Lesson of the week

Misdiagnosis of angle closure glaucoma

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Angle closure glaucoma is a sight threatening ophthalmic emergency. Patients classically present with an acutely painful red eye and periocular headache, loss of vision, nausea, and vomiting, but sometimes the presentation is less dramatic or more systemic than ocular. The diagnosis may be missed in such cases, leading to unnecessary investigations, delayed treatment, and blindness. We describe three cases of angle closure glaucoma in which initial diagnostic uncertainty led to a delay in treatment and which highlight the need for a wider awareness of this condition.

Case reports

Case 1

A 66 year old woman was admitted to the orthopaedic ward for elective spinal canal decompression for spinal stenosis. She was otherwise healthy and was taking oral diclofenac, morphine, and amitriptyline.

During the operation, she was placed prone for spinal laminectomy. Postoperatively, she received regular opiate analgesia. On the third postoperative day the patient developed severe headache, photophobia, and neck stiffness without focal neurological deficit. An urgent computed tomography scan of the head was normal.

On the fourth postoperative day she complained of visual loss, a red eye was noted, and an ophthalmology referral was made. Her visual acuity was counting fingers for both eyes. Slit lamp examination was hampered by her immobility, but both eyes were red with cloudy corneas; shallow anterior chambers; fixed, mid-dilated pupils; and high intraocular pressures of 45 mm Hg in the right eye and 33 mm Hg in the left eye (normal <21 mm Hg). A diagnosis of bilateral angle closure glaucoma was made.

She was treated immediately with the standard medical regimen (using eye drops to constrict the pupil and systemic acetazolamide to lower the intraocular pressure). Her amitriptyline was stopped, as it was a potential precipitating factor. Her response to medical treatment was partial, and, as she had coexistent cataracts, bilateral lens extraction, lens implantation, and surgical peripheral iridotomies were done. The anterior chambers deepened immediately, and the intraocular pressures normalised postoperatively.

Two months later, intraocular pressures were normal without treatment. The best corrected Snellen visual acuity was only 6/12 in either eye, with bilateral

Fig 1 Glaucomatous optic atrophy (right eye)

visual field constriction and reduced colour vision associated with glaucomatous optic atrophy (fig 1).

Case 2

An 80 year old woman was admitted to the medical ward with sudden onset of severe left periorbital pain, frontal headache, and blurred vision in the left eye. Medical problems included severe deafness and poor spinal mobility. Tests for temporal arteritis and an urgent computed tomography scan of the head were negative. Slit lamp positioning was hindered by her poor mobility, but the findings by a junior ophthalmologist were of left conjunctival injection, shallow anterior chambers, and normal intraocular pressures. She was erroneously diagnosed as having left conjunctivitis, treated with chloramphenicol eye drops, and discharged.

Four months later, this patient was readmitted after a fall and treated on the medical ward for a urinary tract infection. During admission, she complained of left eye pain and headache of four months' duration. The left eye was red, and the left pupil was dilated and slowly reactive. An ophthalmic examination revealed Snellen visual acuity of no perception of light in the left eye and 6/9 in the right eye, left corneal oedema, shallow anterior chambers, and intraocular pressures of 48 mm Hg in the left eye and 12 mm Hg in the right eye. A diagnosis of left angle closure glaucoma was made, and the standard medical regimen was started. The next day, she had right prophylactic laser peripheral

Be suspicious for angle closure glaucoma in patients with headache, blurred vision, or red eye

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iridotomy with difficulty owing to her inability to sit at the slit lamp and two failed attempts before a successful left peripheral iridotomy was possible. The intraocular pressures rapidly normalised, but the vision of the left eye did not recover.

Case 3

A 77 year old woman with depression, hypertension, and previous stroke was admitted to the medical ward with a history of a fall at home and being very withdrawn. She was diagnosed as having hyperglycaemia and sepsis, treated with benzylpenicillin and ciprofloxacin, and given a diet to control her diabetes. Her regular drugs included chlorpromazine, paroxetine, and temazepam. Assessment by the mental health nurse on the fifth day of admission provided a two week history of headache and deterioration of her vision. Referral to ophthalmology was deferred because of diarrhoea while in hospital and no further ocular complaints.

Three weeks after admission, the patient developed a red eye, was diagnosed with conjunctivitis, and was treated with chloramphenicol eye ointment by the ward physicians and referred as a non-urgent case to ophthalmology. Her Snellen visual acuities were severely reduced to 1/40 for the right eye and hand movements for the left eye. The direct pupillary reactions were sluggish, and a left relative afferent pupillary defect was present. Intraocular pressures were in excess of 55 mm Hg, anterior chambers were shallow (fig 2), and gonioscopy showed partially closed angles bilaterally (see fig 3 on bmj.com). She was treated medically for angle closure glaucoma. The intraocular pressures decreased to 23 mm Hg and 14 mm Hg. Five days later, laser peripheral iridotomies were done with difficulty as a result of poor cooperation by the patient. The vision did not improve in either eye.

Discussion

Angle closure glaucoma is a form of glaucoma characterised by a rapid increase in intraocular pressure as a result of sudden obstruction of aqueous humour outflow through the drainage angle in the anterior chamber of the eye. It is more common in elderly people, women, people of far eastern origin, and people with hypermetropia (in whom the eye is smaller and the anterior chamber shallower).

Several classes of drugs, including anticholinergic agents, tricyclic antidepressants, selective serotonin

reuptake inhibitors, and adrenergic agonists, can precipitate angle closure glaucoma through their pupil dilating effect.^{1,2} The anticholinergic effect of amitriptyline (used by patient 1) on the sphincter pupillae could precipitate angle closure glaucoma, although the pupil constricting effect of opiates would be protective. Patient 3 took paroxetine, a selective serotonin reuptake inhibitor, to control depression, and this may have contributed to her angle closure.

The prone positioning was probably the most important triggering factor in patient 1. This forms the basis for the provocative test.³⁻⁵ It causes the lens to shift anteriorly, pushing against the back of the iris and increasing angle narrowing. The positioning, combined with other contributory factors (anatomical predisposition, pharmacological and physiological pupil dilatation), produced the attack of glaucoma in this patient.

In case 1, the initial complaint was non-specific, and the visual loss and red eye were not appreciated by a sedated patient. This led to inappropriate management and computed tomography scanning. In case 2, deafness hindered history taking and combined with coexistent medical conditions to produce an initial misdiagnosis and unnecessary investigations. Both these patients had poor mobility because of spinal problems, and all three patients had communication difficulties that made slit lamp examination and diagnosis difficult. Ophthalmologists have access to portable, hand held equipment that can overcome some of these problems. Patients 1 and 3 had an altered mental state that made them poor historians, even in the face of profound visual loss. The result was irreversible optic disc damage (fig 1) that was probably avoidable.

This report highlights a need for awareness of angle closure glaucoma beyond the ophthalmic community. Diagnosing and treating angle closure glaucoma in elderly patients; immediate post-surgical patients; and patients with communication difficulties, concurrent medical or psychiatric conditions, and limited mobility can be challenging because of limitations in history taking and in ophthalmic examination and treatment, which require adequate positioning and cooperation. Doctors and nurses need to maintain a high index of suspicion for angle closure glaucoma in these patients, especially if red eye, blurred vision, or headache is present.

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Fig 2 Shallow anterior chamber in angle closure

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