Guillain–Barré syndrome

Dept. of Paediatrics

Definition

- Guillain–Barré syndrome (GBS) is an acute onset inflammatory polyneuropathy characterized by rapidly progressive, symmetric, ascending weakness with areflexia.

Triggering factors

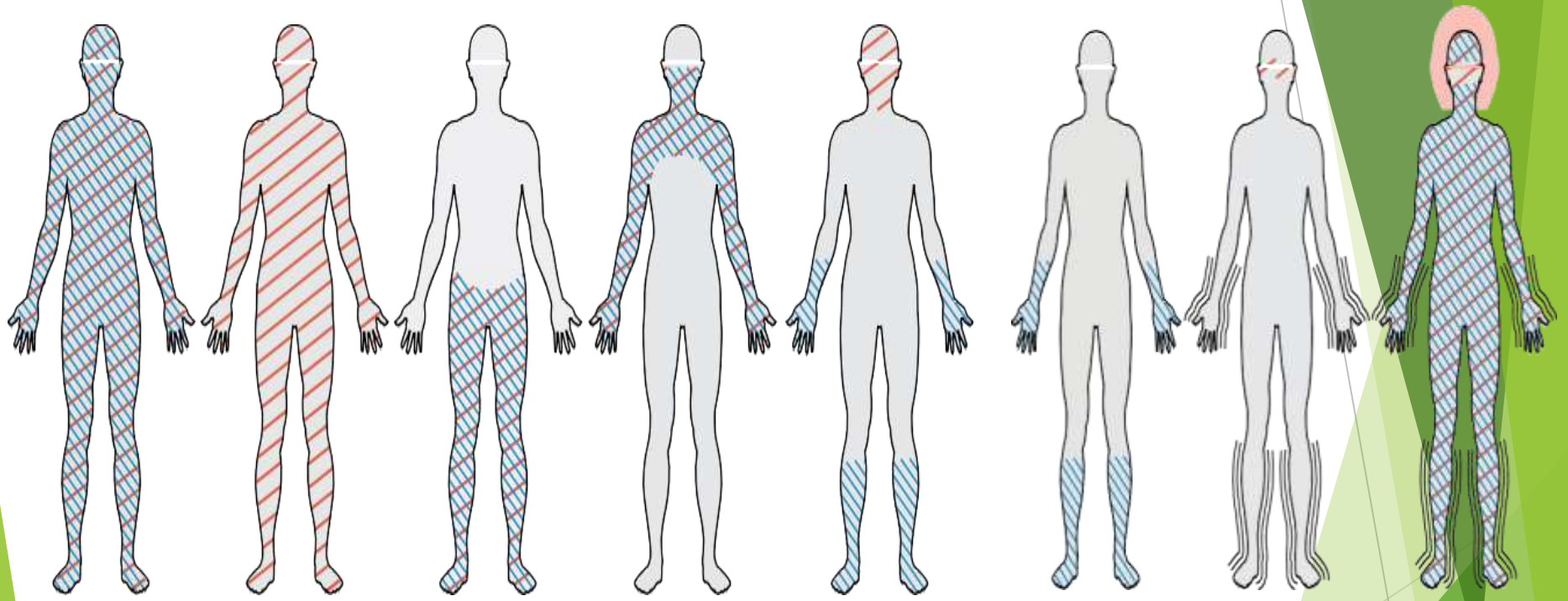
- 1. Infections: Entero, cytomegalo, campylobacter jejuni, zika, mycoplasma
- 2. Recent immunization
- 3. Surgery spinal, GI

Clinical Signs and Symptoms

- Guillain–Barré syndrome presents with acute onset weakness, difficulty in walking and rising from sitting position, fatigue, pain, and paresthesia.
- Weakness is often symmetrical; starting distally in the lower limbs and progressively involves upper limbs, respiratory muscles, and cranial nerves.
- About 40–50% patients with GBS may have facial weakness and nearly about 30% have respiratory weakness.
- Weakness in GBS is rapidly progressive, reaches nadir within 2 weeks in 80% cases and in all by 4 weeks.
- Pain in the legs, thighs, buttocks, back, and neck with neck rigidity and meningismus can occur due to nerve root inflammation.
- Hypertension, blood pressure fluctuations, sinus tachycardia, and abnormal sweating suggest autonomic dysfunction and may be observed in up to 50% patients with GBS.

