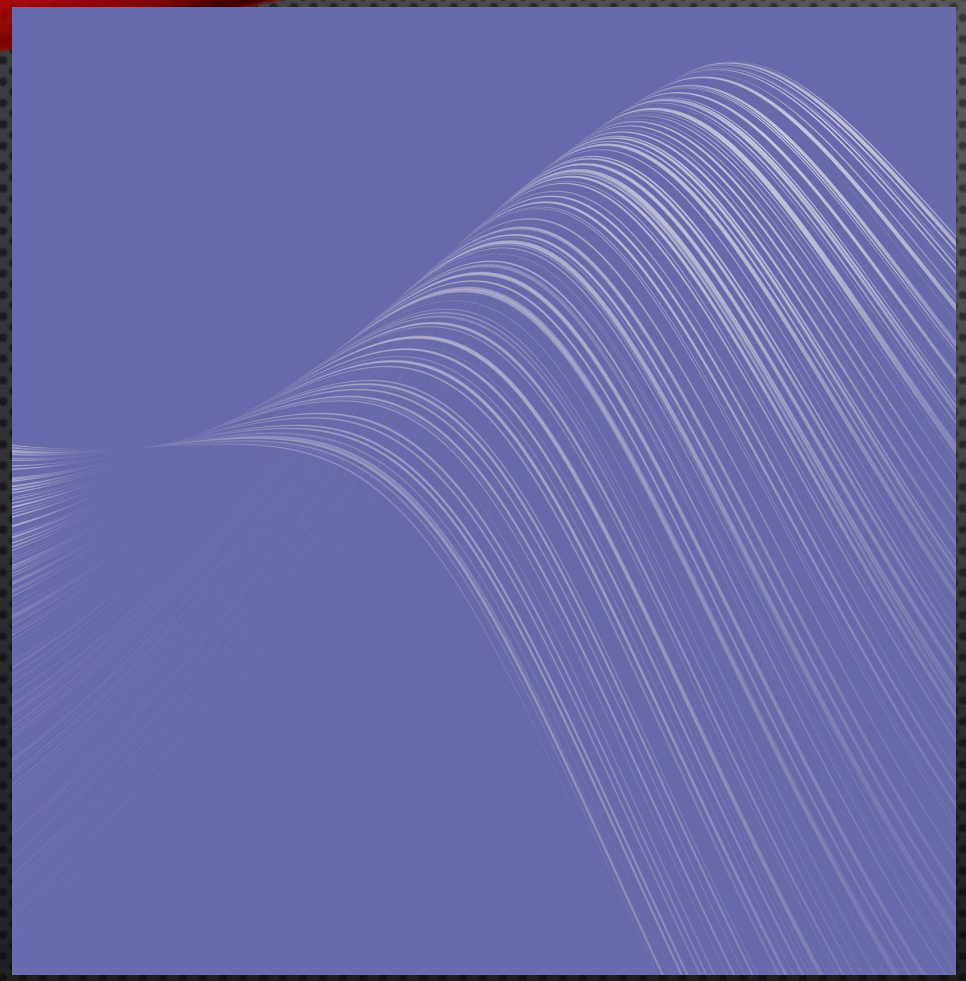


AUTONOMIC NEUROPATHY

Aarish Kaur Dhillon, MBBS, Mahatma Gandhi Medical College (Graduate), Neurology Rotation, Houston Medical Clerkship

DEFINITION

Dysfunction of the autonomic nervous system (ANS) is known as dysautonomia.

The autonomic nervous system regulates unconscious body functions, including heart rate, blood pressure, temperature, digestion, bladder function, sexual function, and metabolic and endocrine responses to stress such as the ‘fight and flight’ response.

As regulating these functions involves various and multiple organ systems, dysfunction of the autonomic nervous systems encompass various and multiple disorders.

TYPES OF AUTONOMIC NEUROPATHY

ACUTE/SUBACUTE:

1. Subacute autoimmune autonomic gangliopathy
2. Subacute paraneoplastic autonomic neuropathy
3. Gullian-Barre disease
4. Botulism
5. Porphyria
6. Toxin induced autonomic neuropathy
7. Drug induced/withdrawal

CHRONIC:

1. Distal small fiber neuropathy
2. Diabetic autonomic neuropathy
3. Sensory neuropathy with autonomic failure
4. Familial Riley day syndrome
5. Uremia
6. Nutritional deficiency
7. Geriatric dysautonomia
8. Postural tachycardia Syndrome (PoTS)

