Misdiagnosis of Acute Angle Closure Glaucoma


Summary
When acute glaucoma presents in its classical form, the diagnosis is fairly simple to make. However, atypical presentations are not uncommon and the diagnosis can be missed. This inevitably leads to a delay in treatment which can permanently compromise visual function.

We have studied which doctors are most likely to make a misdiagnosis and calculated the resulting delay in treatment. All patients with acute glaucoma attending Whipps Cross eye unit between 1991 and 1994 were identified and their notes obtained. Thirty-eight patients were found to have had a diagnosis of acute closed angle glaucoma. In only 39.5% was the diagnosis correctly made by the referring practitioner and a misdiagnosis resulted in a mean delay of treatment of 5.8 days. General practitioners were the most likely group to have difficulty making the diagnosis, while casualty officers were most likely to make the correct diagnosis.

Because acute glaucoma can present without its typical features, there needs to be a high index of suspicion for this diagnosis. This diagnosis does not require expensive equipment or a high level of training—all our patients had a significant reduction in vision.

Any patient who has a red eye and a subjective or objective reduction in vision should be referred to an ophthalmologist the same day.

Introduction
Acute angle closure glaucoma (or primary closed angle glaucoma or acute glaucoma) occurs in 0.1%-0.2% of the population [1]. It typically presents with a sudden onset of severe ocular pain, nausea and vomiting and a marked reduction in vision in the affected eye. Unfortunately some patients do not have this classical presentation and the diagnosis may then be missed. A delay in the diagnosis can permanently compromise vision.

Method
All patients who attended Whipps Cross Hospital Eye Unit (part of the North East London Eye Partnership) between January 1991 and December 1994 with the diagnosis of primary acute angle closure glaucoma were identified from the casualty book. Their notes were requested and from these we extracted the patient’s age, sex and the initial diagnosis by the referring doctor. We also ascertained the time interval from the patient’s first symptoms to the first treatment given from the time noted on the drug Kardex.

Results
Of the 38 patients identified, 25 were women. The number of patients who were referred to the eye department with the correct diagnosis of acute glaucoma was 15/38 (39.5%), while 23/38 (60.5%) had some other diagnosis. Table I indicates the source of referral of each sub-group.

The average age was 72.9 years (range 49—90); there was no statistically significant difference between the groups with correct or other diagnoses.

The average delay in the treatment (i.e. the time from the onset of symptoms to the initiation of appropriate treatment) of the correctly diagnosed group was 9.9 hours (range 6—14 hours), but in the misdiagnosed group the average delay was 5.8 days (range 2 hours—3 weeks) \( \text{(p = 0.009)} \).

Table II lists the different diagnoses made by the doctors who referred the patients.

Finally, by comparing casualty officers with GPs, we calculated that if a casualty officer made an incorrect diagnosis of acute glaucoma it resulted in an average delay in treatment of 18.2 hours before treatment, while if a GP did not make the correct diagnosis the average delay was 7.7 days \( \text{[p = 0.010]} \).

Discussion
An attack of acute angle closure glaucoma results in a sudden and complete blockage of aqueous outflow. This results in a dramatic rise in the intraocular pressure with subsequent hypoxic cell injury, leading to pain and inflammation in the eye. The increased
pressure renders the iris ischaemic so the pupil becomes fixed and mid-dilated. Corneal endothelial cell function is compromised so that the cornea becomes oedematous and the vision drops. It is important that treatment is instituted as soon as possible or irreversible damage will occur to the optic nerve [2] and if enough corneal endothelial cells are lost, the corneal oedema will not recover. The amount of damage that occurs to the eye, and therefore residual visual disability, is more dependent on the duration of the attack than the degree of pressure elevation [3]. Thus early correct diagnosis is of paramount importance.

Acute glaucoma can present without its typical features. Pain may not be present and patients may only have monocular visual loss [4, 5] (of which there is a long list of differential diagnoses). If pain is present, it may be maximal around rather than in the eye leading to the diagnosis of migraine [6], temporal arteritis or even sub-arachnoid haemorrhage—especially if the patient is vomiting. If the abdominal symptoms predominate, the patient may be admitted to a surgical ward [2]. Demented patients may have an attack without being able to relay the symptoms—in fact the only sign may be a worsening of the confusion [8].

In our study, most patients were incorrectly diagnosed by the doctor who initially saw them. Not surprisingly, this led to a marked delay in treatment being given. The average age in both groups was the same, so it is unlikely that this was a significant factor.

### Table I. Source of referral of study patients

<table>
<thead>
<tr>
<th>Referring practitioner</th>
<th>Correctly diagnosed (n = 15)</th>
<th>Misdiagnosed (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP</td>
<td>4 (27%)</td>
<td>15 (65%)</td>
</tr>
<tr>
<td>Casualty officer</td>
<td>9 (60%)</td>
<td>5 (22%)</td>
</tr>
<tr>
<td>Optometrist</td>
<td>1 (7%)</td>
<td>—</td>
</tr>
<tr>
<td>Hospital physicians</td>
<td>1 (7%)</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>General surgeons</td>
<td>—</td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Psychiatrists</td>
<td>—</td>
<td>1 (4%)</td>
</tr>
</tbody>
</table>

Table I indicates that most misdiagnoses were from GPs (65%), while most correct diagnoses were from casualty officers (60%). There may be many reasons for this, but it possibly reflects the different circumstances in which the patients are examined. In the Accident and Emergency department, the examining doctor is likely to have a correctly placed and illuminated Snellen chart available and be able to get an accurate assessment of visual acuity in an elderly patient. The same applies to the optometrist. A GP, in contrast, is quite likely to have been called to the patient’s house and testing the vision there may be very difficult—as it may be on a medical or surgical ward. There have been doubts about the reliability of visual acuity testing in the GP's surgery [9].

Comparing casualty officers with GPs showed that even when the casualty officer made a misdiagnosis the delay to the initiation of treatment was much less. The reason for this is probably the ease of getting an ophthalmologist's opinion while the patient is in the building, even if the doctor feels that the patient may have a relatively minor eye problem.

Although the patients in our study had various symptoms, all had two signs that were consistent—a red eye and reduction in vision in the affected eye. Even on direct questioning, many binocular patients do not notice a reduction of vision in one eye, so formal testing of the visual acuity should always be attempted.

In summary, acute closed angle glaucoma is an ocular emergency and prompt diagnosis can save the vision. When it presents in its classical form it is relatively easy to diagnose, but when the symptoms are not so clear-cut it is essential to make as accurate an assessment as possible of the vision in each eye. Once marked reduction in vision occurs in a patient with a red eye, prompt referral is essential.

## Practice Points

- The presentation of acute angle closure glaucoma may be atypical.
- The diagnosis may be missed or delayed
- General practitioners are most likely to misdiagnose glaucoma, casualty doctors are most likely to make the correct diagnosis.
- The longer the duration of acute glaucoma, the greater the degree of residual disability.
- Consider acute glaucoma in all patients with a red eye and reduced vision.
References


Authors’ addresses

D. Siriwardena, A. K. Arora, S. G. Fraser*, C. Clauoué
Whipps Cross Hospital, London E11 1NR
H. K. McClelland
Wanstead, London E11

*Address correspondence to Mr S. G. Fraser, Glaxo Department of Ophthalmic Epidemiology, Moorfields Eye Hospital, City Road, London EC1V 2PD

Received in revised form 3 June 1996