Classic Hits of the Emergency Department

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Classic Case 1

• JB is a 48 yo male w/ blurred vision and droopy eyelids x 2 months

• PMHx
  – Hypothyroidism, pituitary adenomas, hypertension, and GERD
  – 2 months ago Dx-> Bells Palsy outside ED
Case 1

- **MEDs**
  - Testosterone patch, Ferrous sulfate, Levothyroxine, Singulair, Hydrocortisone, Norvasc, Zocor, Celebrex, Ativan, Hydrocodone.

- **FHx – neg**

- **SHx – past ETOH, Current smoker**
Case 1

- **VSS**
- **HEENT**
  - bilateral ptosis, dysconjugate gaze and diplopia.
  - Holds jaw closed
- **Neuro**
  - Peripheral n. Motor 5/5, Sensory intact
  - Finger ->nose nl
Differential Dx

- Myasthenia gravis
- Guillain-Barre
  - Usually an ascending paralysis, can involve CN
- Lambert-Eaton
  - Release of ACh is impaired, prox muscle weakness
  - Associated w/ CA
- Botulism
  - Progressive, symmetric, descending weakness or paralysis that first affects muscles innervated by the cranial nerves
• A diagnostic test was performed
Myasthenia gravis (MG)

- Rare autoimmune disorder of peripheral nerves
  - Antibodies against ACh receptors at the myoneural junction or against muscle components.
  - reduced muscle strength with repeated use
  - recovery of muscle strength after rest.
- Fluctuating muscle weakness
  - Typically bulbar muscles > peripheral
  - Intermittent generalized weakness common.
Myasthenia gravis (MG)

- M:F 2:3
- Onset
  - 3 peaks
    - Neonates - transfer of maternal autoantibodies,
    - 20-30 years,
    - >50 years
- Presentation variable
  - Mild -> Severe
Presentation MG

- **Mild**
  - Limited to bulbar muscles (ptosis).
  - Findings may not be apparent unless repetitive use
  - Recovery after rest or with application of ice.
  - Heat or fever worsen weakness.
  - 85% with bulbar weakness develop generalized weakness

- **Severe**
  - Floppy head, open jaw, altered voice, no gag, respiratory distress
  - Ventilatory failure / bronchial secretions
  - DTRs are preserved.
• Most patients come to the ED w/ DX of MG
• **Myasthenic crisis**
  – Acute respiratory failure due to worsening MG
  – Respiratory -> muscle weakness
  – Aspiration -> bulbar muscle weakness
  – Hypercarbia, decreased FVC <1, neg insp force <20cm H2O
MG Exacerbations

- Pregnancy, fever, systemic illness, emotional issues, surgery
- Drugs
  - Antibiotics
    » Macrolides, fluoroquinolones, aminoglycosides, tetracycline, and chloroquine
  - Antidysrhythmic agents
    » Beta-blockers, calcium channel blockers, quinidine, lidocaine, procainamide, and trimethaphan
  - Miscellaneous
    » Diphenylhydantoin, lithium, chlorpromazine, muscle relaxants, levothyroxine, adrenocorticotropic hormone (ACTH), and, paradoxically corticosteroids
Myasthenic crisis vs Cholinergic crisis

Not enough meds vs Too much meds
Myasthenic crisis vs Cholinergic crisis

• Like treating a diabetic without a glucometer
• Myasthenic crisis and cholinergic crisis can present in similar ways.
• Cholinergic crisis results from an excess of cholinesterase inhibitors
  – pyridostigmine, (mestinon)
  – Resembles organophosphate poisoning.
  – **SLUDGE** + flaccid muscle paralysis that is indistinguishable from weakness due to MG.