INHERITED AUTONOMIC NEUROPATHY

1. Familial amyloid neuropathy
2. Hereditary sensory autonomic neuropathy
3. Fabry's disease
4. Acute intermittent porphyria and variegate porphyria

HEREDITARY SENSORY AUTONOMIC NEUROPATHY

TYPE I: - Autosomal dominant inheritance
- Distal limb involvement
- Marked sensory loss including loss of pain sensation

TYPE II: - Autosomal recessive inheritance
- Severe with congenital onset
- Pan sensory loss with early ulcers
- Affects both the myelinated and the unmyelinated fibers

TYPE III: aka Riley day syndrome
- Autosomal recessive inheritance
- Swallowing problems, breath holding spells, dry eyes while crying, bowel dysfunction.
- Childhood onset autonomic crisis (usually after 3 years of age)
- Absence of unmyelinated with normal myelinated fibers

TYPE IV: - Autosomal recessive inheritance
- Presents with widespread anhidrosis and insensitivity to pain

TYPE V: - Autosomal recessive inheritance
- Pain insensitivity with partial anhidrosis

ACQUIRED AUTONOMIC NEUROPATHY

PRIMARY:

1. Pandysautonomia
2. Idiopathic distal small fiber neuropathy
3. Holmes-Adie syndrome- tonic pupil associated with tendon areflexia
4. Ross syndrome- segmental anhidrosis in conjunction with Adie's pupil.
5. Chronic idiopathic anhidrosis
6. Amyloid neuropathy
7. Postural tachycardia syndrome- most commonly a/w young females with orthostatic intolerance

SECONDARY:

1. Systemic causes- DM, uremia, hepatic disease
2. Vitamin deficiency- B12
3. Drug induced- Vincristine, cisplatin, carboplatin, suramin
4. Toxin- alcohol by direct toxic effects and by thiamine deficiency
5. Infections: lyme's disease (lymphoplasmacellular infiltrates in autonomic ganglia), HIV, chagas disease, botulism, diptheria, leprosy
6. Autoimmune conditions- celiac disease, SLE, GBS, paraneoplastic syndrome (anti hu abs), IBD
7. Neurological diseases- Parkinson, MSA, PSP, CBD

DIAGNOSIS

- Diagnosis of orthostatic intolerance is made when the patient experiences a decrease in blood pressure (20/10 mm Hg) when attempting to stand and a heart rate increase of less than 30 beats.
- Since dysautonomia can be caused by a set of variable disorders, diagnosis becomes difficult
- MRI Brain can sometimes help detect abnormalities of striatum, cerebellum and brainstem a/w MSA
- Clonidine drug test has been used to differentiate Parkinson’s disease from MSA as certain hormone levels increase in Parkinson's patient after clonidine administration
- Severe dysarthria and stridor should point towards MSA as these are rare in PD.
- Diagnosis depends a lot on history of symptoms and physical examination

