10/11/22 Neuro Morning Report with @CPSolvers

***Case Presenter**: John Acquaviva (@DrJAStrange) **Case Discussants**: Madellena Conte (@MadellenaC) and Valeria Roldan (@valeroldan23)*

CC: Diplopia

55yF, PMHx Covid19 twice, colonic polyps.

3 days of acute onset double vision. Woke up with the double vision that hasn't resolved since.

1st day w/optometrist: diplopia was fixed when putting a prism in front of her eyes. Diplopia was temporary fixed by taping shut one glass-eye.

Following day: numbness and tingling in mouth, tongue, hands, feet.

Following day: unsteady gait. Difficulty controlling upper extremities. Fatigue legs. Eyes are "tired" but diplopia doesn't worsen at end of the day. Daughter notes eyelid drooping. Recent upper respiratory symptoms.

Tick bite last month without rash.

PMH:
None

Meds:
None

Fam Hx:
Son - Chron's. Daughter - T1DM

Soc Hx: Pennsylvania.

Health-Related Behaviors:
None

Allergies: None

Vitals: **T**: **HR**: **BP**: **RR**: **SpO_2**:
Exam:
Systemic
Neuro

- **Mental Status:** normal
- **Cranial Nerves:** PERLA, visual fields full. R eye - off midline laterally to the right. EO movements: normal movements; diplopia worse at L gaze. Other CN intact.
- **Motor:** normal muscle bulk and tone. Strength 5/5 including neck extension and flexion.
- **Reflexes:** 0/4 reflexes.
- **Sensory:** BL LE diminished pin prick and temperature, intact touch, normal propioception.
- **Cerebellar:** ataxic finger to nose, heel to shin wsa intact.
- **Other:** Gait had some corrective steps.

Notable Labs & Imaging:
ESR: elevated at 35.
CT/MRI Head: neg.
LP: elevated protein, mild elevation in WBC.
Anti G1QB: pending.

Final DX: Miller Fisher.
Starting IVIG.

Problem Representation: 55yoF pw acute onset diplopia, paresthesias and areflexia.

Teaching Points (Seyma): #EndNeurophobia

Diplopia: Localization X time course

- **Localization:** Brainstem, Nuclei, CN (= 3+ peripheral nerves, except CN II), NMJ, Eye muscle, Orbital
- **Monocular** (refraction problem, e.g. lens) Vs. **Binocular** (true diplopia due to misalignment; Clue: temporary fixed by taping shut one eye)
- **Etiologies:** Myopathie (e.g. Graves → Rectus muscle > Oblique), MG, Stroke, Infx (cellulitis, abscess), Compression (e.g. malignancy, mass)
- MG can cause Ptosis and can affect Extraocular muscles (not typical for Lambert-Eaton)
- VI (Lateral rectus → abd), IV (Superior oblique), III (Superior, inferior and medial rectus, inferior oblique)

Mnemonic for localization of CN nuclei (The Rule of 4): Midbrain: CN 3-4, Pons: CN 5-8, Medulla: CN 9-12

Horizontal Gaze: Eye conjucation

- VI Nucles and contralateral III Nucleus connected via MLF (Medial longitudinal fasciculus) → INO (Internucl. Ophthalmoplegia = Eye not adducting, but intact convergence)
- Horizontal gaze: Frontal eye field (FEF) → contralateral PPRF → CN6 ncl. → contralateral CN3 ncl. (via MLF)

Numbness and tingling: stroke, neuropathy [autoimmune, infiltrative (paraproteins, amyloid), inflammatory (post-infectious like GBS), metabolic (hypocalcemia, Ciguatox, B12-def, Diabetes mellitus)]

DM neuropathy: CN 3 (most common),4, 6 (rare) → acute onset diplopia
→CN3: microvascular lesion (clue: parasymp. fibers usually not affected, because are lateral in brainstem →pupils reacting! (DD: NOT in compressive lesions)
→ *The classical presentation of oculomotor nerve palsy in diabetes is that of an acute onset diplopia with ptosis and pupillary sparing! [because: fibers controlling the pupillary reflex are superficial and spared of microvascular injury]*

Diplopia + numbness & tingling: Inflammatory (post-infx like GBS, Miller-Fisher variant of GBS) Botulism, Infx (Lyme's, HIV, Leprosy, Diphteria, Covid, Mycoplasma), Heavy metals (lead)

Miller Fisher Syndrome:

- Triad: acute opthalmoplegia, ataxia, areflexia
- Labs: **Gq1b** ab; **Nerve conduction study** (acute neuropathy), **CSF analysis** (albuminocytological dissociation)
- DDx:
  - **GBS like syndrome + cells in CSF:** HIV during seroconversion, Lyme's
  - **Miller-Fisher-like** + AMS => **Bickerstaff encephalitis**

NMJ Vs. Peripheral Nerves:

- NMJ: fatigable weakness (e.g. Simpson-test)
- Neuropathy: areflexia, sensory abnormalities (numbness, tingling)

IVIG can cause hyperviscosity syndrome (thrombosis risk)!