Review of Guillain Barré Syndrome

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Could This Person Have GBS?

Case #1

- 28 yo man with 2 weeks of paresthesias starting in upper extremities, then involving feet, legs, and torso
- Feels off balance
- Mild urinary hesitancy and constipation
- EXAM: hyperreflexia, increased muscle tone in legs, and sensory level at waist
Could This Person Have GBS?

Case #2

- 42 yo woman with hx of EtOH abuse with 1 week of rapid gait ataxia and 2 days of double vision. Feels tired.

- EXAM: ataxic limb testing and gait, absent reflexes, trouble moving either eye inward or downwards, absent vibration at knees, diffuse mild weakness
Could This Person Have GBS?-Case #3

- 50 yo healthy man with 3 months of progressive numbness and weakness, legs > arms, with recent falling and gait instability
- EXAM: unable to walk on toes and heels; weakness 3-4/5 with legs and 4/5 with hands; reflexes absent at ankles, +1 at knees and brachioradialis; absent vibration at ankles
The H1N1 vaccine given during the Swine Flu outbreak of 2009-2010 directly caused almost 450 cases of GBS in the US.

True or False???
Question #2

What is the best method to monitor respiratory status in a GBS patient???

1) Oxygen Saturation
2) Arterial Blood Gas
3) Vital Capacity
Guillain-Barré Syndrome (GBS)

- Most common community-acquired neuromuscular emergency
- Annual incidence: almost 2 per 100,000
- Heterogeneous syndrome of inflammatory disorders of the peripheral nervous system
- Characterized by rapidly progressive weakness and areflexia
- Self-limited, monophasic illness
GBS

- Occurs in all age groups
- 60-65% cases occur several weeks after an infection
- Controversial association with vaccines
- Rare cases after trauma, surgery, bone marrow transplantation
Presenting Symptoms of GBS

- Typical pattern is of paresthesias followed by weakness
- Some cases start with proximal weakness or with facial droop
- Severe back pain with sciatica common
- Other common initial complaints: fatigue, weak voice, gait imbalance, double vision
Exam Findings

- Weakness
- Areflexia / hyporeflexia
- Bifacial weakness
- Dysarthria/ dysphagia
- Loss of vibration sense
- Gait disturbance
Clinical Course of GBS

- Progresses over days to weeks, sometimes more rapidly
- Maximal deficits usually seen by 2-4 weeks
- Ascending pattern of weakness most common
- Proximal weakness and descending weakness are also familiar patterns
- Start of recovery for majority of cases at 4 weeks
Pathogenesis

- Underlying genetic susceptibility
- Autoimmune phenomenon suspected secondary to viral or bacterial infection
- Molecular mimicry
- Antibodies attack specific regions of the myelin or axons of the peripheral nerve fibers
Associated Infections

- *Campylobacter jejuni*
- *Mycoplasma pneumoniae*
- CMV
- EBV

- Can be concurrent with HIV infection
- Usually causative agent not identified
Functional Nerve Fiber Types

- Motor fibers are **large diameter myelinated fibers** that send signals to muscles.
- Proprioception and vibration are transmitted to the CNS by **large diameter myelinated fibers**.
- Pain, temperature, and touch are transmitted to the CNS by **small myelinated** and **unmyelinated fibers**.
- Autonomic fibers are either **small myelinated** or **unmyelinated**.
Nerve Fiber Anatomy
Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP)

- Most common form of GBS in the US, Canada, and Europe (85-90%)
- Affects nerve roots, peripheral nerves, and cranial nerves
AIDP

- Antibody-led immune mediated destruction of the myelin sheath and/or Schwann cells
- The propagation of the electrical nerve impulse is slowed → weakness results
- Once the immune reaction stops, nerve repair and remyelination begin → clinical recovery follows
Other Common GBS Variants

- Axonal Forms (AMAN, AMSAN)
  - common in Asia and Mexico
  - Only 5-10% of US cases
  - Strongly linked with C. jejuni
  - Associated with more severe course and with prolonged recovery
Other Common GBS Variants

