Emergent Neuro-Intervention for Isolated Abducens Nerve Palsy

Nathaniel J. Kim, MD; Sahil Parag, DO; Ngoc Phan, DO; Riyadh Al-Rubaye, MD
Department of Internal Medicine, Northeast Georgia Medical Center, Gainesville, GA

Northeast Georgia Medical Center
GRADUATE MEDICAL EDUCATION

Objectives

- Differentiate etiologies for acute abducens nerve (CN 6) palsy
- Assess role of magnetic resonance imaging (MRI) in assessing CN 6 palsy
- Identify early referral cases for neuro-intervention

Introduction

- Isolated CN 6 palsy caused by unruptured cerebral artery aneurysms are rare as compared to ruptured aneurysms
- Estimated incidence of CN 6 palsy due to aneurysm ranges from 4.66 to 11.30 per 100,000 person-years
- Role of MRI in patients > 50 years old with isolated CN 6 palsy and vasculopathic risk factors is unclear due to limited and conflicting evidence
- Murchison et al. 2011 found total modeled cost for 1 out of 93 patients with lesion causing CN palsy was $131,688; suggested MRI for initial evaluation may not be necessary
- Tamhankar et al. 2013 found 16.5% of patients in multicenter cohort had nonmicrovascular ischemia causes; suggests MRI does have a role during initial evaluation

Physical Exam

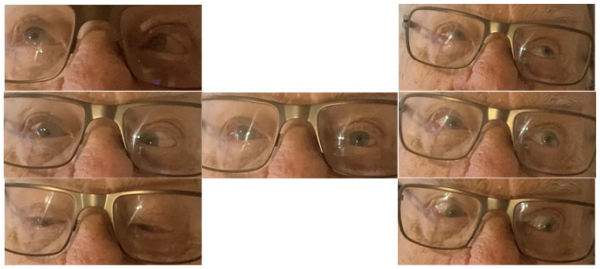

Figure 1. Ocular cranial nerve exam. Abducens nerve palsy of right eye demonstrated with right-ward gaze.

Initial Assessment Imaging

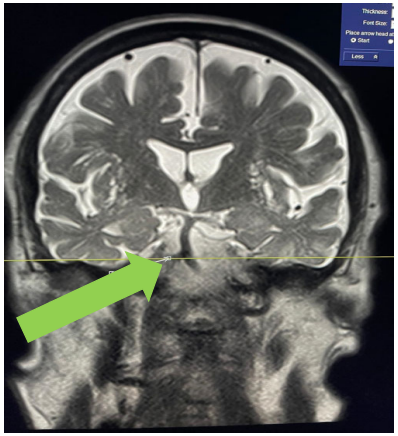

Figure 2. Magnetic resonance imaging of the brain without contrast. No evidence of acute ischemic process. Evidence of an absent flow void in right vertebral artery (green arrow).

Case Presentation

- An 86-year-old male with a history of thoracic aortic aneurysm, atrial fibrillation on rivaroxaban, hypertension, hyperlipidemia, and diabetes presented with acute onset three-day history of horizontal diplopia with systolic blood pressure in 200s without nystagmus nor ataxia
- Ophthalmologist referred to the local emergency department where computed tomography angiography of the head demonstrated a proximal basilar sidewall unruptured aneurysm in proximity of the sixth cranial nerve without subarachnoid hemorrhage, thus prompting urgent transfer and evaluation at a tertiary center with magnetic resonance imaging of the brain without contrast
- Urgent neuro-intervention was performed with cerebral angiography revealing fusiform dilation of the mid basilar segment distal to the anterior inferior cerebral artery origins with a basilar sidewall aneurysm arising on the right lateral wall
- The neuro interventionist successfully performed endovascular coiling and pipeline embolization of the basilar artery aneurysm
- The patient was discharged on the second post-operative day and was asked to report for follow-up at the neurology clinic within a week

