HELP!

- Drink plenty of fluids
- Increase salt intake (as advised)
- Move regularly
- Sleep well
- Manage stress
- Follow your care plan

Consistency is key. Small steps can make a big difference! ❤️



YOU ARE NOT ALONE

POTS can be challenging, but with the right support and treatment, many people improve and live full, active lives.

*We are here to help you
on your journey!*



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Esta información es solo para fines educativos.
Consulte siempre con su profesional de salud para recibir orientación médica personalizada.



UNDERSTANDING DYSAUTONOMIA & POTS

A PATIENT AND FAMILY GUIDE



WHAT IS DYSAUTONOMIA?

Dysautonomia is a condition where the autonomic nervous system (ANS) does not work properly. It can affect heart rate, blood pressure, digestion, body temperature, sweating and more.

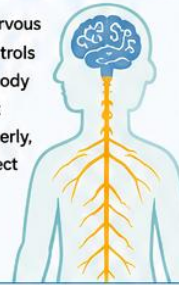


WHAT IS POTS?

POTS stands for Postural Orthostatic Tachycardia Syndrome. It occurs when the heart rate increases abnormally after standing. Blood pools in the legs and lower body, so the heart works harder to keep blood flowing to the brain.

THE BODY'S CONTROL CENTER

The autonomic nervous system (ANS) controls many automatic body functions. When it doesn't work properly, symptoms can affect daily life.



- Heart Rate
- Blood Pressure
- Breathing
- Digestion
- Temperature Control
- Sweating

NORMAL

Small increase in heart rate when standing.



POTS

Large increase in heart rate when standing.



COMMON SYMPTOMS OF POTS



CARDIOVASCULAR SYMPTOMS

- Rapid heartbeat (tachycardia)
- Palpitations
- Dizziness or lightheadedness
- Fainting or near-fainting
- Chest discomfort



NEUROLOGICAL SYMPTOMS

- Brain fog
- Difficulty concentrating
- Headaches
- Tremors
- Fatigue



GASTROINTESTINAL SYMPTOMS

- Nausea
- Abdominal pain
- Bloating
- Constipation or diarrhea



OTHER SYMPTOMS

- Exercise intolerance
- Weakness
- Sweating abnormalities
- Temperature sensitivity
- Sleep disturbances
- Anxiety-like symptoms



WHO CAN DEVELOP POTS?

POTS can affect both children and adults, but is more common in:

- Teenagers and young adults
- Females
- Patients after viral illnesses
- Individuals with hypermobility or Ehlers-Danlos Syndrome (EDS)



COMMON TRIGGERS

Symptoms may worsen with:

- Dehydration
- Heat exposure
- Prolonged standing
- Illness
- Stress
- Skipping meals
- Lack of sleep

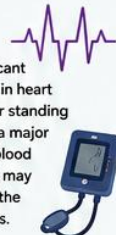


HOW IS POTS DIAGNOSED?

Diagnosis is based on:

- Medical history and symptoms
- Physical examination
- Orthostatic vital signs
- Tilt-table testing
- Electrocardiogram (ECG)
- Echocardiogram when needed

A significant increase in heart rate after standing without a major drop in blood pressure may support the diagnosis.



LIFESTYLE STRATEGIES THAT HELP



HYDRATION

Drink plenty of fluids daily. Electrolyte drinks may help.



SALT INTAKE

Increased salt intake may improve symptoms (only under medical guidance).



PHYSICAL ACTIVITY

Gradual exercise conditioning. Recumbent biking, rowing, and swimming are often recommended initially.



COMPRESSION GARMENTS

Compression stockings may reduce blood pooling.



SLEEP & RECOVERY

Maintain regular sleep habits. Avoid overexertion.



NUTRITION

Eat balanced meals. Smaller frequent meals may help. Avoid excessive caffeine and energy drinks.



WHEN TO SEEK MEDICAL ATTENTION

Seek medical care if symptoms include:



Frequent fainting



Chest pain



Severe shortness of breath



Significant exercise intolerance



Worsening symptoms

Do not ignore persistent or worsening symptoms.



IMPORTANT MESSAGE FOR PATIENTS & FAMILIES

Many patients with dysautonomia and POTS improve significantly with:

- Proper diagnosis
- Lifestyle adjustments
- Exercise conditioning
- Hydration strategies
- Medical support when needed

Early recognition and consistent management can greatly improve quality of life.



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BRAIN FOG IN POTS

Understanding the Connection and How to Manage It



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WHAT IS BRAIN FOG?

