



ACUTE ANGLE CLOSURE CRISIS WITH IMMATURE SENILE CATARACT: A CASE REPORT

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ABSTRACT

Senile cataract causes lens thickening and anterior displacement, which may narrow the anterior chamber angle and obstruct the aqueous outflow, which is marked by an increase in intraocular pressure. Acute angle closure occurs due to sudden closure of the trabecular meshwork located in the anterior chamber angle, resulting in a rapid rise in intraocular pressure. In Indonesia, glaucoma is one of the leading causes of blindness after cataract. This descriptive case report of a single patient aims to describe the clinical presentation, diagnostic evaluation, and management of acute angle-closure crisis in a patient with senile cataract. A 58-year-old woman presented with a 4-day history of a red right eye, worsening pain, progressive blurred vision, and headache radiating from the eye. She also reported blurred vision with halos for 3 months. The visual acuity OD was light perception and the IOP 52.9 mmHg. She was diagnosed with acute angle-closure OD, primary angle closure OS, and bilateral immature senile cataract. After one week medical therapy, the IOP in the right eye was still 38.6 mmHg. The right-eye IOP decreased to 18 mmHg one week after phacoemulsification combined with goniotomy. Prompt evaluation and management are essential to prevent irreversible glaucomatous optic nerve damage.

Keywords: AACC; PAC; cataract; glaucoma

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INTRODUCTION

Glaucoma is a group of conditions marked by chronic, progressive optic neuropathy that causes typical morphological alterations in the optic nerve head and the retinal nerve fiber layer, resulting in glaucomatous optic disc atrophy and characteristic visual field defects (Salmon, 2024; Sitorus et al., 2017). In Indonesia, glaucoma is a major contributor to blindness after cataract. According to a 2019 report from the Ministry of Health of the Republic of Indonesia, the prevalence of glaucoma was 0.46%, or 4-5 per 1,000 population. In Indonesia, 1.8 million people experience blindness as a complication of glaucoma (Luthfiani Sarah Sophia & Hayati, 2024). Glaucoma is commonly accompanied by elevated intraocular pressure (IOP). Which develops as a consequence of impaired aqueous humor outflow. This may be due to either abnormal drainage through the anterior chamber angle (open-angle glaucoma) or restricted aqueous humor access to the drainage route (angle-closure glaucoma) (Paul Riordan-Eva & Emmet T. Cunningham Jr., 2018).

In angle-closure glaucoma, fluid is unable to drain from the eye because of narrowing of the angle between the cornea and the iris (Hajar et al., 2021). Angle closure is defined as the obstruction of the trabecular meshwork by the peripheral iris, which obstructs the outflow of aqueous humor. Acute primary angle closure (APAC) occurs due to abrupt obstruction of the trabecular meshwork located within the anterior chamber angle, resulting in a sudden rise in intraocular pressure (Chan et al., 2019).

Factors associated with a narrow anterior chamber angle include hyperopia, a thick lens, and Asian ethnicity, with a threefold greater likelihood compared with Caucasians, as well as female sex, which carries a higher risk of APAC than male sex (Nüßle et al., 2021). Around 50% of glaucoma cases globally are attributable to primary angle-closure glaucoma (PACG), which is especially frequent in Asia (Salmon, 2024). Throughout life, the lens fibers multiply continuously. In older individuals, this leads to a thickened, heavier, and opacified lens, which constitutes senile cataract. With aging, the lens becomes thicker and moves anteriorly. This anterior shift of the lens surface causes the anterior chamber to become shallower. These changes in lens dimensions can close the anterior chamber angle, resulting in obstruction of the aqueous outflow pathway, which is marked by an increase in intraocular pressure (Luthfiani Sarah Sophia & Hayati, 2024).

The clinical manifestations of glaucoma are usually insidious and may become apparent only in the late stages of the disease (Allen, 2019). Symptoms that commonly occur in glaucoma include severe eye pain, blurred vision followed by the perception of colored halos around lights, red eye, and nausea or even vomiting (Yosafat et al., 2026). The goal of glaucoma therapy is to stabilize and reduce damage to ocular structure and function (Ramadani et al., 2023). Phacoemulsification is the main option in acute glaucoma. Patients who undergo phacoemulsification have a lower risk of blindness in the affected eye, elevated intraocular pressure, or the need for further medical treatment (Mohamed A. Anbar et al., 2023). This case report describes the clinical presentation, diagnostic evaluation, and management of acute angle-closure crisis to emphasize the importance of early detection in preventing glaucoma-related blindness.

