

Chapter 7: Autonomic Function

Core concept: Autonomic nervous system (ANS) controls involuntary visceral/glandular functions. Dysfunction affects pupils, BP/heart rate, bladder/bowel/sexual function, sweating/lacrimation/salivation.

1. Orthostatic Hypotension

- Definition:

- Systolic BP $\downarrow \geq 20$ mmHg or diastolic BP $\downarrow \geq 10$ mmHg within 3 minutes of standing.
- Absent compensatory \uparrow in pulse rate.

- Symptoms: Lightheadedness, syncope, blurred vision, fatigue, nausea.

- Causes:

- Autonomic failure (e.g., pure autonomic failure, Parkinson's, multiple system atrophy).

- Confounders: Antihypertensive drugs (esp. elderly), dehydration.

2. Neurogenic Bladder Dysfunction

Type	Pathology	Clinical Features	Incontinence Type
LMN (S2-S4)	Damage to sacral cord/cauda equina	Bladder fills but can't empty \rightarrow Retention	Overflow
UMN	Supraspinal lesion (e.g., spinal cord)	Detrusor instability \rightarrow Urgency	Urge

- Complications: UTIs, palpable tender bladder (if afferents involved).

- Bowel Dysfunction: Constipation \rightarrow fecal impaction \rightarrow overflow incontinence (esp. cauda equina lesions).

3. Other Autonomic Features

- **Anhidrosis** (↓ sweating), dry eyes/mouth (Sjögren's, anticholinergics > autonomic failure).
- **Sexual Dysfunction:** Erectile impotence (common in autonomic failure).
- **GI Dysfunction (e.g., diabetes):**
 - Gastroparesis (nausea, vomiting), pseudo-obstruction, diarrhea.

4. Investigations

- **Bedside:** Lying vs. standing BP.
- **Advanced Tests:**
 - Cardiovascular: Tilt-table, loss of sinus arrhythmia (↓ R-R variation), Valsalva maneuver (↓ bradycardia).
 - Bladder: Urodynamics, videocystometrogram.

5. Specific Conditions

- **Central Causes:**
 - Multiple System Atrophy (Shy-Drager): Parkinsonism + cerebellar/UMN signs + autonomic failure.
 - Hypothalamic Lesions: Tumors → appetite/thirst/sleep/temperature dysregulation.
- **Peripheral Causes:**
 - Polyneuropathies (diabetes, amyloidosis, Guillain-Barré → labile BP, arrhythmias).
- **Sympathetic Pain Syndromes:**
 - Causalgia/Reflex Sympathetic Dystrophy: Trauma → neuropathic pain + shiny/red/dry skin + poor wound healing.

6. Treatment

- **Orthostatic Hypotension:** Head-up bed tilt, fludrocortisone (mineralocorticoid).
- **Bladder:**
 - Detrusor instability: Anticholinergics (oxybutynin).
 - Chronic retention: Intermittent self-catheterization.
- **Erectile Dysfunction:** Intracavernosal papaverine, sildenafil.
- **Causalgia:** Sympathectomy.

Chapter 15: Spinal Conditions

Core Concept: Spinal cord/root lesions cause motor, sensory, and autonomic deficits. Key is to exclude cord compression urgently.

1. Spinal Cord Disease (Myelopathy)

- **Symptoms/Signs:**
 - Motor: Spastic paraparesis (legs) or tetraparesis (arms + legs if cervical).
 - Sensory: Sensory level (e.g., T10 = lesion at or above T10). Sacral sparing suggests intrinsic lesion.
 - Autonomic: Early bladder urgency → urge incontinence; late constipation.
- **Key Syndromes:**

Syndrome	Cause	Features
Brown-Séquard	Cord hemisection	*Ipsilateral*: UMN weakness, ↓ vibration/position sense. *Contralateral*: ↓ pain/temp.
Syringomyelia	Cervical cord syrinx	"Cape" anesthesia (↓ pain/temp arms), UMN legs + LMN arms, spared vibration.
Cord Compression	Tumor/disc	Saddle anesthesia, spastic weakness, sphincter dysfunction.

2. Causes by Age

- **Over 50 years:** Cervical spondylosis (osteophytes, disc protrusion).
- **Under 40 years:** Multiple sclerosis (most common).
- **Other Causes:** Trauma, epidural abscess, metastases, infarction (anterior spinal artery).