"Brain fog" is a common symptom in people with Postural Orthostatic Tachycardia Syndrome (POTS) and other forms of dysautonomia. It is not a formal medical diagnosis, but rather a term used to describe:



Difficulty concentrating



Slowed thinking



Poor short-term memory



Mental fatigue



Difficulty finding words



Trouble multitasking



Feeling "disconnected" or mentally cloudy

Many patients report that brain fog can be just as disabling as the rapid heart rate or dizziness associated with POTS.

ORTHOSTATIC CHANGES IN POTS



$HR_{standing} - HR_{supine} \geq 30 \text{ beats/min}$
within 10 minutes of standing

This excessive heart rate increase reflects autonomic dysfunction that may contribute to poor cerebral perfusion and cognitive symptoms.



WHY DOES BRAIN FOG OCCUR IN POTS?



1 Reduced Blood Flow to the Brain

When standing, blood may pool in the lower body instead of returning efficiently to the heart and brain. This can lead to reduced cerebral blood flow and oxygen delivery, causing cognitive slowing and fatigue.



2 Autonomic Nervous System Dysfunction

The autonomic nervous system controls heart rate, blood pressure, blood vessel tone, and stress responses. Imbalance in POTS can impair the brain's ability to maintain attention and alertness.



3 Fatigue and Poor Sleep

Chronic fatigue, non-restorative sleep, insomnia, and frequent awakenings can significantly worsen cognitive function and concentration.



4 Overactivation of Stress Hormones

Elevated norepinephrine (hyperadrenergic POTS) may lead to anxiety, tremulousness, mental overstimulation, and difficulty focusing.



5 Associated Conditions

Conditions often seen with POTS that may worsen brain fog: migraine, chronic fatigue syndrome (ME/CFS), mast cell activation syndrome (MCAS), Ehlers-Danlos syndrome, anxiety, depression, and nutritional deficiencies (iron, B12, vitamin D).

COMMON TRIGGERS OF BRAIN FOG



Standing too long



Heat exposure



Dehydration



Skipping meals



Poor sleep



Viral illnesses



Menstrual cycles



Physical overexertion



Stress and anxiety



Poor blood sugar control



Illness or infection



Certain medications



BRAIN FOG CAN IMPACT

- ✓ School and work performance
- ✓ Daily functioning
- ✓ Social interactions
- ✓ Quality of life



WHEN TO SEEK MEDICAL EVALUATION

Seek medical assessment if brain fog is:

- Progressive or severe
- Associated with fainting
- Accompanied by neurological symptoms
- Affecting school, work, or daily functioning significantly



Other conditions such as anemia, thyroid disease, sleep disorders, medication side effects, or neurological disorders should also be considered.

HOW TO MANAGE BRAIN FOG IN POTS



1 Optimize Hydration and Salt Intake

Fluids: 2-3 liters/day • Increase salt intake • Use electrolyte solutions
Improves blood volume and circulation to the brain.



2 Compression Garments

Compression stockings or abdominal binders help reduce blood pooling in the legs and abdomen, improving blood pressure stability and mental clarity.



3 Physical Conditioning

Start slowly and build gradually. Helpful exercises include recumbent biking, swimming, rowing, and resistance training.



4 Improve Sleep Quality

Maintain a consistent schedule, limit screen time before bed, treat sleep disorders, and avoid excessive caffeine late in the day.



5 Nutrition and Blood Sugar Stability

Eat regular, balanced meals with adequate protein. Avoid large high-sugar meals. Check for iron, B12, vitamin D, and other nutritional deficiencies.



6 Cognitive and Lifestyle Strategies

Break tasks into smaller steps, use planners and reminders, schedule demanding tasks during better energy periods, take seated rest breaks, stay cool, and avoid overheating.



7 Medications (When Needed)

Some patients may benefit from medications prescribed by a physician depending on the POTS subtype and symptoms.

Examples: Fludrocortisone • Midodrine • Beta-blockers • Ivabradine • Pyridostigmine (Treatment must be individualized.)



KEY TAKEAWAY

Brain fog in POTS is likely related to impaired blood flow regulation, autonomic dysfunction, fatigue, and associated conditions. Management focuses on improving circulation, hydration, conditioning, sleep, and overall autonomic stability.



Hydrate



Move



Sleep



Fuel



Manage Stress



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Website: www.apcardio.com

WE TREAT THE WHOLE PATIENT

Our goal is to identify the underlying causes of your symptoms and create a personalized treatment plan to help you feel better and live better.



