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## CASE REPORT

# Anisocoria secondary to inadvertent contact with scopolamine patch

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## SUMMARY

A unilaterally fixed mydriasis, also known as a 'blown pupil,' is considered an ominous sign concerning for intracranial pathology. Causes of anisocoria can range from benign to immediately life-threatening. When a patient presents with anisocoria, the concern for a fatal diagnosis leads the clinician to obtain numerous tests, many of which may be unnecessary. The authors present a case of a healthy woman in her 30s who presented with an acute unilateral mydriasis likely secondary to inadvertent contact with a scopolamine patch. On examination, she had no other neurological deficits. Further investigation did not reveal any abnormality. In the event of a patient with an isolated mydriasis in an otherwise healthy and conversant patient with no other neurological deficits, it is essential to rule out other causes before pursuing aggressive and unnecessary testing and treatment.

## BACKGROUND

In the era of modern medicine, tissue plasminogen activator (tPA), has made ground-breaking advances in the treatment of acute ischemic stroke. In the suspicion of stroke, time is of the essence for tPA administration, because it is most effective within 3–4.5 hours of the onset of symptoms. However, administration of tPA to ineligible patients can lead to catastrophic consequences, such as increased risk of haemorrhage.<sup>1</sup> Due to the time constraints, healthcare providers may have stroke high on the differential, making it easier to overlook other diagnoses that can mimic a stroke. Therefore, it is essential to form a differential that contains all possible etiologies that may contribute to a presentation that mimics a stroke.

The scopolamine patch, a commonly used medication in the hospital, has been noted to cause mydriasis in patients and healthcare workers.<sup>2</sup> Accidental ocular contamination secondary to scopolamine has been documented in various case reports.<sup>2–8</sup> This patient's symptoms at first appeared worrisome for a stroke which ultimately led to numerous tests and imaging. However, by the end of her hospital stay, it was a detailed history that guided the management of the patient, which ultimately saved the patient from potentially harmful therapy (i.e., tPA).

## CASE PRESENTATION

A healthy 30-year-old female nurse who presented to the emergency department complaining of sudden onset of blurry vision in the right eye. She was noted to have right unilateral mydriasis without any other neurological deficits. The patient had no significant medical history, denied any history of trauma or use of any new medications, aside from her chronic oral contraceptive use. The patient denied any smoking or alcohol consumption. Her family history was unremarkable.

For fear of a stroke in such a young healthy patient, a Code Neuro was immediately called. Clinically relevant differential diagnoses to rule out in this type of presentation included cerebrovascular accident, carotid artery dissection, cerebral aneurysm, multiple sclerosis and drug-induced mydriasis. CT of the head without contrast, CT angiogram of the head and MRI of brain were all obtained and negative for any abnormalities. Ophthalmology was consulted. Patient's consensual response of the left eye was preserved, however, the right eye remained non-reactive to light and dilated at 5.5 mm. However, in a dim/dark room, patient's left eye dilated from 2.7 to 3.1 mm, and the right eye pupil remained unchanged. Extraocular muscles were intact; funduscopic examination was normal and visual acuity was 20/25 in both the right and left eyes. After multiple tests and several interviews, the patient recalled having contact with a patient in the hospital with a scopolamine patch. She insisted that she washed her hand immediately after this activity and did not recall touching the patch. However, despite not having direct contact with the scopolamine patch, the patient could have contacted contaminated bedding and rubbed her eye. Within 2 days of the onset of symptoms, patient's mydriasis improved and no longer complained of blurry vision.

This unique presentation of pharmacologically induced mydriasis emphasises the importance of obtaining a thorough and detailed history to evade expensive, unnecessary testing and misdiagnosis, and highlights the importance of recognising this rare side effect of a commonly used medication. The suspicion for a pharmacological cause should especially be heightened for patients who work in healthcare.

## INVESTIGATIONS

As per protocol for a Code Neuro, a CT of the brain without contrast was done first to rule out



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## Reminder of important clinical lesson

the presence of an ischemic or haemorrhagic stroke. There was no evidence of stroke on CT. MRI of the brain was obtained to rule out possible multiple sclerosis or vascular anomalies. Lastly, a CTA of the head and neck was done to rule out carotid dissection and that was found to be negative as well.

### DIFFERENTIAL DIAGNOSIS

Evaluation of a unilateral mydriasis can be a diagnostic challenge and is considered a neurological emergency. Differential diagnoses include cerebrovascular accident, oculomotor nerve palsy, Adie tonic pupil, previous trauma/eye surgery, cerebral aneurysm, multiple sclerosis, topical/systemic drug-induced mydriasis or exposure to plant toxins.<sup>2 9–11</sup> Through the patient's history, physical examination and thorough investigation, these diagnoses were excluded as they would present with other neurological symptoms.

