CASE REPORT

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Acute angle closure glaucoma: Management in acute attack setting

Krisnhaliani Wetarini, * Ni Made Ratih Purnama Dewi, 1 Ni Made Widya Mahayani 2

ABSTRACT

Introduction: Acute angle closure glaucoma is an emergency ophthalmic condition that occurs due to a sudden closure of the angle in the anterior chamber of the eye, causing an abrupt intraocular pressure (IOP) increase. The purpose of writing this case is to present clinical findings in acute glaucoma and the initial managements taken in reducing IOP.

Case: A 45-year-old gentleman presented with 24-hour history of sudden severe left-sided headache associated with reduced vision on his left eye. Examination on the left eye revealed mixed conjunctival and ciliary injection, with visual acuity of 4/60 and raised intraocular pressure with the value of 40.2 on Schiotz tonometry. The anterior chamber was shallow, cornea was edematous, pupil was mid-dilated with diameter of 4 mm and unresponsive to light, iris crypt unclear, and hazed lens. The contralateral eye had a deep anterior chamber with normal pressure and a clear lens. He was treated initially by oral acetazolamide 250 mg two times a day, oral analgesic, a topical beta blocker 0.5% two times a day, and a topical steroid six times a day.

Conclusion: A prompt and appropriate management in cases of acute glaucoma can prevent further complications and permanent blindness.

Keywords: acute glaucoma, angle closure, intraocular pressure


INTRODUCTION

Acute angle closure glaucoma (ACG) is an urgent but uncommon dramatic symptomatic event in the eye, that occurs due to a sudden appositional blockage of the trabecular meshwork by the iris via papillary block mechanism. 1 This condition may cause the iris to be pushed or protruded forward causing aqueous humors outflow to be blocked, so that the intraocular pressure (IOP) increase abruptly.1,2 Acute glaucoma usually presents with a sudden reduction in vision and other severe acute symptoms, such as aching in the eye and surrounding area, halos around lights, nausea and vomiting.1,3

Acute glaucoma patients are often misdiagnosed due to systemic complaints that are more dominant such as headache, nausea and vomiting.3 Angle-closure glaucoma affects a total of 20 million people worldwide.2,4 The number is estimated to increase to 23 million in 2020 and 32 million in 2040.3 It is also known as one of the leading cause of irreversible blindness around the world, which is presented by 3.9 million people in 2010.5 The highest rates of ACG are reported in Inuit and Asian populations.1,6 In Indonesia, the prevalence of glaucoma was 4.6 per 1.000 populations in 2007.5 Acute ACG is a true ophthalmic emergency that requires a prompt and appropriate management in order to obtain a favorable prognosis. We report a case of acute ACG without complications. The purpose of writing this case is to present clinical findings in acute glaucoma and the importance of initial managements taken in reducing IOP.

CASE REPORT

A 45-year-old gentleman presented to ophthalmologist with a history of sudden severe unilateral headache on the left side. Pain was associated with blurry vision with red eye and retrobulbar pain 24 hours prior examination. Pain was described as constant and shooting, as nine on a scale of one to ten. Based on the history obtained, this was the first-time patient experienced the following symptoms. No complaints of itchy eyes, discharge, or trauma. There was no history of using topical or systemic eye medications. Patient had not taken any medication. Patient had no history of ocular or systemic diseases. No family members were reported to have similar complaint.

From vital sign examination, general condition appeared to be in pain, consciousness was compo mentis, blood pressure was 150/90 mmHg, pulse rate was regular with frequency of 64 times per minutes, respiratory rate was 18 times per minute, axial temperature was 36.8°C. Ophthalmological examination on the left eye revealed that there was mixed conjunctival and ciliary injection, visual acuity of 4/60 and hardening of the left orbit on...
palpation with IOP of 40.2 on Schiotz tonometry. The anterior chamber was shallow, cornea was edematous, pupil was mid-dilated with diameter of 4 mm and unresponsive to light, iris crypt unclear, lens was hazy. The contralateral eye had a deep anterior chamber with normal pressure and a clear lens. On general examination, no abnormalities were found.