Guillain-Barré Syndrome Variants

TABLE 1: Clinical variants of GBS with key clinical features and NCS findings.			
Type	Clinical features	Associated antibodies	NCS findings
Acute demyelinating inflammatory polyneuro pathy (AIDP)	Symmetric ascending paralysis and proximal weakness	GM1, GM4, GD1a, and GD1b	Slow CV and prolonged DL
Acute motor axonal neuropathy (AMAN)	Symmetric ascending paralysis and distal weakness	GM1, GM2, GD1a, and GD1b	Reduced amplitude, normal CV, and DL
Acute motor and sensory axonal neuropathy (AMSAN)	Axonal motor and sensory	GD1a	Axonal motor and sensory polyneuropathy
Miller Fisher syndrome (MFS)	Ophthalmoparesis, ataxia, and areflexia	GQ1b and GT1a	Axonal polyneuropathy
Bickerstaff's brainstem encephalitis	Ophthalmoparesis, ataxia, and areflexia with long tract signs	GQ1b and GT1a	Axonal polyneuropathy
Pharyngealcervicalbrachial variant	Descending with neck and shoulder weakness	GT1a, GQ1b, and GD1a	Axonal polyneuropathy
Polyneuritis cranialis	Bifacial weakness with dysphagia and dysphonia	GQ1b and GT1a	Demyelinating polyneuropathy
Acute (ataxic) sensory neuropathy	Acute onset ataxia	GQ1b and GT1a	Axonal polyneuropathy
Acute pandysautonomia	Acute hypertension, posterior reversible encephalopathy syndrome (PRES), sweating abnormalities, and tachycardia		Axonal polyneuropathy
Acute ophthalmoparesis	Isolated ophthalmoparesis	GQ1b and GT1a	Axonal polyneuropathy



Classic sensorimotor

Pure motor

Paraparetic

Pharyngeal – cervical–brachial

Bilateral facial palsy with paraesthesias

Pure sensory

Miller Fisher syndrome

Bickerstaff brainstem encephalitis

Diagnostic criteria for Guillain–Barré syndrome

- **Features required for diagnosis**
- Progressive bilateral weakness of arms and legs (initially only legs may be involved)
- Absent or decreased tendon reflexes in affected limbs (at some point in clinical course)
- **Features that strongly support diagnosis**
- Progressive phase lasts from days to 4 weeks (usually <2 weeks)
- Relative symmetry of symptoms and signs
- Relatively mild sensory symptoms and signs (absent in pure motor variant)a
- Cranial nerve involvement, especially bilateral facial palsy
- Autonomic dysfunction
- Muscular or radicular back or limb pain
- Increased protein level in cerebrospinal fluid (CSF); normal protein levels do not rule out the diagnosis
- Electrodiagnostic features of motor or sensorimotor neuropathy (normal electrophysiology in the early stages does not rule out the diagnosis

Diagnostic criteria for Guillain–Barré syndrome

- **Features that cast doubt on diagnosis**
- Increased numbers of mononuclear or polymorphonuclear cells in CSF (>50 × 106/l)
- Marked, persistent asymmetry of weakness
- Bladder or bowel dysfunction at onset or persistent during disease course
- Severe respiratory dysfunction with limited limb weakness at onset
- Sensory signs with limited weakness at onset
- Fever at onset
- Nadir <24 h
- Sharp sensory level indicating spinal cord injury
- Hyper-reflexia or clonus
- Extensor plantar responses
- Abdominal pain
- Slow progression with limited weakness without respiratory involvement
- Continued progression for >4 weeks after start of symptoms
- Alteration of consciousness (except in Bickerstaff brainstem encephalitis)

Laboratory investigations supporting the diagnosis of GBS.	
Laboratory investigations and their utility	**Typical findings**
Cerebrospinal fluid analysis: ☑ Required to rule out infectious conditions ☑ Presence of albumincytological dissociation (ACD) support GBS diagnosis ☑ ACD can be absent in first week of illness	☑ ACD: Presence of <5 mononuclear cells/μL and protein >45 mg/dL within 3 weeks of symptom onset ☑ Cells >50 mononuclear cells atypical for diagnosis of GBS*
Nerve conduction studies (NCS): ☑ NCS confirms the diagnosis ☑ Identified GBS subtypes ☑ Virtually positive in 90% cases by second week ☑ Must have these finding in two or more motor nerves	AIDP: ☑ Slowing of motor and sensory nerve conduction velocity (<70% of lower limit of normal values for age) ☑ Prolonged distal latencies (>150%) ☑ Conduction block [proximal to distal compound muscle action potential (CMAP) ration <0.7] ☑ Temporal dispersion of CMAP ☑ Increased F and H response latencies (>120% of upper limit of normal) AMAN and AMSAN: ☑ Lack of neurophysiologic evidence of demyelination ☑ With reduced CMAP amplitude of motor and/or sensory nerve action potential (<80% of the lower limit of normal values for the age)
MRI spine: ☑ Not routinely indicated ☑ Required to rule of infectious or transverse myelitis or compressive myelopathy in presence of bladder dysfunction and sensory level	Shows postcontrast enhancement of nerve roots and cauda equina in GBS
Antiganglioside antibodies	GM1, GM2, GM3, GD1a, GD1b, GT1b, and GQ1b IgG and IgM can be positive in 30% cases with GBS