METHOD

This descriptive case report describes the clinical presentation, diagnostic evaluation, and management of a single patient with acute angle-closure crisis who presented to the Ophthalmology Outpatient Clinic of Cilegon General Hospital in September 2026. Data were collected from patient interviews, including demographic characteristics, presenting symptoms, medical and ophthalmologic history, and duration of symptoms. Clinical data were obtained through physical and comprehensive ophthalmologic examinations, including visual acuity assessment, intraocular pressure measurement, anterior segment examination, and funduscopy. Supporting investigation results and treatment information were obtained from the patient's medical records. The data were analyzed descriptively and presented narratively in chronological order. No statistical analysis was performed because this is a single-patient case report. The findings were subsequently discussed in light of current clinical guidelines and published literature.

RESULT

Case Illustration

A 58-year-old female patient presented to the Ophthalmology Outpatient Clinic of Cilegon General Hospital with a red right eye for 4 days prior to admission. The complaint was accompanied by sudden-onset pain in the right eye. The pain caused the vision of the right eye to become progressively blurrier, and was subsequently followed by a right-sided headache radiating from the eye. The pain was intermittent and worsened on exposure to glare. The patient's current pain score was 6 out of 10. The pain was relieved by rest and by occasional use of over-the-counter headache medication purchased by the patient at a local shop; however, the symptoms recurred. The patient also complained of nausea when the headache persisted for a prolonged period. There was no vomiting.

For 3 months prior to admission, the patient had complained of blurred and hazy vision in the right eye. This complaint was continuous and gradually worsened. The patient also frequently saw colored halos around lights, particularly at night. In addition, the patient had difficulty reading in overly bright light because of glare. Watery eyes, eye discharge, and double vision were denied. No prior ocular trauma was reported. The patient had never sought treatment for these complaints. The

patient had only self-medicated with headache relievers, and the symptoms did not resolve completely.



Figure 1. Clinical photograph of both eyes



Figure 2. Slit-lamp images of the patient's right eye



Figure 3. Slit-lamp images of the patient's left eye

On clinical examination, the patient appeared to be in good general condition with a *compos mentis* level of consciousness (E4V5M6). Vital signs showed an SpO₂ of 99% on room air, blood pressure of 121/81 mmHg, heart rate of 90 beats/minute, respiratory rate of 22 breaths/minute, and body temperature of 36.5°C. The general status examination, including the head, neck, thorax, abdomen, and extremities, was within normal limits.

Ophthalmologic examination of the right eye (*oculus dextra*, OD) revealed a visual acuity (VOD) of light perception (LP) positive, with blepharospasm, mixed injection of the bulbar conjunctiva, corneal edema, iris pigment, anterior chamber depth of Van Herick grade 1, flare difficult to assess, a round, central, mid-dilated pupil with a diminished light reflex, lens opacity, and positive *glaukomflecken*. Funduscopy showed a round optic disc with well-defined margins, an estimated cup-disc ratio (CDR) of 0.6–0.7, and a tigroid retina. Examination of the left eye (*oculus sinistra*, OS) revealed a visual acuity (VOS) of 20/50, with a quiet eyelid and bulbar conjunctiva, a clear cornea, anterior chamber depth of Van Herick grade 1, no cells or flare, a round, central pupil with a positive light reflex, and lens opacity. Funduscopy showed a round optic disc with well-defined margins, a CDR of 0.4–0.5, and a positive macular reflex. Intraocular pressure measured by non-contact tonometry was 52.9 mmHg in the OD and 17.9 mmHg in the OS.

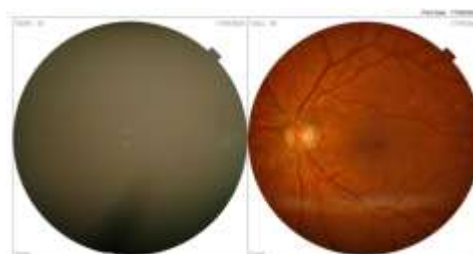


Figure 4. Results of fundus photography

On fundus photography, the OD could not be assessed due to opacity of the refractive media (corneal edema and cataract), whereas the OS showed a satisfactory appearance of the optic disc and retinal vessels.