- Miller-Fisher Syndrome (MFS):
  - **Ophthalmoplegia, Ataxia, Areflexia**
  - strongly associated with anti GQ1b
  - recognizes epitopes expressed in the oculomotor nerves, DRGs, cerebellum
  - more prominent sensory findings
  - 5% of GBS cases
Labs and Studies

- CSF: 90% with increased protein at 7 days
- CSF: WBCs < 10 mm3
- EMG/NCV testing:
  - Demyelinating vs. Axonal
- Anti-GQ1b antibodies in MFS (90%)
- CK level: if initially elevated, GBS is doubtful
Red Flags

- Hyperreflexia/ normal reflexes
- Sensory level (i.e. spinal level)
- Pronounced asymmetry of findings
- CSF WBCs > 50
- Early severe bowel and bladder dysfunction
- Symptom progression > 1 month
Differential Diagnosis of GBS

- Acute Spinal Cord Compression or Inflammation
- Toxic Neuropathies
- Botulism
- Myasthenic Crisis
- ICU acquired weakness (CCM, CCPN)
- CIDP
Chronic Inflammatory Polyradiculoneuropathy (CIDP)

- Similar to GBS but slower time course
- More prominent sensory signs
- Bulbar and respiratory involvement rare
- Linked with concurrent illnesses (HIV, MGUS, diabetes, connective tissue disorders)
Treatment for GBS

- Both intravenous immunoglobulin (IVIG) and Plasma Exchange (PE) can mitigate disease severity and speed recovery
- Ideally started within 2 weeks of onset
- Efficacy the same for PE and IVIG
- No indication for steroids in GBS treatment
Plasma Exchange

- The most studied in GBS
- 4-7 treatments (every other day)
- More difficult to administer/invasive procedure
- Complications include hypotension, hemorrhage and infection
IVIG

- Standard is 2g/ kg BW over 2-5 days
- Much easier to use than PE
- Avoid with IgA deficiency or significant renal dysfunction
- Side-effects: anaphylaxis, ARF, headaches, hematological abnormalities
Supportive Management

- Monitor for signs of neuromuscular respiratory failure (NMRF)
- Monitor for autonomic dysfunction
- Watch for SIADH
- Look for complications of immobility
- Pain management
- Psychological support
Neuromuscular Respiratory Failure (NMRF)

- Impaired ventilation due to primary respiratory muscle dysfunction (e.g. diaphragm, thoracic intercostals)
- Impaired airway protection due to bulbar dysfunction (i.e. larynx and pharynx)
- Respiratory failure in GBS is primarily due to NMRF
Warning Signs of NMRF

- Quadriplegia
- Inability to lift head off the bed
- Weak voice
- Weak cough
- Facial diplegia
- Dyspnea
- Orthopnea

- Tachypnea
- Accessory muscle use
- Abdominal paradox
- Tachycardia
- Unable to speak in full sentences
- Unable to count to 20 on one breath
Respiratory Status Monitoring

- Count on one breath
  - Should be greater than 40
  - Less than 20 concerning
- Assess cough
- Accessory Respiratory Muscle Use
- Bedside spirometry q4 –12h
Bedside Spirometry: 20/30/40 rule

- **Vital Capacity** (nml: > 60 ml/kg)
  - Concern if < 20ml/ kg
- **Negative Inspiratory Force** (nml < -70 cm H2O)
  - Concern if > -30 cm H2O
- **Maximum Expiratory Pressure** (nml > 100 cm H2O)
  - Concern if < 40cm H2O
Key Points- Respiratory Status Monitoring

- **Clinical picture** and **bedside spirometry** guide decision making in regards to patient placement (floor vs. ICU) and as to need for intubation.

