Guillain-Barré Syndrome

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Indexing Metadata/Description

- **Title/condition:** Guillain-Barré syndrome (GBS)
- **Synonyms:** Miller-Fisher syndrome (MFS); acute motor axonal neuropathy (AMAN); acute motor sensory axonal neuropathy (AMSAN); acute or post infectious polyneuritis; acute inflammatory demyelinating polyneuropathy (AIDP); chronic inflammatory demyelinating polyneuropathy (CIDP); Landry's ascending paralysis
- **Anatomical location/body part affected:** peripheral nervous system; sometimes affecting the cranial nerves also
- **ICD9:** 357.0 - Acute Infective Polyneuritis; Guillain-Barré syndrome; Post infectious polyneuritis
- **ICD10:** G61.0 – Guillain-Barré syndrome; acute (post-) infective polyneuritis
- **Presentation/signs and symptoms:** progressive motor loss (rubbery legs) with or without sensory loss ascending to the upper extremity and in some cases, influencing lower cranial nerves (eye movements, double vision, swallowing, maintaining open airway)

Causes & Risk Factors

- **Causes:** GBS is a self limiting autoimmune disorder; immune response to foreign antigens usually as a result of an acute infectious process; auto-immune attack causes inflammation of the myelin of peripheral nerves and blocks normal conduction; historical factor – affected a number of individuals who received the swine-flu vaccine of 1976.
- **Pathogenesis:** GBS progresses quickly (10-14 days after infection) with resolution in 4 weeks and residual dysfunction; demyelination of peripheral nerves targeting complex glycosphingolipids on nerve tissue; incidence 1 to 2 per 100,000 per year and a male to female ratio of 2 to 1
- **Risk Factors:** since the cause is unclear (about 50% occur after microbial infection – sore throat and/or diarrhea), the risk factors are even more uncertain; there are certain genetic markers that may increase susceptibility

Contraindications/Precautions

- **Complications exist in those requiring mechanical ventilation. About 5% of cases result in death as a result of respiratory failure, sepsis, autonomic dysfunction, or a pulmonary emboli**

Examination

- **History**
  - History of present illness: over a two week period, begins with muscle weakness in the legs and progresses upwards.
  - Medical history: patient may have experienced a recent infection (C jejuni, cytomegalovirus, Epstein-Barr virus, M pneumoniae); patient reports recent onset of lower extremity weakness; some increase in incidence noted with selected flu vaccines, bacterial enteritis due to contaminated water, or other flu-like symptoms.
  - Social history: incidence greater among males from age 16 to 25 and 24 to 60 though cases have affected both genders and varied ages.
• Specific tests and measures (as appropriate for condition; if others not listed are appropriate, please add)
  o Cranial and peripheral nerve integrity: evaluate cranial and peripheral nerve integrity through muscle testing and EMG/NCS (nerve conduction studies)
  o Gait/locomotion: gait analysis for deviations
  o Muscle strength: manual muscle testing of all four extremities; EMG analysis
  o Range of motion: ROM may be influenced by muscular weakness
  o Reflex integrity: reflex testing of all four extremities
  o Ventilation/respiration: evaluate swallow and breathing as condition may progress to include involvement

• Diagnostic tests: (x-ray, MRI, etc...)
  o CSF (elevated protein)
  o Electrodiagnostics
    ▪ EMG
    ▪ NCS
  o Other vitals

Evaluation

• Diagnosis/need for treatment: since GBS is a syndrome rather than a definitive diagnosis (at least initially), certain criteria should be considered
  o Weakness of two or more limbs with neuropathy
  o Decreased reflexes
  o Short course (less than 4 weeks of weakness)
  o Weakness should be symmetric
  o Sensory loss may only be minimal
  o No fever
  o Cranial nerves become involved (eye movements, double vision, swallowing; respiratory involvement)

• Differential diagnosis: brainstem stroke or encephalitis; acute anterior poliomyelitis; acute myelopathy (either space occupying lesion or acute transverse myelitis); post-rabies vaccine neuropathy; diphtheritic neuropathy; heavy metals, biological or industrial toxins, or drug intoxication; myasthenia gravis; hypokalaemia; hypophosphataemia; inflammatory myopathy; trichinosis

• Perceived Exertion scales (ie. Berg) can be used during the treatment program to minimize the ill-effects of overexertion

• Digital gait analysis: Though it is a costly evaluative tool, digital gait analysis used during the rehabilitation process provides valuable feedback for altering and advancing the GBS patient program; this also served as a fairly reliable and specific functional measure

• Prognosis: outlook is worse with the elderly and those requiring ventilation; rapid onset is an indicator of difficulty with recovery and those who can still walk at 14 days are likely to improve more rapidly and completely

• Goals: multidisciplinary approach to minimize the effects of the condition to include immunotherapy and occupational and physical therapy