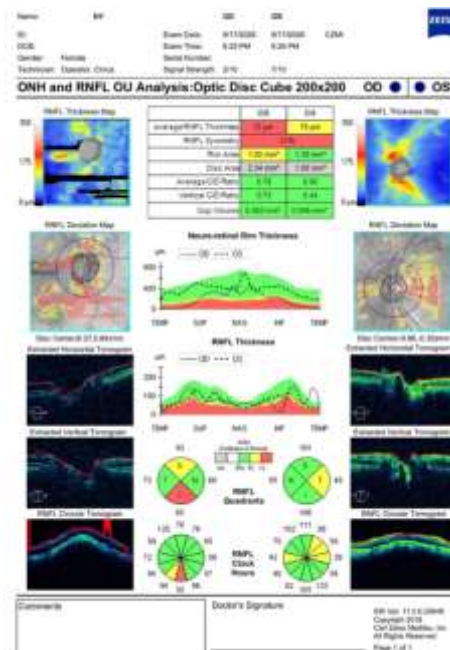


Figure 5. Results of optical coherence tomography (OCT)

OCT RNFL examination showed an average thickness of 72 µm in the OD and 78 µm in the OS, both below normal values, indicating thinning of the retinal nerve fiber layer in both eyes due to elevated intraocular pressure. The average CDR was 0.75 in the OD and 0.50 in the OS.

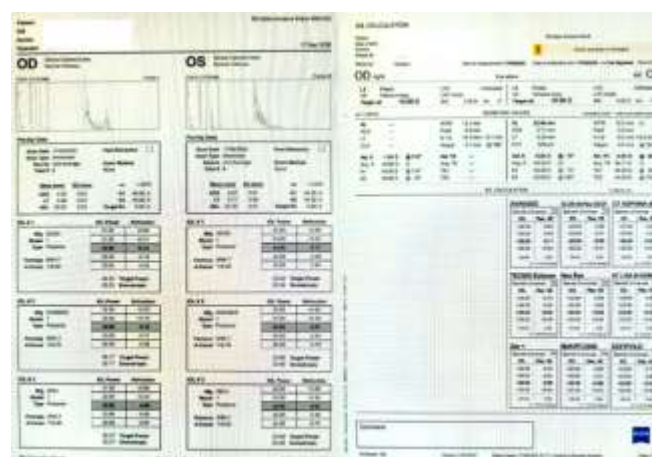


Figure 6. Results of ocular biometry and intraocular lens (IOL) power calculation

The patient was scheduled for phacoemulsification with intraocular lens implantation. Therefore, ocular biometry and appropriate IOL power calculation were performed to measure the dimensions of both eyes. The biometric data of the OD showed an axial length (AL) of 22.52 mm; anterior chamber depth (ACD) of 4.32 mm; lens thickness (LT) of 3.09 mm; and K1/K2 (corneal curvature) of 44.50 D/45.00 D; the lens showed an immature cataract and the vitreous was normal. The biometric data of the OS showed an AL of 22.36 mm; ACD of 2.87 mm; LT of 5.17 mm; and K1/K2 of 44.25 D/44.50 D; the lens showed an immature cataract and the vitreous was normal. On the basis of the history, physical examination, and supporting investigations, the diagnoses established were acute angle-closure crisis in the OD, primary angle-closure with differential diagnosis primary angle-closure glaucoma in the OS, and immature senile cataract bilaterally.

As initial management, the patient was given medical therapy to alleviate the acute symptoms. The patient received Glauseta (acetazolamide) 250 mg tablets orally three times daily, timolol maleate 0.5% eye drops, one drop twice daily in the right eye, and KSR (potassium chloride) 600 mg tablets

orally once daily. At the one-week follow-up, the IOP in the right eye had decreased from 52.9 mmHg to 38.6 mmHg. Because the IOP in the right eye remained markedly elevated despite medical therapy, the patient underwent phacoemulsification with IOL implantation combined with goniotomy in the right eye. One week after surgery, the IOP in the right eye was 18 mmHg and VOD was 6/21. Slit-lamp examination of the right eye showed a clear cornea, an anterior chamber depth of Van Herick grade IV, no cells or flare, a mid-dilated pupil with no light reflex, and the IOL in place. Funduscopy showed a cup-disc ratio of 0.3-0.4.

DISCUSSION

The clinical findings in this patient are consistent with acute angle-closure crisis (AACC) which was characterized by markedly elevated IOP (OD 52.9 mmHg; OS 17.9 mmHg), edema of the cornea, mixed injection (conjunctiva and ciliary), a mid-dilated pupil, and glaukomflecken. The patient also had the pain in the eye, headache, blurred vision with halos, and sometimes nausea. If it's untreated, this condition may cause irreversible vision loss or even blindness, so early recognition and prompt IOP-lowering treatment are essential. The guideline recommends gonioscopy of both eyes for diagnosis, but this patient had corneal edema so the visualization of the angle may be obscured (Gedde et al., 2026).

