Abstract

A patient with hypertension and diabetes presents with an acute third nerve palsy. There are several imperative steps an optometrist needs to perform in order to effectively and safely manage and treat this presentation.

Case History

- 64 YO Black male presents as an emergency walk in
- CC: Vertical and horizontal diplopia upon awakening x 6 days. Diplopia began as intermittent, and then progressed to constant over the next 2 days. On the third day, patient noticed a ptosis in OS. No pain is reported.
- PMHX: Hypertension, Diabetes, Hepatitis C, Right-sided Bell’s Palsy 4 years prior, Shingles
- POCHx: Non-proliferative diabetic retinopathy OU, Nuclear sclerosis OU, exposure keratopathy OD
- Meds: Metoprolol, Lisinopril, Amlodipine, Glipizide, Metformin

Pertinent Findings

- VA sc: 20/20- OD, 20/30- OS
- Pupils:
  - OD: Round, reactive, No APD, Dim: 3.5mm Bright: 2.5mm
  - OS: Round, sluggish response, No APD, Dim: 4mm Bright: 3mm
- EOMS: OD: full range of motion, OS: 0% adduction, 60% elevation, 40% depression, 95% abduction
- Palpebral aperature: OD: 8mm OS: 4mm
- Levator function: OD: 15mm OS: 6mm
- Cover test:
  - Primary Gaze: 45 exo, 20-25 left hyper
  - Up gaze: 30-35 exo, 12 right hyper
  - Down gaze: 45 exo, >25 left hyper
  - Right gaze: 70-80 exo
  - Left gaze: 8 exo, 14 left hyper
- Red desaturation: OS: 20% decrease compared to OD
- BP: 160/100 mmHg, LFBS: 225 mg/dL, LHbA1c: 9.3%
- CT of Brain without contrast (images to be included): No intracranial hemorrhage or mass effect. Cerebral atrophy, advanced for patient’s age. Mild periventricular white matter hypodensity compatible with microvascular ischemic change.
- MRI of brain without contrast (images to be included): No acute infarct, hemorrhage, or mass. Generalized cortical atrophy dilatation consistent with age.
- CTA of head: No evidence of intracranial aneurysm
Differential Diagnosis

- Third nerve palsy
  - Ischemic/vasculopathic, intracranial aneurysm, trauma, intracranial mass, undetermined
- Myasthenia Gravis
- Giant Cell Arteritis
- Internuclear Ophthalmoplegia
- Thyroid-related Ophthalmopathy

Diagnosis and Discussion

- Determine if ER referral is emergent or if it is appropriate to monitor the patient yourself.
  - Assess the patient’s age, atherosclerotic risk factors, and presence or absence of pain.
  - Assess if the third nerve palsy is complete or incomplete; determine the level of pupil involvement, and whether the palsy is isolated vs. complicated.
- Complete third nerve palsy will cause complete paralysis of all the muscles innervated by the third nerve including the superior rectus, levator palpebrae, medial rectus, inferior rectus and inferior oblique. An incomplete or partial third nerve palsy will not involve all of the muscles innervated by the third nerve nerve or will involve all of the muscles innervated by the third nerve but only to a modest extent.
- Differentiate pupil involving vs. relative pupil involvement vs. pupil sparing
  - Pupillomotor fibers are located peripherally and superomedially in the nerve as it exits the brainstem. Compressive lesions and berry aneurysms are more likely to cause pupil involvement by compressing the superficial parasympathetic iris sphincter fibers resulting in a fixed dilated pupil. Vascular supply of the third nerve affects the central fibers deep within the nerve. Ischemic lesions of the third nerve typically spare the peripheral pupillomotor fibers, however this is not always the case.
  - Compare pupil size in bright and dim illumination
  - Assess the light response
  - Assess the direct vs. consensual response
- Isolated vs. Complicated: Isolated third nerve palsy will only involve the third nerve. Complicated third nerve palsies may be accompanied by ataxia, contralateral tremor or contralateral hemiparesis. Complicated third nerve palsies warrant further investigation to localize the lesion.

Treatment, Management

- All pupil involving or relative pupil involving third nerve palsies require emergent imaging
- If pupil is spared, and third nerve palsy is incomplete, one must assume that the palsy is evolving and a STAT referral is warranted to rule out aneurysm vs. mass vs. ischemia as the underlying etiology.
To make an appropriate referral ensure a neurologist is on staff at the hospital and that the appropriate imaging studies are performed.

Send the patient with a succinct copy of today’s examination and your pertinent findings.

Call and speak with the ER doctor personally to initiate transfer of care. Explain to the ER doctor on staff the case you are transferring, and which anatomical structures you find suspicious for an aneurysm or mass.

Ensure the patient has a scheduled follow up visit and that there is appropriate communication with the patient’s PCP.

Confirm that the CTA scan is negative for an aneurysm at the junction of the posterior communicating artery and internal carotid artery (or less commonly at the junction of the basilar and posterior cerebral artery) by speaking to the hospital’s radiologist. Ensure the patient has a copy of the imaging studies that you can review at follow up visits. (CTA and MRI pictures to be included)

If ischemic, follow the patient every month for the next three months to ensure resolution of the third nerve palsy. If no resolution, urgent more invasive neuroimaging and bloodwork should be obtained.

Order blood work to rule out an infectious or inflammatory component including a CBC with differential, platelet count, Lyme western blot, ESR, C-reactive protein, ANA, RPR, FTA-ABS, ACE.

Relieve diplopia with occlusion therapy

Treat the underlying condition

Conclusion

A third nerve palsy is an ocular emergency that requires an urgent referral. Paresis of the third nerve can occur anywhere along its course from the midbrain to the orbit. Underlying etiologies can be life threatening and immediate neuroimaging is warranted to ensure there is no intracranial mass or aneurysm. It is imperative that all optometrists feel comfortable and confident with the work up and referral process as this presentation can present at any time.

Works Cited