Treat the ABCs – Avoid respiratory failure
Morbidity and Mortality

- Untreated MG carried a mortality rate of 30-70%.
- Morbidity results from
  - Aspiration, pneumonia, and falls
- With treatment, the mortality rate of myasthenic crisis is less than 5%.
Treatment

- Cholinesterase-inhibiting medication.
  - Edrophonium used as a diagnostic tool -> short half life
  - Pyridostigmine is used for long-term maintenance.
- Corticosteroids to suppress autoimmunity.
- Other immunosuppressive drugs (eg, azathioprine, cyclosporine).
- Other Rx*
  - Plasmapheresis
  - High dose intravenous immunoglobulin
  - *lack of well-designed clinical trials
Diagnostic Testing
Ice Test

- **Ice pack test**
  - Cooling may improve neuromuscular transmission.
  - Ice in a surgical glove wrapped in a towel over the eyelid x 2 minutes.
  - A positive test -> resolution of the ptosis.
  - Positive ~ 80% of patients with ocular myasthenia.
• Edrophonium
  – Cholinesterase inhibitor
  – Prolongs the action of acetylcholine, increasing the amount of ACh at the receptor
  – In MG the body's immune system destroys many of the muscarinic receptors,
Tensilon Test

- Secure airway if needed
  - IV, O2, Monitor in place
  - Atropine at bedside
    » Bradycardia heart block and asystole can occur
    » Increased secretions
- Edrophonium
  - Test dose 1mg IV
  - If no improvement and no adverse rxn, can give 3 mg, then 5mg (10mg total MAX)
  - Dramatic response in 1min.
  - If muscle strength fails to improve, think about cholinergic crisis or another cause
Tensilon Test

- May be useful in diagnosing MG and in distinguishing myasthenic crisis from cholinergic crisis.
  - A positive response is not completely specific for MG; other conditions (eg, amyotrophic lateral sclerosis) may also respond.
- Myasthenia crisis – patient improves.
- Cholinergic crisis - may develop SLUDGE syndrome.
  - Managed expectantly, half-life of Tensilon ~ 10 min.
Other Non-ED tests

- EMG has characteristic findings
- Anti-acetylcholine receptor antibodies levels (+ 90%)
- Look for thymoma
Case 1 Patient Follow up

• Admitted
  – Improved significantly with mestinon
    » Titrated 30 mg q.i.d. to 60 mg q.i.d
  – CT of the chest -> Thymoma
  – F/U Thoracic surgery clinic
Night Fever

Classic Hits of the E.D.

SIDE ONE
SK-355-A
STEREO
• B. G. is a 48yo M, PMHx fall down steps 2 weeks ago, 24hr trauma admit
  – L distal clavical frx
  – L rib frx
  – Small L pneumothx
• Awoke this am with weakness/numbness L arm
Interesting case 2...

• PMHx
  – Sz, cataracts, hypertension, recent fall

• Meds
  – Hydrochlorothiazide/lisinopril and Dilantin

• Social Hx
  – Stopped ETOH 2 weeks ago (after fall)
Physical exam

- Afebrile VSS
- Neck nontender, full ROM
- L Upper arm
  - Soft compartments
  - No echymosis
  - Tender over distal clavical
- Neuro exam
  - Sensory- paresthesias web space fingers 1-2
  - Motor – weak wrist/finger extension
Radial N palsy

- May anywhere along the nerve
  - Proximal …Crutch palsy
  - Upper arm …SNP, Honeymooners palsy
  - Wrist…Handcuff palsy
- Saturday Night Palsy
  - Compression Radial N at spiral groove
  - Triceps OK unless lesion is higher
  - Weak wrist and finger extension
Radial N. Palsy

- Radial nerve (C5–C8)
  - Compression injury of radial
  - Extensors of wrist and fingers, “wrist drop”
  - triceps, triceps jerk (if compressed in axilla)
Saturday night palsy

- Caused by “carousing and alcohol”
- First described in the late 1800s
  - Arm over the curb, over chair, bed
- Saturday night was the end of the 6 day work week
- Tradition on English vessels
  - give the crew ETOH just after dark on Saturday night
AKA

- Sleep palsy, Grand Rounds palsy
- Honeymooner’s palsy, lovers’ palsy,
- Park bench palsy, Drunkard’s palsy, Crutch palsy
Differential Diagnosis

- Lesion of the posterior cord/brachial plexopathy
- Brachial neuritis
- Axillary nerve injury
- Hemotoma (vascular manipulation)
- Tumor
- Humerous frx
- Extensor tendon rupture
- Epicondylitis
- de Quervain's Tenosynovitis
- Upper extremity extensor compartment syndrome
- Carpal tunnel syndrome
- Ulnar neuropathy
Treatment