3. Spinal Root Disease (Radiculopathy)

- **Cervical Radiculopathy (e.g., C6/7 disc → C7 root):**
 - Arm pain (myotomal > dermatomal), weakness, ↓ reflex.
- **Lumbar/Sacral Roots:**

- Sciatica (L5/S1): Leg pain (buttock to ankle), ↓ ankle reflex, foot drop (L5).
- Cauda Equina Syndrome (Surgical Emergency):
 - Bilateral leg weakness + saddle anesthesia + acute urinary retention + absent anal reflex.
 - Cause: Central disc prolapse/tumor.
 - Treatment: Urgent decompression (laminectomy).

4. Management Principles

- **Rule Out Compression:** Immediate MRI/myelography.
- **Surgical Emergencies:** Cord compression, cauda equina syndrome.
- **Non-Surgical:** Treat underlying cause (e.g., MS: immunomodulators; infection: antibiotics).

Chapter 17: Nerve and Muscle

Core Concept: Peripheral nerve/muscle disorders cause weakness, sensory loss, or pain.

1. Peripheral Nerve Disorders

- **Mononeuropathy (Single nerve):**

Nerve	Site	Features	Tests/Treatment
Median	Carpal tunnel	Nocturnal hand pain, thenar wasting, ↓ thumb abduction.	Tinel's/Phalen's; splint/corticosteroid/surgery.
Ulnar	Elbow	Claw hand, ↓ finger abduction, sensory loss (ulnar 1.5 fingers).	Splint/transposition.
Radial	Spiral groove	Wrist/finger drop ("Saturday night palsy").	Spontaneous recovery.

- **Multifocal Neuropathy (Mononeuritis Multiplex):**
 - Stepwise deficits (e.g., vasculitis, diabetes, leprosy).
- **Polyneuropathy (Symmetrical, distal):**
 - Causes: Diabetes (most common), alcohol, B12 deficiency, Guillain-Barré, toxins.
 - Features: "Glove-stocking" sensory loss, distal weakness, ↓ reflexes.
 - Investigations (Table 17.3):
 - Bloods (glucose, B12, ESR), CSF (↑ protein in inflammation), nerve conduction studies, biopsy.

2. Neuromuscular Junction Disorders

- **Myasthenia Gravis (MG):**
 - Pathophysiology: Autoimmune → anti-AChR antibodies → fatigable weakness.
 - Features: Ptosis, diplopia, bulbar symptoms (dysphagia, nasal speech), respiratory crisis.
 - Diagnosis: Edrophonium test, AChR antibodies, EMG (decremental response).
 - Treatment:
 - Symptomatic: Pyridostigmine (anticholinesterase).
 - Immunomodulation: Steroids, azathioprine, IVIG/plasma exchange.
 - Thymectomy (for thymoma/refractory cases).

3. Myopathy (Primary Muscle Disease)

- Features: Proximal weakness (waddling gait), ↓ neck flexion, facial weakness.
- Causes:

Type	Examples	Key Features
Inherited	Duchenne/Becker MD	Gowers' sign, calf pseudohypertrophy.
	Myotonic dystrophy	Myotonia, cataracts, frontal balding.
Acquired	Polymyositis/ Dermatomyositis	Proximal weakness + heliotrope rash (DM).
	Toxic (steroids)	Proximal weakness.

- Investigations: ↑ Creatine kinase, EMG (myopathic), muscle biopsy.

High-Yield Exam Topics

1. Autonomic Failure: Orthostatic hypotension definition and causes.
2. Bladder Dysfunction: UMN vs. LMN patterns (urge vs. overflow).
3. Spinal Cord Localization: Sensory level implications (lesion at or above level).
4. Emergencies: Cord compression, cauda equina, myasthenic crisis.
5. Syndromes: Brown-Séquard, syringomyelia, Guillain-Barré.
6. Nerve Lesions: Carpal tunnel vs. ulnar neuropathy signs.
7. MG Diagnosis/Treatment: Edrophonium test, thymectomy indications.
8. Myopathy Patterns: Proximal weakness + CK elevation (inflammatory) vs. pseudohypertrophy (Duchenne).

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