

CLINICAL VIGNETTE

Postoperative Pupil Dilation – Scopolamine Induced Anisocoria

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Introduction

Postoperative nausea and vomiting (PONV) is a common side effect of anesthesia and leads to decreased patient satisfaction, prolonged hospital stays and increased complications such as aspiration pneumonia.¹ Transdermal scopolamine is commonly used preventive therapy for postoperative nausea and vomiting (PONV). Scopolamine is an anticholinergic agent that acts directly on the vomiting center of the brain.² Onset of action is 4 hours after application and peak effect is at 24 hours. The plasma half-life after removal is about 9.5 hours.³ The transdermal patch has lower systemic anticholinergic side effects (tachycardia, agitation, confusion) compared to oral or intravenous anticholinergics, but they do occur – the most common side effects being blurred vision, dilated pupils and dry mouth.² Though often both pupils will be affected, it is possible to have only one pupil dilated resulting in anisocoria (usually due to touching the patch and then the eye),^{4,7} which raises concern for acute intracranial processes, and can result in unnecessary work up if this medication side effect is not considered.

Presentation

A 37-year-old female with navicular fracture of her right foot, status post multiple orthopedic surgeries, presented for a scheduled surgical revision due to failed arthrodesis. She was seen by the hospitalist consult service on the day of surgery, and was doing well preoperatively without any complaint. On postoperative day one she awakened with a throbbing headache associated with light sensitivity and slight dizziness. There was no pain with eye movement and no blurry or double vision. She denied any history of migraine or other frequent headaches. She also mentioned noting her right pupil was much larger than her left pupil, which was new and had never happened before.

Her vital signs were within normal limits. On exam she had anisocoria, with the right pupil dilated compared to the left with sluggish reaction to light. The difference in pupil size was more apparent with the lights on than in the dark. She had pain with light shining in the right eye, but not the left. Extraocular movements were intact. There was no relative afferent pupillary defect. Visual fields were intact. A scopolamine patch was adherent to skin behind right ear. She had no other neurological deficits, and aside from expected surgical findings on right lower extremity, her exam and labs were unremarkable.

Consideration was given to obtaining radiologic imaging of her head and neck, however given the discovery of the scopolamine patch with its known side effect profile, lack of other neurologic deficits and her overall well appearance, she was monitored without further evaluation. Scopolamine patch was removed, and her room darkened to minimize pain from light exposure. Neurology was consulted and concurred that isolated anisocoria was most likely the result of medication side effect of scopolamine patch. Additional evaluation was not recommended. Her headache resolved and pupil size equalized by the following day.

Discussion

When confronted with a unilaterally dilated pupil in a postoperative patient, it is important to consider possible serious and/or life-threatening etiologies, but medication side effects should also be on the differential. Scopolamine patches are often used, and there are multiple case reports of these inducing anisocoria.

This unobtrusive flesh-colored patch is often applied behind the ear in the preoperative holding area, and can easily be missed by the staff on the floor caring for the patient after the surgery. When considering a systemic medication side effect, it may be expected that both pupils would be involved, but it is possible for only one pupil to be dilated, likely due to patient touching the patch and then rubbing affected eye. Our patient did not have any other focal neurological findings, had no risk factors for acute intracranial hemorrhage, and her procedure had no craniofacial involvement. It was reasonable to remove the suspected offending agent and monitor for improvement. The antimuscarinic reversal agent physostigmine can be used if there are severe side effects from scopolamine patch, but generally removal of the patch and monitoring is all that is required.²

More serious causes of acute onset anisocoria include aneurysms and internal carotid artery dissections. Careful history and exam can help delineate the likelihood of either condition. The first step is determining if the abnormal pupil is the large one or the small one. If the large pupil is the abnormal one, the highest concern is for third nerve palsy from a compressive lesion – a posterior communicating artery aneurysm is the most feared culprit. Accompanying ptosis or abnormal extra-

ocular eye movement should be seen and isolated pupil dilation would be unusual. CTA or MRA of head and neck would establish this diagnosis. If the small pupil is the abnormal one, Horner syndrome must be considered. This is often accompanied by ptosis and anhidrosis. Evaluation includes MRA/MRI of brain, neck and chest. If the patient is having pain, internal carotid dissection is the most feared etiology.⁸ In craniofacial or neurosurgical cases there would be higher concern for direct optic nerve injury.⁴

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