

# Ataxia and Gait disturbance

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# Overview

- Definition
- Pathophysiology
- Ataxia
- Gait disturbance
- History and Physical examination
- Special conditions

# Definition

- Ataxia : uncoordinated movement
- Gait disorder : abnormal pattern or style of walking

# Pathophysiology

- cerebellar lesions
- systemic or focal conditions that affect different elements of the central and peripheral nervous systems

**TABLE 169-1** Common Etiologies of Acute Ataxia and Gait Disturbances**Systemic conditions**

## Intoxications with diminished alertness

Ethanol

Sedative-hypnotics

## Intoxications with relatively preserved alertness (diminished alertness at higher levels)

Phenytoin

Carbamazepine

Valproic acid

Heavy metals—lead, organic mercurials

## Other metabolic disorders

Hyponatremia

Inborn errors of metabolism

Wernicke's disease

**Disorders predominantly of the nervous system**

## Conditions affecting predominantly one region of the CNS

## Cerebellum

Hemorrhage

Infarction

Degenerative changes

Abscess

## Cortex

Frontal tumor, hemorrhage, or trauma

Hydrocephalus

## Subcortical

Thalamic infarction or hemorrhage

Parkinson's disease

Normal pressure hydrocephalus

## Spinal cord

Cervical spondylosis and other causes of spinal cord compression

Posterior column disorders

## Conditions affecting predominantly the peripheral nervous system

Peripheral neuropathy

Vestibulopathy

# Ataxia

- Motor ataxia
- Sensory ataxia

# Motor ataxia

- Cerebellar ataxia
- cerebellar disorders
  - Integration of proprioception is faulty
  - Intact sensory receptors and afferent pathways
- Lateral cerebellar lesions: ipsilateral limb ataxia
- Midline cerebellar lesions : truncal ataxia

# Motor ataxia

- Posterior limb of the internal capsule : isolated hemiataxia
- Thalamic nuclei : contralateral ataxia with sensory loss
- Frontal lobe (tumor or cystic masses) : motor ataxia (contralateral)
- Nontraumatic spinal cord compression : gait ataxia





# Sensory Ataxia

- failure of transmission of proprioception or position sensation to CNS
- May be due to disorders of spinal cord or peripheral nerves
- Can be compensated for by visual inputs



# Gait Disorder

- Motor ataxic gait
- Sensory ataxic gait
- Apraxic gait
- Festinating gait (hypokinetic gait)
- Hemiplegic gait
- Waddling gait

# Motor ataxic gait

- Widely based with unsteady and irregular steps
- CNS lesions, ethanol intoxication



# Sensory ataxic gait

- Loss of proprioception
- Abrupt movement of the legs and slapping impact of the feet with each step



# Apraxic gait

- Lost the ability to initiate the process of walking
- Ignition failure
- Right or nondominant hemispheric lesions and frontal lobe dysfunction



# Festinating gait

- Narrowly based miniature shuffling steps
- Parkinson's disease





# Hemiplegic gait

- Asymmetric weakness of the proximal lower extremity muscles



# Waddling gait

- failure to maintain the normal position of the pelvis relative to the lower extremities



# History

- Onset
- Previous symptoms
- Medications
- Alcohol intake/drug use

## Associated Symptoms

- Headache
- Drowsiness
- Dizziness
- Vertigo
- Tinnitus
- Fever
- Nausea/vomiting
- Weakness
- Paresthesia

# Physical Examination

- Vital sign : orthostatic hypotension
- Neurologic exam
  - Cranial nerve , mental status, sensation, motor, nystagmus
  - Gait
  - Cerebellar sign
    - Dysdiadochokinesia
    - Finger-to-nose test
    - Heel-to-shin test
    - Rhomberg

# Diagnosis

- Sensory or Motor ataxia
- Systemic or Nervous system
- Localization
- CT, MRI ,LP

# Special Populations

- Geriatric Patient
  - Gait normally changes with age
  - Shortened stride, Widened base, Slow gait
- Senile gait may represent neuronal loss, reduced proprioception, slowing of corrective responses and weakness

# Special Populations

- Alcoholic Patient
  - associated with confusion and eye movement abnormalities
  - Wernicke encephalopathy needs to be considered
  - Still other intracranial pathology needs to be ruled out
  - Treatment : IV hydration, Vit B1 and dextrose

# Special Populations

- Children
  - May appear well, but wobbly when sitting
  - Intoxications are most common, followed by infection/inflammation



**TABLE 169-3****Causes of Acute Ataxia in Children, Roughly in Order of Frequency**

Cause	Example
Drug intoxication	Ethanol Isopropyl alcohol Phenytoin Carbamazepine Sedatives Lead, mercury
Idiopathic	Acute cerebellar ataxia of childhood
Infection and inflammation	Varicella Coxsackievirus A and B Mycoplasma Echovirus Postinfectious inflammation Postimmunization
Neoplasm	Neuroblastoma Other CNS tumors
Paraneoplastic	Opsoclonus-myoclonus syndrome
Trauma	Subdural or epidural posterior fossa hematoma
Congenital or hereditary	Pyruvate decarboxylase deficiency Friedreich's ataxia Hartnup disease
Hydrocephalus Cerebellar abscess Labyrinthitis/vestibular neuronitis Transverse myelitis Meningoencephalitis	