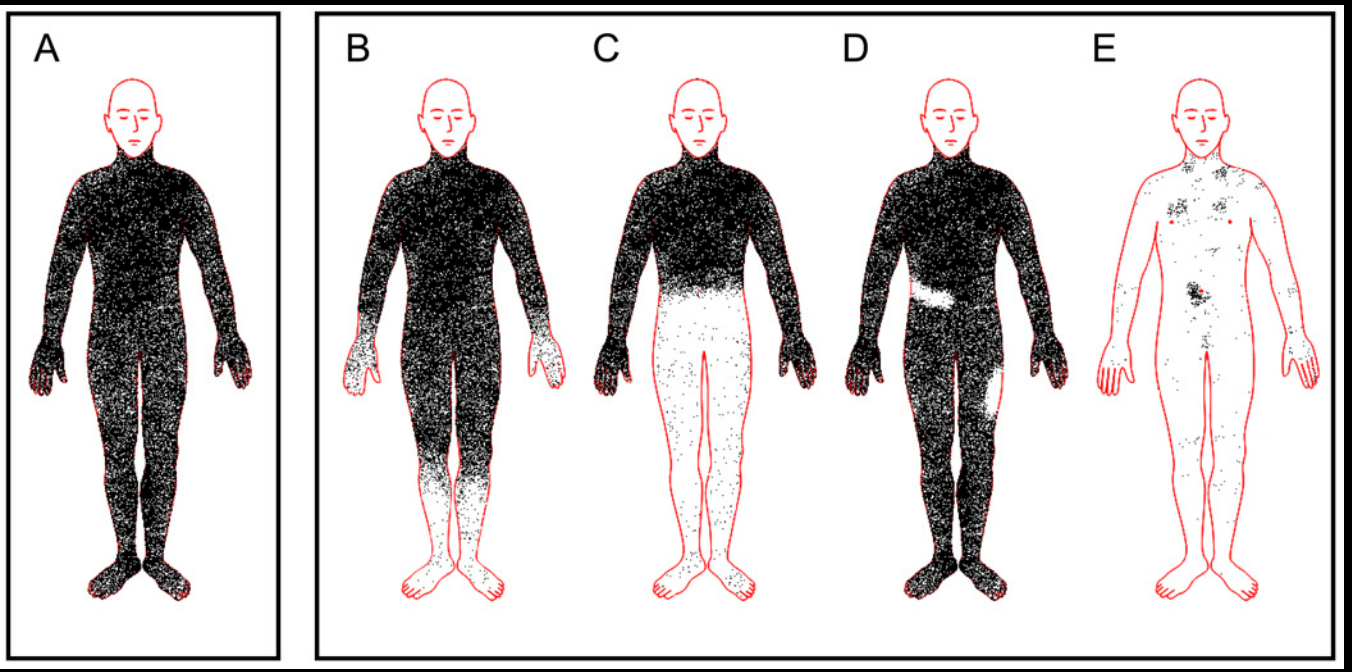
AUTONOMIC TESTING

Comprises of 3 parts:

1. TST (thermoregulatory sweat testing)
2. QSART (quantitative sudomotor axonal reflex testing)
3. Cardiovascular autonomic testing with head tilt

THERMOREGULATORY SWEAT TEST

TST is performed in a temperature and humidity controlled room or chamber. The temperature is adjusted to 45–50 °C with a relative humidity of 35–40%. The subject lies supine on a table and is covered with an indicator that changes color in the presence of moisture.



Normal sweat patterns show a sweat response present over the entire body that may be variable in intensity (A). In (B), a length dependent neuropathy from diabetes with stocking and glove distribution loss is seen. A patient with a complete myelopathy at T9 is shown in (C). Lesions to individual nerves can show focal or dermatomal sweat defects. A patient with a right T10 radiculopathy and a left lateral femoral cutaneous neuropathy can be identified in (D). A patient with complete anhidrosis secondary to pure autonomic failure is seen in (E).

QSART

1. Quantitative sudomotor axon reflex test (QSART) is used to evaluate postganglionic sympathetic cholinergic sudomotor function by measuring the axon-reflex mediated sweat response over time and has achieved widespread clinical use. Sweat glands are stimulated via iontophoresis of a cholinergic agent and the sweat production is measured as an increase of humidity through a hygrometer
2. Therefore, a positive TST and QSART points towards a postganglionic AN, whereas, a positive TST but negative QSART shifts the diagnosis towards a pre-ganglionic AN.

CARDIOVASCULAR AUTONOMIC TESTING

1. During this part of the autonomic test, we record THE blood pressure and heart rate using an electrocardiogram (ECG). This test involves performing the simple maneuvers such as taking deep breaths , blowing into a mouth piece and changing position from lying down to standing upright.
2. A change in BP equivalent or greater than 20/10mm HG within 30seconds to 3 minutes of the maneuver OR a change in HR of <30bpm within a period of 10 minutes is considered a positive test.

TREATMENT

1. AT PRESENT, THERE IS NO CURE FOR SEVERE AUTONOMIC DYSFUNCTION
2. MAKE THE PATIENT FEEL COMFORTABLE
3. FLUCTUATION BP IS THE HALLMARK OF THE DISORDER AND CAN BE DIFFICULT TO TREAT- but can be managed by medications and dietary modifications (drinking more water, adding extra salt)
4. A BREATHING OR FEEDING TUBE MAY HAVE TO BE USED IN CASES OF DIFFICULTY SWALLOWING AND BREATHING ISSUES
5. TREATMENT OF THE SECONDARY CAUSES
6. FOR ORTHOSTATIC HYPOTENSION USE FLUDROCORTISONE, Ephedrine OR MIDODRINE
7. AIDS FOR WALKING, REACHING, AND MAINTAINING POSTURE, AND BALANCE WHILE RISING CAN BE PR OVIDED BHY PHYSICAL AND OCCUPATIONAL THERAPISTS
8. SPEECH AND NUTRIONAL THERAPISTS CAN DEVISE SAFE STRATEGIES FOR EATING AND CAN RECOMMENT TUBE FEEDINGS IF NECESSARY