EVIDENCE-BASED CARE



PATIENT-CENTERED



INNOVATION



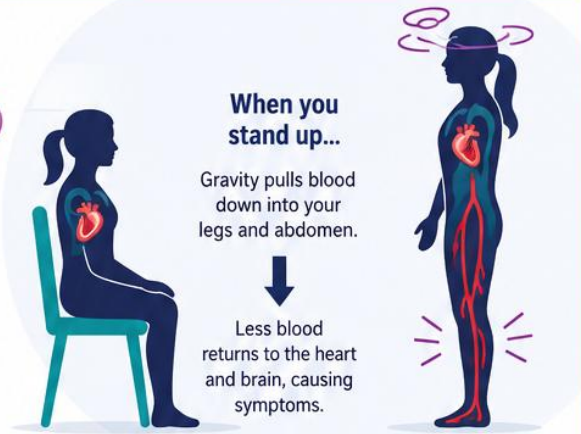
COLLABORATION



EXCELLENCE

UNDERSTANDING ORTHOSTATIC INTOLERANCE

Orthostatic Intolerance (OI) is a condition in which the body has difficulty adjusting to standing upright. When a person stands, blood may pool in the lower part of the body instead of returning efficiently to the heart and brain. This can lead to symptoms that improve when sitting or lying down.



COMMON SYMPTOMS

- Dizziness or lightheadedness
- Rapid heartbeat (palpitations)
- Fatigue and weakness
- Brain fog or difficulty concentrating
- Headaches
- Blurred vision
- Nausea
- Shortness of breath
- Feeling shaky or anxious
- Fainting or near-fainting episodes

COMMON TYPES OF ORTHOSTATIC INTOLERANCE

POTS



Postural Orthostatic Tachycardia Syndrome

A significant increase in heart rate after standing, often accompanied by fatigue, dizziness, and exercise intolerance.

ORTHOSTATIC HYPOTENSION



A drop in blood pressure upon standing that can cause dizziness or fainting.

VASOVAGAL SYNCOPE



A reflex that may cause sudden slowing of the heart rate and drop in blood pressure, leading to fainting.

POSSIBLE CAUSES AND ASSOCIATED CONDITIONS

- Dehydration
- Viral illnesses
- Prolonged bed rest
- Autonomic nervous system dysfunction
- Hypermobile Ehlers-Danlos Syndrome (hEDS)
- Chronic fatigue syndrome
- Anemia
- Autoimmune conditions
- Poor sleep and stress

HOW ORTHOSTATIC INTOLERANCE IS DIAGNOSED

- Detailed medical history and physical examination
- Orthostatic vital signs
- Electrocardiogram (ECG)
- Echocardiogram
- Holter or event monitor
- Tilt-table testing
- Blood tests when indicated

HELPFUL LIFESTYLE STRATEGIES



HYDRATION AND SALT

- Increase water intake (unless restricted by your physician)
- Increase salt intake if recommended



PHYSICAL CONDITIONING

- Gradual exercise program
- Recumbent biking, rowing, or swimming may help



COMPRESSION SUPPORT

Compression stockings or abdominal binders may reduce blood pooling



DAILY HABITS

- Avoid prolonged standing
- Rise slowly from bed
- Eat smaller, frequent meals
- Maintain regular sleep habits



WHEN TO SEEK MEDICAL ATTENTION

Seek evaluation if symptoms:

- Cause fainting
- Interfere with school, work, or daily life
- Occur with chest pain or significant shortness of breath
- Become progressively worse



PROGNOSIS

Many patients improve with lifestyle changes, physical conditioning, and targeted medical treatment when needed. Early recognition and proper management can significantly improve quality of life.



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Advanced Pediatric Cardiology
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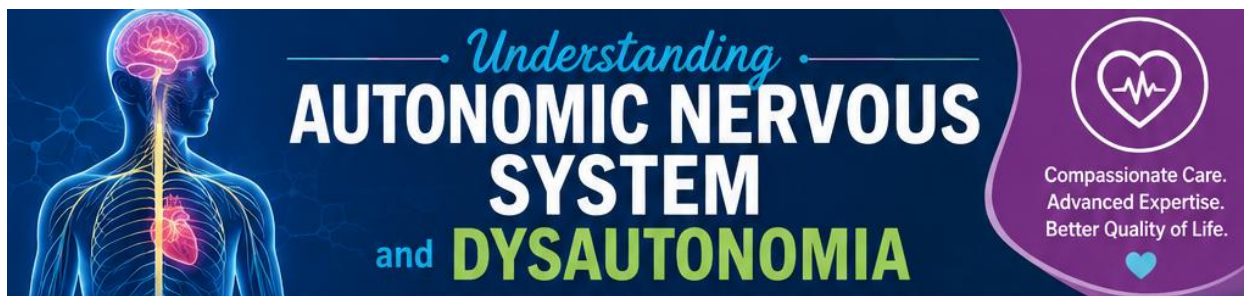
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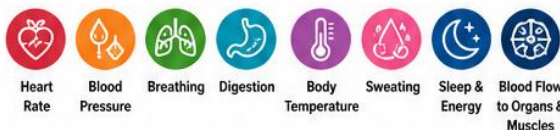