Intervention

• Therapeutic exercises: progressive resisted exercise should be performed with care to avoid overexertion

• Functional training:
- Safe transfer skills; balance and equilibrium in all positions; and progressive ambulation; some patients may require progression on a tilt table to improve tolerance and decrease sensitivity to weight bearing.
- Neurodevelopmental sequencing is effective with progressing the geriatric patient with GBS.
- Use of partial body weight support systems can be beneficial during the rehabilitation of GBS patients as they can objectively progress the patient during gait.
- Proprioceptive training using devices such as the podiatron (a motorized variable pitch wobble board with handrails) is helpful with functional ability especially due to residual muscle shortening and loss of proprioception of the lower extremities.
- Manual therapy: muscle shortening and contractures could be avoided with passive range of motion exercise and positioning is critical to achieve goal of avoiding shortening and contractures; positioning, turning programs, and mobilization are critical to offset the risks of deep vein thrombosis and decubiti.
- Prescription, application of devices and equipment: orthotics are beneficial to prevent contractures and minimize the effect of immobilization; bedding to prevent pressure sores should be considered; compression stockings can be used since there are some patients at risk of deep vein thrombosis due to bed rest; ankle foot orthosis (AFO) is sometimes used when beginning a gait program due to residual lower extremity weakness.
- Airway clearance techniques: mechanical respiration may be required in some patients with proper techniques for maintaining hygiene and providing incentive spirometry to encourage recovery.
- Integumentary repair and protection techniques: some patients with GBS depend on a catheter for a portion of their treatment duration.
- Electrotherapeutic modalities: transcutaneous nerve stimulation (TENS) has been used effectively for pain control in patients with GBS.
- Physical agents and mechanical modalities: hydrotherapy can be a valuable part of the treatment program with the GBS patient as it encourages mobility and muscle strengthening leading the improved respiratory function in the ventilator dependent patient.
- Medications used for this condition, if applicable:
  - Plasma exchange
  - Immunoglobulin infusion
  - Corticosteroids
    - One study concluded that 500 mg methylprednisolone was ineffective in treating GBS.
    - Another older study did conclude that prednisone can be effective in CIDP.
- Referrals to other disciplines:
  - Respiratory therapy
  - Social services – due to long term care issues and psychosocial adjustment.

**Outcomes/Outcome Measures**

- Hughes scale (though it lacks sensitivity to subtle change and correlates poorly to other functional scales can be used.
  - 0 – Healthy, no signs of GBS
  - 1 – Minor symptoms or signs; able to run
  - 2 – Able to walk > 5 meters without assistance but unable to run
  - 3 – Able to walk > 5 meters with assistance (human or crutch)
  - 4 – Bed or chair bound; unable to walk
  - 5 – Requiring assist with ventilation for at least part of the day or night.
- Treatment effectiveness on functional limitations specific to mobility can be obtained with self-report measures (WOMAC-PF and SF-36) and timed performance measures such as the 6-minute walk, Up & Go test.
• Functional Independence Measure (FIM) scale or the FIM-FAM (used within 72 hours of admission, at discharge, and at follow-up); FIM is adequate in sensing disability and variations over time with GBS patients

**Maintenance or Prevention**

• GBS is a challenging and complex syndrome. Infectious conditions such as tainted water tend to demonstrate a higher incidence of this condition and care should be given to improving source water and control microbial influences on our food sources

**References:**

   **Level 1 (likely reliable); RV**

   **Level 1 (likely reliable); RCT**


   **Level 1 (likely reliable); RV**

   **Level 1 (likely reliable); R, C**

   **Level 1 (likely reliable); RV**

7. Karavatas SG, The role of neurodevelopmental sequencing in the physical therapy management of a geriatric patient with Guillain-Barré syndrome. *Topics in Geriatric Rehabilitation.* 2005;21(2);133-135  
   **Level 2 (mid-level); C**

   **Level 1 (likely reliable); C**

   **Level 1 (likely reliable); C**

    **Level 2 (mid-level); C**

    **Level 1 (likely reliable); RCT**
   **Level 1 (likely reliable); RCT**

   **Level 1 (likely reliable); RCT**

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   **Level 1 (likely reliable); M, QI**

12 Dyck PJ, O'Brien PC, Oviatt KF, Dinapoli RP, Daube JR, Bartleson JD, Mokri B, Swift T, Low PA, Windebank AJ. Prednisone improves chronic inflammatory demyelinating polyradiculoneuropathy more than no treatment. *Ann Neurol.* 1982;11:136-141 Level 1 (likely reliable); RCT


14 Prasad R, Hellawell DJ, Pentland B, Usefulness of the Functional Independence Measure (FIM), its subscales and individual items as outcome measures in Guillain Barré syndrome. *International Jour Rehabil Research.* 2001;24:59-64 Level 1 (likely reliable); M, QI