- Variable bars: more bars, stronger peripheral perfusion

- Low perfusion index results from one of two issues:
  - Cardiac output low
    - Can use an echo probe to diagnose.
  - Patient overly vasoconstricted
    - Feel the skin. If it is cold, vasoconstriction is the issue.

- Pulse oximeter waveform is poor or can't be detected.
  - This happens frequently in patients with hypotension. Typical response is to move pulse ox to different places trying to get a reading.

PERSPECTIVES

- It is important to understand that the number on the pulse oximeter is a marker of oxygenation while the waveform is a measurement of perfusion.
  - A poor waveform cannot be fixed by adding oxygen or ventilatory support.
  - Instead, you need to work to augment perfusion (for instance with push dose epinephrine).

- NB: The amplitude of the waveform can be misleading because of auto-leveling (ie, the computer may automatically normalize the size of the waveform for easier visibility).
  - Can have a high amplitude waveform with a poor perfusion index.

Myasthenia Gravis: Parts 1 and 2

Brit Long, MD and Mike Gottlieb, MD

- Immune disorder of the neuromuscular junction.
  - Presents with weakness of the bulbar and proximal muscle groups and improves with rest.
  - Patients have antibodies that bind to postsynaptic acetylcholine receptors blocking acetylcholine binding.

- A quick neurologic exam to differentiate myasthenia gravis from other neurologic issues includes:
  - Bulbar abnormalities.
    - Weak extraocular and facial muscles
    - Dysphonia, dysphagia, dysarthria

- Ptosis (occurs in 80% of cases)
- Proximal muscle weakness (particularly of neck muscles).
- Normal sensation, normal pupils, normal reflexes
- No increased secretions, no fasciculations, no increased autonomic dysfunction.

- Bedside Diagnostic Testing
  - Tensilon test
    - Administer edrophonium (acetylcholinesterase inhibitor).
    - Increases Ach in the neuromuscular junction.
    - Increases muscle strength.
    - Infrequently performed - edrophonium not available.
  - Ice Pack Test
    - Useful in any patient with ophthalmoparesis or ptosis.
    - Assess eye muscle strength.
    - Apply an ice pack for 2 minutes.
    - Reassess eye muscle strength (a 2 mm improvement is diagnostic).
    - Approximately 90% sensitive for myasthenia gravis.
- Antibody testing
  - Not typically available in ED.
  - About 80% sensitive.
- Medication issues
  - Many patients will be on pyridostigmine (increases Ach in the synapse) and steroids.
  - **Many medications can worsen myasthenia gravis.**
    - **Antibiotics.**
      - **Avoid:** fluoroquinolones, aminoglycosides, macrolides (intermediate risk).
      - **Safe:** Penicillins, carbapenems, nitrofurantoin, cephalosporins, clindamycin, doxycycline.
    - **Avoid** magnesium, beta-blockers, haloperidol, prochlorperazine, phenytoin, antihistamines.
  - IV Contrast: Low osmolarity contrast: low risk. ~ 3% will have increased weakness.
- Myasthenic Crisis
  - Any exacerbation of myasthenia that can cause respiratory failure. About 30% of patients will experience a crisis.

- Triggers
  - Infection
  - Electrolyte abnormalities
  - Surgery
  - Trauma
  - Thyroid disease
  - Pregnancy
  - Medications
- Labs
  - Electrolytes
  - Thyroid function tests (concomitant thyroid disease common)
- Signs of impending respiratory failure
  - Chest-related issues
    - Weakness of intercostal muscles and diaphragm
    - Accessory muscle use, Retractions
    - Pt may also be retaining, doesn't look ill but slowly developing ventilatory failure.
    -
  - Bulbar and pharyngeal muscle issues
    - Difficulty swallowing secretions
    - Difficulty holding head up
    - Difficulty with phonation
- Evaluating respiratory effort
  - Negative inspiratory force (NIF) + Forced vital capacity are adjuncts to clinical assessment
  - Normal FVC: > 60 cc/kg
  - Abnormal FVC: 30 cc/kg
  - Single breath test
    - How high the patient can count with one breath
    - Normal: Able to count to greater than 40 on one breath Abnl <10-15.
- Treatment of Myasthenic Crisis
  - Empiric antibiotics (infection common)

- Electrolyte repletion
- Airway evaluation
  - Intubate for FVC < 10 cc/kg, inability to tolerate secretions, respiratory fatigue
  - Can support respirations with BPAP (strongest evidence) or high-flow nasal cannula
- Intubation medications
  - Avoid depolarizing agents (ie succinylcholine) as patients can have unpredictable responses
  - Increase sensitivity to nondepolarizing agents: consider using ½ dose
- Other treatments
  - Plasmapheresis (faster acting)
  - IVIG (effects are longer lasting)
  - Steroids
    - Can cause further decompensation early in management
    - Part of maintenance therapy

CorePendium Chapter: Peripheral Nerve Disorders

References
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Tachycardia in Pregnancy

Susy DeMeester, MD and Justin Cormack, MD

Case: The OB hospitalist comes to the ED and asks for your help with a patient who is 39 weeks pregnant and tachycardic. The ECG you are handed shows a narrow complex tachycardia.

- **Differential diagnosis of narrow complex, regular, tachycardia includes**
  - Sinus tachycardia
  - Supraventricular tachycardia (SVT)
  - Atrial flutter with 2:1 conduction