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WHAT IS THE AUTONOMIC NERVOUS SYSTEM (ANS)?

The Autonomic Nervous System (ANS) is the part of the nervous system that automatically controls many essential body functions without you having to think about them.



The ANS works continuously to keep the body balanced and functioning properly.

THE TWO MAIN BRANCHES OF THE ANS

1 SYMPATHETIC NERVOUS SYSTEM "Fight or Flight" System

Activated during stress, danger, exercise, or excitement.



- Faster heart rate
- Increased blood pressure
- Dilated pupils
- Increased alertness
- Reduced digestion

2 PARASYMPATHETIC NERVOUS SYSTEM "Rest and Digest" System

Helps the body relax and recover.



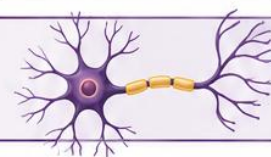
- Slower heart rate
- Improved digestion
- Relaxation
- Energy conservation
- Better recovery and healing



WHAT IS DYSAUTONOMIA?

Dysautonomia is a group of disorders caused by abnormal function of the autonomic nervous system.

The ANS may become overactive, underactive, or poorly coordinated, leading to multiple symptoms throughout the body.



COMMON SYMPTOMS OF DYSAUTONOMIA



CARDIOVASCULAR SYMPTOMS

- Fast heart rate (tachycardia)
- Palpitations
- Dizziness
- Fainting (syncope)
- Blood pressure fluctuations



NEUROLOGIC SYMPTOMS

- Brain fog
- Fatigue
- Headaches
- Difficulty concentrating



GASTROINTESTINAL SYMPTOMS

- Nausea
- Bloating
- Constipation
- Abdominal pain



TEMPERATURE & CIRCULATION SYMPTOMS

- Heat intolerance
- Sweating abnormalities
- Cold hands and feet
- Color changes in the skin



OTHER SYMPTOMS

- Exercise intolerance
- Weakness
- Anxiety-like sensations
- Sleep disturbances

COMMON TYPES OF DYSAUTONOMIA



POTS

Postural Orthostatic Tachycardia Syndrome
A condition where heart rate increases excessively when standing.



ORTHOSTATIC HYPOTENSION

A significant drop in blood pressure upon standing.



VASOVAGAL SYNCOPE

A common cause of fainting triggered by stress, pain, dehydration, or standing for long periods.



NEUROCARDIOGENIC SYNCOPE

A dysregulation of heart rate and blood pressure leading to fainting episodes.

POSSIBLE CAUSES

Dysautonomia may occur alone or with other conditions, including:

- ✓ Viral illnesses
- ✓ Autoimmune disorders
- ✓ Ehlers-Danlos Syndrome (EDS)
- ✓ Diabetes
- ✓ Concussions or trauma
- ✓ Genetic factors
- ✓ Chronic stress or deconditioning
- ✓ Sometimes the exact cause is unknown.



HOW IS DYSAUTONOMIA DIAGNOSED?

- ✓ Detailed medical history
- ✓ Physical examination
- ✓ Orthostatic vital signs
- ✓ Electrocardiogram (ECG)
- ✓ Echocardiogram
- ✓ Holter or event monitors
- ✓ Tilt-table testing
- ✓ Autonomic function testing



TREATMENT AND MANAGEMENT

Treatment depends on the underlying condition and symptoms.



Increase hydration



Increase salt intake (when appropriate)



Regular exercise and conditioning



Compression garments



Compression garments



Adequate sleep



Avoid prolonged standing

MEDICATIONS

Some patients may benefit from medications that help regulate heart rate, blood pressure, or circulation.



KEY TAKEAWAY

The autonomic nervous system plays a critical role in maintaining balance throughout the body. Dysautonomia can affect many organs and cause a wide range of symptoms, but with proper evaluation, education, and treatment, many patients experience significant improvement in quality of life. ❤️

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