### TREATMENT

The patient did not require any treatment for the condition.

### OUTCOME AND FOLLOW-UP

Following thorough workup, including neurology and ophthalmology consult, the patient was discharged from the emergency department and given appropriate follow-up with both the neurologist and ophthalmologist. The patient's mydriasis and blurry vision improved within 2 days of onset of the symptoms without any need for medical intervention. It has been reported that mydriasis caused by scopolamine or hyoscine normally resolves spontaneously within 24–72 hours.<sup>2 3</sup> However, its effects can last anywhere from 3 days to 2 weeks.<sup>4</sup>

### DISCUSSION

Acute unilateral mydriasis is a neurological emergency and warrants immediate and thorough examination.<sup>2 10</sup> However, it was realised that this patient had been in contact with an individual who had a scopolamine patch. Scopolamine, a belladonna alkaloid, a frequently used medication in the hospital setting, is most commonly used for motion sickness, prevention of postoperative nausea/vomiting, vertigo, dizziness and drooling,<sup>2 4 5</sup> acts as a competitive antagonist to acetylcholine, which blocks muscarinic receptors of the sphincter pupillae in the iris, resulting in mydriasis.<sup>6</sup> Several cases of pharmacological mydriasis have been documented in previous literature. It usually occurs when there is hand-to-eye contact in individuals who have contact with such agents, for example, as a scopolamine patch for motion sickness, administration of eye drops for a family member with ophthalmic disease or exposure to plants that have anticholinergic properties.<sup>2 9</sup> Other anticholinergic agents such as nebulised ipratropium have also been reported to cause mydriasis due to inadvertent contamination.<sup>9</sup> Due to the association of life-threatening, intracranial pathology is associated with a fixed, mydriatic pupil; it is important to differentiate between pharmacologically mediated anisocoria and pathological anisocoria.<sup>4 10</sup>

Pharmacological anisocoria can be distinguished from neurogenic pupillary dilation using the 1% pilocarpine test in both eyes. In the absence of trauma to the eye, if the dilated pupil fails to constrict within 30 min, is proof of pharmacological blockage of the iris muscle. Neurogenic dilation of the pupil due to oculomotor nerve palsy, for example, does not directly affect the cholinergic receptor of the sphincter pupillae, and will constrict if pilocarpine is instilled into the affected eye.<sup>4</sup> Other causes of decreased response to pilocarpine would include trauma or increased intraocular pressure.<sup>8</sup>

There are several case reports of inadvertent pharmacological mydriasis due to scopolamine (hyoscine).<sup>2–8</sup> Many of these cases, an MRI or CT scan were obtained to investigate the cause of the anisocoria, however in only one case, imaging was cancelled as the patient recalled coming into contact with a scopolamine patch. A similar case report discussed a 46-year-old female nurse who worked in a stroke ward who also presented with sudden onset unilateral mydriasis. With further history, she recalled applying a hyoscine (scopolamine) patch to a patient in the morning.<sup>2</sup> Another case report revealed a 42-year-old male with progressive blurred vision who had initially denied any topical eye medications, but later remembered that he used atropine 1% which believed were lubricant eye drops.<sup>7</sup> Glassner and Skiendzielewski, also described inadvertent ocular contamination of scopolamine patches in air medical personnel.<sup>6</sup> A 28-year-old male with blurry vision and unilateral mydriasis had been wearing a scopolamine patch to prevent motion sickness but inadvertently caused contamination to his eye.<sup>6</sup> Aside from scopolamine, there have also been cases of inadvertent contact with anticholinergic agents that also lead to anisocoria. Examples include ipratropium use in critically ill patients and deadly nightshade (*Atropa belladonna*).<sup>9 12</sup>

As seen in this case and previously documented cases, unilateral mydriasis in the absence of any focal neurological deficits should lead the differential away from stroke and tPA administration and towards pharmacological causes, which resolve spontaneously without medical intervention.<sup>2 10</sup> Healthcare workers and providers should be aware of accidental ocular contamination with these anticholinergic agents in isolated mydriasis. This case exemplifies thorough history taking is still essential to avoid unnecessary investigation, patient anxiety and potentially harmful therapy.<sup>1</sup>

### Learning points

- It is important to recognise neurological symptoms that mimic a stroke before considering administering tPA.
- Healthcare providers should be aware of accidental ocular contamination with scopolamine and other anticholinergic agents in cases of unilateral mydriasis.
- Obtaining a detailed and targeted history is still essential to prevent costly investigations, unnecessary radiation to the patient and potentially harmful therapy.

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