Treatment

- Immunotherapy should be started if patients have rapid progression of weakness, inability to walk independently for 10 meters (Hughes disability score ≥3), presence of swallowing dysfunction, respiratory insufficiency, and severe dysautonomia.
- Intravenous immunoglobulin or plasma exchange must be initiated within 2 weeks and 4 weeks, respectively after the onset of weakness in patients with GBS.
- Treatment for GBS should be considered early among rapidly progressive cases and should not be delayed pending confirmation with nerve conduction studies (NCS).
- Intravenous immunoglobulin (IVIg) should be administered at a dose of 400 mg/kg/day for 5 days (total dose 2 g/kg) and plasma exchange (200–250 mL plasma/kg body weight, 5 alternate day sessions) are equally efficacious in management of patients with GBS. Plasma exchange followed by IVIg is not more effective than either IVIg or plasma exchange alone.
- IVIg is easier to administer and widely available than plasma exchange.
- The adverse effects of IVIg and plasma exchange are comparable.
- Corticosteroids showed no significant benefit in patients with GBS and treatment with oral corticosteroids has shown to have a negative effect on outcome.

- Treatmentrelated fluctuation (TRF) may occur in <10% of patients with GBS.
- TRF is defined as progression of symptoms within 2 months following an initial improvement or stabilization after treatment.
- Patients with TRF might benefit from repeating a full course of IVIg or plasma exchange.

Additional Management in Patients with Guillain-Barré Syndrome in Acute Phase and Long-term

- *Acute complications*: Pain, delirium, respiratory weakness, aspiration pneumonia, corneal ulceration, inadequate nutrition, constipation, urinary retention, infection, pressure sores, deep vein thrombosis, and limb contractures.
- *Long-term complications*: Residual motor and sensory deficits, pain, fatigue, and psychosocial stress.

Differential Diagnosis

- **CNS**
- Inflammation or infection of the brainstem (for example, sarcoidosis, Sjögren syndrome, neuromyelitis optica or myelin oligodendrocyte glycoprotein antibody-associated disorder)
- Inflammation or infection of the spinal cord (for example, sarcoidosis, Sjögren syndrome or acute transverse myelitis)
- Malignancy (for example, leptomeningeal metastases or neurolymphomatosis)
- Compression of brainstem or spinal cord
- Brainstem stroke
- Vitamin deficiency (for example, Wernicke encephalopathya, caused by deficiency of vitamin B1, or subacute combined degeneration of the spinal cord, caused by deficiency of vitamin B12)
- **Anterior horn cells**
- Acute flaccid myelitis (for example, as a result of polio, enterovirus D68 or A71, West Nile virus, Japanese encephalitis virus or rabies virus)
- **Nerve roots**
- Infection (for example, Lyme disease, cytomegalovirus, HIV, Epstein– Barr virus or varicella zoster virus)
- Compression
- Leptomeningeal malignancy
- **Peripheral nerves**
- Chronic inflammatory demyelinating polyradiculoneuropathy (CIDP)
- Differential diagnosis for Bickerstaff brainstem encephalitis.
- Metabolic or electrolyte disorders (for example, hypoglycaemia, hypothyroidism, porphyria or copper deficiency)

Differential Diagnosis

- Vitamin deficiency (for example, deficiency of vitamins B1 (also known as beriberi), B12 or E)
- Toxins (for example, drugs, alcohol, vitamin B6, lead, thallium, arsenic, organophosphate, ethylene glycol, diethylene glycol, methanol or
- N-hexane)
- Critical illness polyneuropathy
- Neuralgic amyotrophy
- Vasculitis
- Infection (for example, diphtheria or HIV)
- **Neuromuscular junction**
- Myasthenia gravis
- Lambert–Eaton myasthenic syndrome
- Neurotoxins (for example, botulism, tetanus, tick paralysis or snakebite envenomation)
- Organophosphate intoxication
- **Muscles**
- Metabolic or electrolyte disorders (for example, hypokalaemia, thyrotoxic hypokalaemic periodic paralysis, hypomagnesaemia or hypophosphataemia)
- Inflammatory myositis
- Acute rhabdomyolysis
- Drug-induced toxic myopathy (for example, induced by colchicine, chloroquine, emetine or statins)
- Mitochondrial disease

Thank You