- NSAID, muscle relaxants
- Treat neuropathic pain PRN
  - antidepressants or anticonvulsants
- EMGs
  - Differentiate between partial and complete injuries
  - Usually delayed 2-4 weeks
- Xrays, MRIs prn to R/O tumor, mass
- Splinting
  - Wrist in extension
- Increase activity after 4 weeks
• Paralysis may last days ->year
• May have refractory pain
• Neurology follow-up is a very good idea
Other Saturday Night Medical Conditions

- Saturday night retinopathy
  - Retinal ischemia from prolonged orbital pressure
- Saturday night blue
  - Amyl nitrite abuse -> methemoglobinemia
- Saturday night fever
  - Increased temperature resulting from sympathetic hyperactivity caused by illegal drug use (Ecstasy or Methamph)
- “Help! I’ve got Saturday Night Palsy!”
  - Rap song which describes the ill effects of ETOH
Case 3

- 22 yo F with a 1 year history of headaches
  - Bilateral, diffuse, no associated nausea, vomiting, stiff neck, photophobia or weakness
  - Intermittent, now mild
  - Extensive workup by PCP 6 months ago, neg CT
- PMHx
  - Headaches, head trauma age 7
- Meds
  - Tylenol Motrin
Physical Exam

• VS
  – 150/80, P119, R18 and O2 sat 97%.
• PERRL, EOI, Fundi-nl
• Neuro exam
  – CNII-XII intact, Motor 5/5 Sensory nl, Finger->Nose nl

*As per Medical Student*
• Thought process
  – Going on > 1 year w/ neg wu in past
  – Currently not in distress
  – Non focal neuro exam

• Differential include migraine
  – Treat for migraine
  – F/U PCP
Additional evaluation

- CT Scan
  - neg
Differential Dx
Papilledema

• Meds
  – Minocycline, Tetracycline, Vit A, Cimetidine
  – Li, Lead, Arsenic
  – BCP, L-thyroxine
  – Danazol, Cyclosporine
• Other
  – Pseudo tumor, Dural sinus thrombosis, AVM
  – CHF, Hypertension, pregnancy
• Neuro conditions
  – Tumor, trauma, Chiari malformation
• Infectious
  – SBE, meningitis, Mono Lyme, Polio, Typhoid fever
  – Encephalitis, Guillain-Barre
• Endocrine
  – Addisons, Cushings, hypoparathyroidism, DKA
• Hematologic
  – Leukemia, anemia, Hemophilia, Lupus
Diagnostic testing

• CT Scan
  – Neg

• Lumbar puncture
  – Opening pressure > 460mm
  – 15-20cc drained
  – Closing pressure 220mm

How fast do we make CSF? ~30 cc/ hour
Pseudotumor cerebri

- Increased ICP without brain tumor
  - most important manifestation is papilledema, may lead to optic atrophy and blindness.
- Idiopathic
  - ? Decreased reabsorption of CSF
  - Increased ICP aids reabsorption
- Children and adults, F:M 8:1 incidence 19x higher in obese women
• Headache
  – Intermittent, constant or absent
  – Worse in am, worse lying flat
  – Can exacerbate existing migraine

• Visual loss
  – Mono or binocular transient visual sx
  – May last seconds, may change with position or valsalva
  – Diplopia due to 6th N. palsy
  – Most sensitive tool - visual field testing
  – Color vision not sensitive
Diagnostic testing

• Imaging
  – MRI with gadolinium is the best
    » Can R/O venous sinus thrombosis*, meningeal infiltrative or inflammatory disease
  – CT is OK to R/O mass lesion
    » Usually normal
  – Lumbar puncture
    » Must measure OP supine
    » Nl OP 100-200mm H₂O
    » (No need to repeat, short lived) *Consider in non obes pts, males or known procoagulant states
Treatment

