# Persistent Left Abducens Nerve Palsy Secondary to a Prepontine Cistern Meningioma

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## INTRODUCTION

Abducens nerve palsies are the most common ocular motor paralysis in adults. The abducens nerve innervates the lateral rectus muscle, allowing for abduction of the eye. It can become compromised anywhere along its intracranial course, leading to a non-comitant esodeviation and subsequent diplopia. There are a variety of etiologies for abducens nerve palsies, ranging from microvascular ischemia and trauma as the most common, to other less common etiologies such as neoplasm, multiple sclerosis, increased intracranial pressure, and giant cell arteritis. This case demonstrates a patient with a persistent left abducens nerve palsy that was originally presumed to be secondary to her diagnosis of hypertension. Additional MRI imaging revealed the presence of a left prepontine cistern meningioma as the cause of the persistent palsy.

## CASE PRESENTATION

### Clinical Findings

o A 65-year-old African American female presents to the Illinois Eye Institute for a follow-up visit for a left abducens nerve palsy that was diagnosed 1.5 years prior. Initially, the palsy was presumed secondary to microvascular ischemia, due to her history of hypertension and unremarkable neuroimaging at the time of the first presentation. Although she notes gradual resolution of her diplopia over the past several follow-up visits, her abduction deficit in the left eye remains, prompting additional imaging.

**TABLE 1**
Entrance testing

| OD | | OS |
|---|---|---|
| 20/20 | **VA (cc)** | 20/20 |
| PERRL, (-)RAPD | **Pupils** | PERRL, (-)RAPD |
| FROM | **EOMs** | 2+ abduction deficit w/slowed glissade in left gaze |
| FTFC | **CVF** | FTFC |

**FIGURE 1**
Simplified pathway of the abducens nerve from its origin in the pons to the lateral rectus muscle. Green star indicates the approximate location of the patient's meningioma. Created with BioRender.com

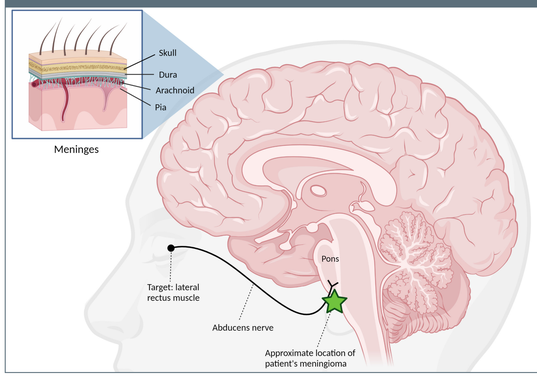



**FIGURE 2**
Patient's extraocular motility testing displayed in **A)** right, **B)** primary, and **C)** left gazes. Abduction deficit and temporal scleral show of the left eye can be seen.

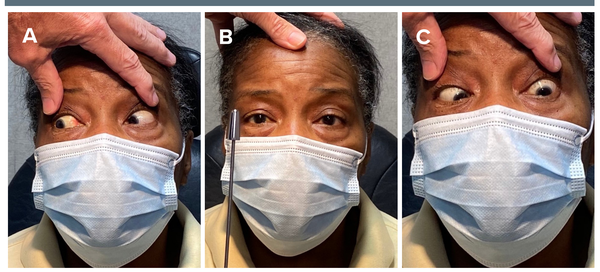



**FIGURE 3**
QR Code link to a video of the patient's extraocular motility testing in right and left gazes. Abduction deficit and slowed glissade of the left eye in left gaze can be seen.

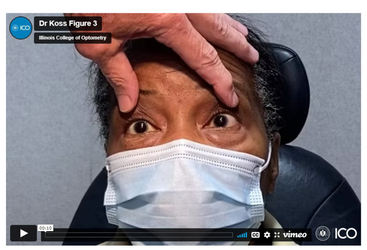
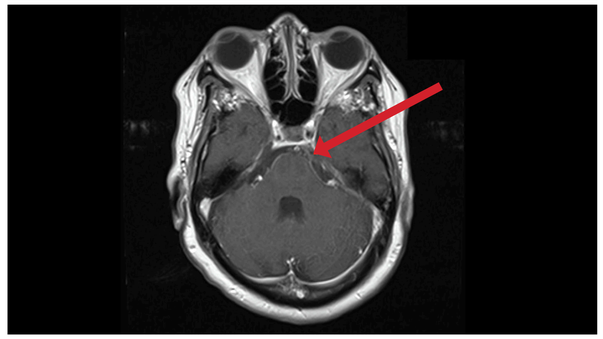



**FIGURE 4**
Axial T1-weighted post-contrast magnetic resonance image depicting a partially mineralized meningioma in the left half of the prepontine cistern.



### Additional Testing

o MRI of brain and orbits with contrast: reveals partially mineralized meningioma in the left half of the prepontine cistern, which was undetectable on previous imaging due to small size and subtle nature of lesion

o Erythrocyte sedimentation rate and C-reactive protein: within normal limits for patient's age and gender

## DISCUSSION

The abducens nerve has the second longest intracranial course of all the cranial nerves. Damage or disruption to the abducens nerve anywhere along its intracranial course can cause a palsy. When affected, the abducens nerve is unable to stimulate the lateral rectus muscle, leading to an overaction of the medial rectus muscle and subsequent esodeviation. The diplopia is usually greater at distance and with head turn towards the affected side. The majority of abducens nerve palsies occur secondary to microvascular ischemia and should self-resolve within 3-6 months. If the palsy does not resolve, other etiologies, such as a compressive lesion, should be considered.

In this case, the slowly progressive onset of her symptoms and condition suggested a compressive etiology, but the initial neuroimaging was unremarkable. When the palsy persisted past the natural course for a microvascular ischemic etiology, repeat neuroimaging revealed the small, slow-growing meningioma in the prepontine cistern. Meningiomas are tumors that arise from the meninges, and the vast majority are benign, slow-growing, and do not warrant treatment. Risk factors for a meningioma include obesity, female hormones, previous radiation therapy, and neurofibromatosis type 2. Surgical removal may be recommended, depending on the size, location, and rate of growth, but observation only is usually preferred.

## MANAGEMENT

Treatment of abducens nerve palsies is based on the underlying cause uncovered by the workup. In this case, the patient's meningioma is small, slow-growing, and her diplopia has resolved, so no surgical removal was warranted. The patient is currently being monitored in six-month intervals by optometry and as directed by her primary care provider. For persistent, stable deviations, an occlusion patch, prism, and/or surgery may be considered.

## CONCLUSION

Abducens nerve palsies can have a variety of etiologies, ranging from microvascular ischemia to neoplasms. Prompt diagnosis, imaging, and serology are essential to preventing both acute and chronic complications. Although vasculopathic etiologies are the most common causes, palsies that have not resolved in approximately six months warrant additional or repeat imaging to rule out other intracranial abnormalities or space-occupying lesions. Although a patient's symptoms may resolve, their condition may persist, warranting continued evaluation and management.

## REFERENCES

Available upon request

## CONTACT

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