- **Arterial O2 desaturation** and **ABG changes** are **late signs** of NMRF and should **not** be the sole means of monitoring.
Key Points-Respiratory Status Monitoring

**When in doubt...**

Better to monitor a GBS patient of concern for 24 to 72 hours in the ICU/step-down and NOT need mechanical ventilation...*as opposed to* patient being on the floor and then needing emergent intubation
Mechanical Ventilation (MV)

- 15-30% of GBS patients
- Can be weeks to months; may require tracheostomy
- Avoid neuromuscular blocking agents
- Attempts at weaning should begin only once improvement is seen with overall and respiratory neuromuscular function
Autonomic Dysfunction in GBS

- Occurs in 65% of patients
- Usually mild but rarely can be lethal
- Initial monitoring with telemetry/ frequent vitals/ bowel and bladder care
- Can last for weeks to months
Autonomic Dysfunction in GBS

- Cardiovascular:
  - 1) Arrhythmias - usually sinus tachycardia
  - 2) BP instability
- Urinary retention
- Sweating
- Constipation/ Adynamic Ileus (50%)
SIADH

- Occurs in 25% of cases
- Usually mild
- IVIG treatment can be a confounder as it can cause both a hyponatremia and a pseudohyponatremia
Complications of Immobility

- DVTs
- Pressure sores
- Compressive neuropathies
- Joint contractures
- Muscle loss

PT/OT and Nutrition involvement very helpful
Neuropathic Pain in GBS

- Occurs in 85% of patients
- Can last for months to years to permanent
- Often require a mix of opiates plus neuropathic pain relievers
Psychological Effects of GBS

- GBS can lead to anxiety and depression
- Patients do best when reassured by medical team that they will get better
- Especially holds true when on MV
- Concerns with prolonged rehabilitation and possible permanent disability can add to this
Hospital Course

- Variable and unpredictable
- May be dependent on secondary factors such as ICU complications
- Only mild weakness: only 2 to 5 days
- If MV required: weeks to even months
Long-term Prognosis

- 10% may have a single relapse
- 2% may actually have CIDP
- 65% walk independently by 6 months
- 80% have good functional recovery by 1 yr
- 15% have long term disability
- 5% mortality rate
Vaccines and GBS

- Ongoing concern, especially with the public
- Very limited evidence that certain current vaccines are significant risks
- GBS considered secondary to vaccination if it occurs within 6 weeks of administration
H1N1 Vaccine and GBS

- **1976**
  - 48 million vaccines given
  - Approx 550 cases occurred within 6 weeks
  - 1+ cases per 100,000

- **2009-2010**
  - CDC: increased rate of 0.8 per 1 million
  - Rate no different than influenza vaccine
  - China: 90 million doses; Only 11 cases
Influenza Vaccine and GBS

- Influenza vaccine of early 1990s: increased incidence of GBS at 1 in 1 million for back-to-back vaccinations
- Most experts agree that there is a risk, but small- probably less than 1 in 1 million
- There is also debate if influenza is itself a risk
Meningococcal Vaccine and GBS

- 15 million doses of tetravalent meningococcal conjugate vaccine given
- 26 GBS cases
- CDC still investigating
GBS Patients and Vaccines

- Avoid vaccination for 12 months after GBS onset
- Generally avoid any vaccine that is suspected to have precipitated the GBS
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Think CNS and particularly spinal cord here—this patient has probable MS.
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- EXAM: ataxic limb testing, absent reflexes, trouble moving either eye inward or downwards, absent vibration at knees, unable to walk due to ataxia, mild weakness

Hope you gave thiamine just in case- but this person had MFS variant of GBS.
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- EXAM: unable to walk on toes and heels; weakness 3-4/5 with legs and 4/5 with hands; reflexes absent at ankles, +1 at knees and brachioradialis; absent vibration at ankles

3 month progression is too long for GBS. CIDP confirmed with EMG/NCV.
Question #1

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False. 27 according to the CDC.
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Sources

2) CONTINUUM: Critical Care Neurology, AAN, June 2009.
5) “Safety of Influenza A (H1N1) Vaccine in Postmarketing Surveillance in China”, Liang et al, NEJM, Feb 17, 2001
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