Based on the history and examination, patient was diagnosed with acute angle closure primary glaucoma. Patients were given oral acetazolamide 250 mg two times a day, oral analgesic, a topical beta blocker 0.5% two times a day, and a topical steroid six times a day. The next five days, after administration of initial therapy, patient was re-evaluated. Based on patient's complaint, pain was getting less-severe, result of left eye visual acuity was 5/60 and 6/20 with pin hole, IOP on Schiotz's tonometry was 27.2 mmHg. Previous treatment then continued and patient was planned to undergo an operative intervention in the form of iridectomy, once the acute attack resolved.

DISCUSSION

Acute ACG or primary closed angle glaucoma is an ophthalmic condition that is characterized by the elevation of intraocular pressure due to appositional or synechial closure of anterior chamber angle of the eye.\(^1\)\(^,\)\(^2\)\(^,\)\(^5\) Several risk factors have been implicated to be related in the presence of ACG, such as family history, old age (above 50-year-old), and female gender.\(^5\) Symptoms that may arise include severe headache or pain around the affected eye, blurred vision, halos around lights, eye redness, nausea and vomiting that occur abruptly.\(^1\)\(^,\)\(^5\)\(^,\)\(^7\) In this case, a man of 45-year-old presented with complaints that were found to be in accordance with the clinical manifestation of acute ACG. Rapid and progressive headache, eye soreness, reduction in vision, and eye hyperemia are the symptoms that occur in all cases.\(^1\)\(^,\)\(^5\)\(^,\)\(^8\) Nevertheless, some unusual findings were found, as there were no risk factors found in patient that may causing the attack, including that the patient were male in gender and tend to have younger age than the common onset of ACG attack.

Ophthalmology examination findings that may need further consideration for ACG include impaired visual acuity, refractive status, pupil size and reactivity, presence of eye inflammation, appearance of corneal edema, shallow anterior chamber depth, iris abnormalities, lens changes, vascular indications of neovascularization, and elevation of intraocular pressure.\(^5\)\(^,\)\(^8\) In this case, result of significant ophthalmological findings related to ACG were found on the left eye. There was also typical opacity of the lens found in acute glaucoma, which is known as the Vogt cataract lens.\(^7\) Further investigation, such as gonioscopy was ideally needed to be done in order to assess the depth of the anterior chamber segment.\(^5\) However, in this case it could not be done due to the limitation of resource in acute setting and the presence of the hazy and edematous conditions of the cornea. Ophthalmoscopy examinations for the evaluation of optic-disk abnormalities may not be advisable in acute glaucoma, but if it is deemed essential, findings such as optical disc edema and hyperemia are commonly shown on the evaluation.\(^5\) After remission of acute attacks, the finding will show a pale-color optic disc or having glaucomatous cupping.\(^8\)

The diagnosis of acute glaucoma was established from complete history and physical findings from the patient. In this case, the history and clinical manifestation presented clearly lead to symptoms and signs of acute glaucoma. In addition, the absence of systemic causes, recent use of drugs, or primary eye condition that may initiated acute attack, leading to the diagnosis of primary closed angle glaucoma.\(^5\)

In the setting of acute attack glaucoma, the management of therapy aims to reverse or prevent the angle closure process, reduce and stabilize IOP, and prevent damage of the optic nerve.\(^5\)\(^,\)\(^7\) Surgery is indicated to reduce IOP drastically. However, it is known to result in quite number of complications, such as development of posterior synechiae, hyphema, iritis, and the development of ocular dysphotopsias.\(^5\) Therefore, antiglaucoma drug administration is the most recommended type of therapy.\(^3\) Operative intervention in the form of iridotomy, iridectomy, or peripheral laser
iridoplasty may be done further as the IOP gets controlled and the acute attack resolved.\(^5,7,9\)