- Weight loss
- Acetozolamide 1000-2000mg/d (high dose)
  - Carbonic anhydrase inhibitor
  - Replace K, Mg
  - Many side effects
  - Cause hemoconcentration
- Steroids
  - For marked sx
  - Makes wt loss impossible and has side effects
- Surgery
  - Optic nerve sheath fenestration – cut holes in optic N sheath allows egress of CSF directly into the orbital fat
  - Lumbar-peritoneal or VP shunt
- Follow up
  - Fundus photography and Visual fields
Admission criteria

• Pain control for intractable headache
• Unclear Dx
• Progressive visual loss
  – Admit for IV steroids and repeat funduscopic exams
• Medicolegal risk -> visual loss
  – Visual sx should be addressed in hours-days
• V.I. is a 49yo male CC: foot pain
  – Notes a hx of “alcohol problems”
  – Had foot pain ~ 2 weeks ago, today looked at his feet and noted black toes.
  – Toes painful and numb
• PMHx - none Meds - none Allergies – none
• SHx-pint of liquor a day
• PE VSS
Physical exam
Differential Dx

- Trauma
- Vascular
- Frost Bite

Patient was wearing heavy duty work boots but....

Admitted to walking in the snow in tennis shoes
Frostbite

- Cold injury to tissue due to freezing
- Cellular injury
  - Intracellular ice crystals - damage cells
  - Extracellular ice crystals - osmotic injury
  - Vasospasm
  - Microvascular issues – endothelial injury
    » Emboli, clots, stasis
  - Mediator release
    » Free radicals, arachadonic acid
• Traditionally graded I-IV but appearance changes

Superficial

- No Signs
- Clear Blisters

Deep

- Hemorrhagic Blisters
- Gangrene
Treatment

• If still frozen (rare to see)
  – Yellow/white, insensate, mottled or frozen solid

• Rapid rewarming in water bath
  40-42deg C x 30 min
  – Keep water warm, treat pain
  – Return of nl skin color and sensation is good
  – Stops ice crystal injury but not secondary injury
## Progression

<table>
<thead>
<tr>
<th>Initial injury</th>
<th>Yellow/white, insensate, mottled</th>
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</thead>
<tbody>
<tr>
<td>~ 3 hours</td>
<td>Edema</td>
</tr>
<tr>
<td>~6-24 hours</td>
<td>Blisters</td>
</tr>
<tr>
<td>~9-15 days</td>
<td>Black eschar</td>
</tr>
<tr>
<td>~22-45 days</td>
<td>Mummification and demarcation</td>
</tr>
</tbody>
</table>
## Frostbite

<table>
<thead>
<tr>
<th>Phase</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefreeze phase</td>
<td>Vasospasm, Loss of sensation</td>
</tr>
<tr>
<td>Freeze–thaw phase</td>
<td>Extracellular and intracellular ice crystal formation</td>
</tr>
<tr>
<td>Vascular stasis phase</td>
<td>Vasospasm, dilation, plasma leakage, stasis coagulation, and shunting</td>
</tr>
<tr>
<td>Late ischemic phase</td>
<td>Thrombosis, arteriovenous shunting, ischemia, gangrene, and autonomic dysfunction</td>
</tr>
</tbody>
</table>
Treatment

• Avoid repeat injury (Social issues?)
• Wound care
  – Blisters?
  – dT, Pain control, antibiotic?, ASA or NSAIDS
  – Local care
    » Aloe vera, hydrotherapy?, topical antibiotics?
  – Surgical debridement – NO!
  – Permanent tissue loss is often much less than originally suspected
Fig. 3. (A) Frostbite injury. (B) Frostbite injury. (C) Clear delineation of nonviable tissue. (D) Postoperative, same patient.
• Can be big deal
  – Social
  – Physical
  – Chronic pain
  – Long term
Treatment

• Theoretically, preventing secondary injury (vasospasm, clotting) should improve outcome
  – No good studies

• Recent studies
  – tPA early digital angiography (24hrs) and treatment for abnormal perfusion.
    » Who wants to give an alcoholic tPA/heparin?
  – Technetium 99m “triple-phase”
    » scanning (1 minute, 2 hours, 7 hours) performed 48 hours after admission
    » assess early tissue perfusion and viability
    » Early surgical intervention