Neuro-interventional Imaging

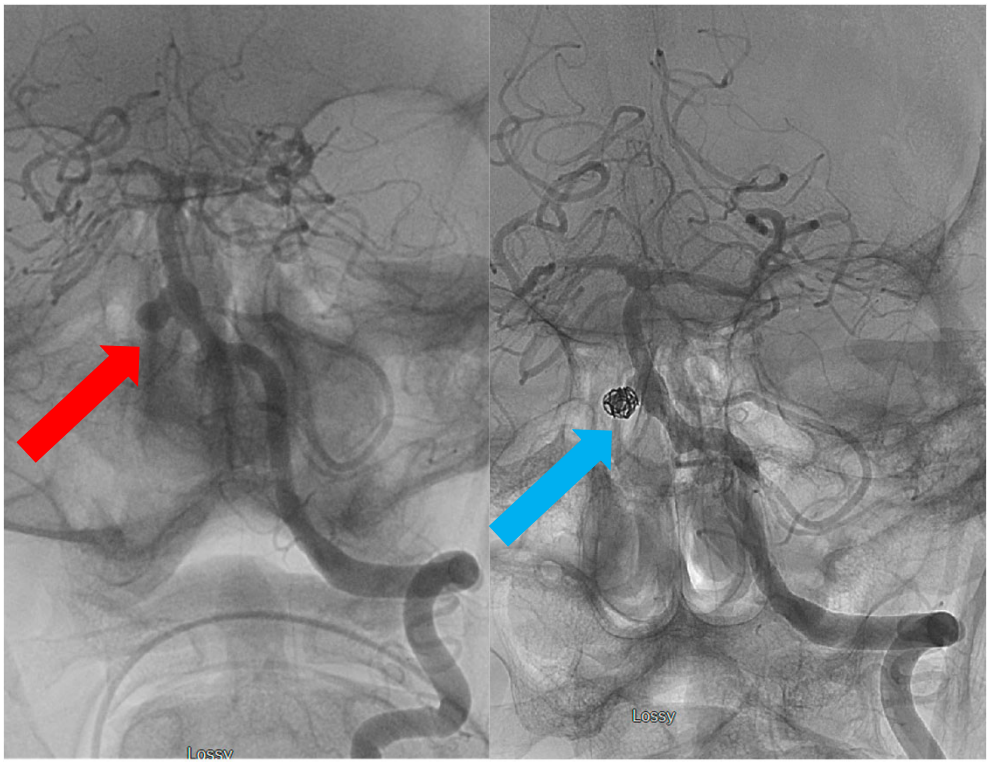

Figure 3. Cerebral angiogram of a right basilar sidewall aneurysm (red arrow). 3D rotational angiography interpretation measured the saccular component 4.9 mm x 7.3 mm x 5.7 mm; the fusiform segment of the basilar artery 4.7 mm in maximal diameter.

Figure 4. Successful endovascular coiling and pipeline embolization of the basilar artery aneurysm (blue arrow).

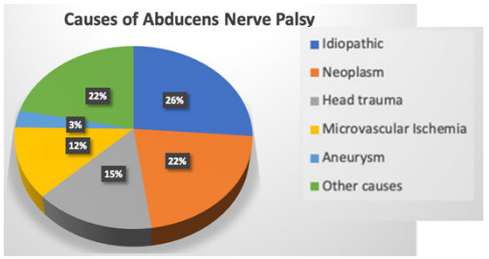

Figure 5. Kung et al 2015 retrospective study by Mayo Clinic for patients of all age groups (1,919 patients total).

Discussion

- CN 6 dysfunction can be present along its tract, which originates at the pons and innervates the lateral rectus muscle
- Though there are many causes of CN 6 palsy, a symptomatic presentation from an unruptured cerebral artery aneurysm is rare
- Given the symptoms associated with CN 6 palsy and the risk associated in a symptomatic patient with a unruptured aneurysm, early imaging evaluation and neuro intervention is a priority
- Early identification of abducens nerve palsy etiology by CT or MRI may distinguish between urgent and emergent conditions, including intracranial bleeds or aneurysms allowing prompt intervention to decrease morbidity and mortality

Conclusion

- This report highlights the significance of rapid identification and intervention for acute diplopia and abducens nerve palsy due to an unruptured basilar artery aneurysm
- Early referral to a tertiary center providing neuro-interventional services, such as early endovascular embolization, can prevent progression of compressive symptoms and rupture consequences (eg subarachnoid hemorrhage)
- This case demonstrates how early recognition and management by MRI for cranial nerve palsy may guide timely neurosurgical intervention to reduce morbidity and duration of hospital stay

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