In this case, the choice of medications therapy given was oral acetazolamide 250 mg two times a day, oral analgesic, a topical beta blocker 0.5% two times a day, and a topical steroid six times a day. The principle of therapy for acute glaucoma is maintaining the patient’s visual function by reducing IOP. Evaluation of IOP is needed to achieve the desired IOP target (10-21 mmHg) and to determine the combinations of drugs used. The choice of therapy is in accordance with the treatment of acute glaucoma which usually involves a combination of 2-4 different function drugs to obtain the goal therapy as soon as possible.\(^3\)

The choice of systemic therapy in reducing IOP of the patient was acetazolamide. Acetazolamide is the most common and appropriate carbonic anhydrase inhibitor that is used in the emergency treatment of acute glaucoma.\(^2,5\) This drug blocks carbonic anhydrase enzyme reversibly to the ciliary body so that it suppresses the production of aqueous humor. It is available in oral with general dose of 125-250 mg 2-4 times a day or 500 mg intravenous preparation.\(^4\) In this case, patient was given the oral preparation because there were no nausea and vomiting as gastric complications. When given orally, peak concentrations in the plasma are obtained in 2 hours, last 4-6 hours and decrease rapidly due to excretion in the urine.\(^3,7\)

Several studies revealed recommendation of strong miotic agent, such as pilocarpine as the first-line drug for treating ACG.\(^2,7\) The drug works to contract the pupillary sphincter, pulling the peripheral iris away from the trabecular meshwork and therefore reopening the drainage angle.\(^2\) However, in some other references, it had been stated that the drug is ineffective for the attacks that occurred for more than 1-2 hours.\(^10,11\) Thus, in this case the usage of pilocarpine as IOP lowering agent was dismissed.

Other topical antiglaucoma agent that is often used in clinical practice is beta-adrenergic antagonist, alpha2-adrenergic agonist, and prostaglandin analogs.\(^7\) It had been stated that beta-blockers and prostaglandin analogs are recommended as first choice because of their outstanding IOP-lowering effects and favorable tolerability.\(^8\) Timolol maleate is a beta-adrenergic antagonist (beta blocker) drug that has the main therapeutic effect to reduce the production of aqueous humor by blocking beta-2 receptors in the ciliary process. Timolol can work directly on the ciliary epithelium to block the active or ultrafiltration transport. The recommended dosage for 0.5% timolol eye drop is 1 drop twice a day with therapeutic effect for more than 7 hours.\(^1\) Beta blockers are estimated to reduce the IOP by 26% to 27% from the baseline.\(^3\)

Other topical drug that is used in the case was steroid. For acute attack cases, it has been stated that topical steroids are also important that can control the inflammation of the anterior segment, restrain the formation of peripheral anterior synechia, and protect the structure and function of angle drainage.\(^2,7\) Acute attacks in closed angle primary glaucoma must be addressed immediately to minimize damage to the trabecula, optic nerve and lens and prevent posterior synechiae and anterior peripheral synechiae.\(^5,7\) If IOP is successfully reduced, iridotomy combined with iridectomy together as definitive therapy is preferred to be done immediately to prevent recurrent acute attacks.\(^9\) Sometimes IOP drugs cannot be lowered, so peripheral iridectomy is difficult due to edema of the corneal epithelium. In this situation, one alternative to reduce IOP is to do iridoplasty (peripheral iridoplasty, gonioplasty) before laser iridectomy can be performed.\(^5,7,9\)

**CONCLUSION**

A careful clinical approach plays a major role in establishing effective diagnosis and selection of therapeutical management, especially in acute attack setting. Management of acute angle closure glaucoma requires the provision of initial therapy with prompt and appropriate choices, so that complications of blindness can be prevented.

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**CONFLICT OF INTEREST**

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**AUTHOR CONTRIBUTION**

All of authors are equally contributed to the study from the study framework, data gathering, data analysis, until reporting the result of study.
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