Sudden closure of the anterior chamber angle with obstruction of the trabecular meshwork is the usual trigger of acute primary angle closure (APAC), and it is responsible for the abrupt increase in intraocular pressure. In APAC, excessive pupillary block occurs, which disrupts the natural flow of aqueous humor into the anterior chamber (Chan et al., 2019). Factors associated with a narrow anterior chamber angle include hyperopia. In addition, the risk of a shallow anterior chamber angle is known to increase with a thick lens. Demographic factors include ethnicity, advanced age, and female sex. In some reports, individuals of Asian ethnicity are three times more likely to be affected than Caucasians. Women have a higher risk of APAC than men (Nüßle et al., 2021).

The clinical manifestations of glaucoma are usually insidious and may become apparent only in the late stages of the disease. Visual field defects are characterized by scotomas of various forms and constriction of the peripheral visual field. In the early asymptomatic stage, special examinations are required (visual field, optical coherence tomography (OCT), and nervus opticus photography) (Allen, 2019). Symptoms that commonly occur in glaucoma include severe eye pain, blurred vision followed by the perception of colored halos around lights, red eye, and nausea or even vomiting (Yosafat et al., 2026).

Refractive status needs to be considered, particularly in elderly patients and in patients with hyperopic eyes. Pupillary examination is needed to find out the size and shape of the pupil (which probably mid-dilated, asymmetrical, or oval), as well as the presence of a relative afferent pupillary defect (RAPD), which may show asymmetrical damage of nervus opticus (Gedde et al., 2026). The gold standard procedure for determining the condition of the angle is gonioscopy (Christine, 2025). Using the slit lamp, the Van Herick method estimates angle width non-invasively by grading anterior chamber depth (Riva et al., 2020). Slit-lamp examination may reveal vascular congestion of the conjunctiva and episclera, inflammation within the anterior chamber, corneal edema, diffuse or focal iris atrophy, posterior synechiae, abnormal pupillary function, and a mid-dilated pupil, as well as lens changes, including cataract, a more anteriorly positioned lens, and glaukomflecken (focal anterior subcapsular opacities) (Gedde et al., 2026). Primary angle closure is considered "acute" when there is decreased visual acuity (usually 6/60 to hand movement), very high IOP (50–80 mmHg), conjunctival injection, epithelial edema of the cornea, reduced anterior chamber depth, and a mid-dilated pupil (Salmon, 2024).

Phacomorphic glaucoma was considered in the differential diagnosis because the right eye presented with cataract and an acute pressure rise. It is an acute secondary angle-closure glaucoma

precipitated by an intumescent lens, in which age-related lens growth loosens zonular support and allows the lens to move forward, increasing iridolenticular contact and promoting pupillary block. Its presentation resembles acute primary angle closure, with a shallow anterior chamber and a mid-dilated pupil, but a dense white cataract is usually evident (Salmon, 2024). Several findings in this patient favored a primary mechanism. Biometry showed a short axial length in both eyes (22.52 mm in the OD and 22.36 mm in the OS), indicating a shared anatomical predisposition, which is more typical of primary angle closure than of a unilateral lens-induced process (Salmon, 2024). The left eye also had a narrow angle (Van Herick grade 1), a shallow anterior chamber (2.87 mm), and a thick lens (5.17 mm), whereas the fellow eye in phacomorphic glaucoma may instead show a deep anterior chamber and an open angle (Salmon, 2024). Nevertheless, lens thickening is likely to have contributed to angle crowding, particularly in the left eye, and the two mechanisms may coexist (Sun et al., 2017). This uncertainty does not alter management, as cataract extraction is the definitive treatment in both conditions once the IOP has been controlled and the eye is quiet (Mohamed A. Anbar et al., 2023).

The goal of glaucoma therapy is to stabilize and reduce damage to ocular structure and function (Ramadani et al., 2023). The patient was given glauseta (acetazolamide) 250 mg tablets and timolol maleate eye drops to lower the very high intraocular pressure of the right eye (>50 mmHg). Because APAC is acute in nature, patients with acute or subacute glaucoma must be given intraocular pressure-lowering therapy immediately. Initial management begins by administration of the carbonic anhydrase (CA) inhibitor acetazolamide 500 mg intravenously if IOP is >50 mmHg and orally if IOP is <50 mmHg (Li et al., 2025). CA is an enzyme that actively secretes bicarbonate ions into the anterior chamber. Acetazolamide can lower IOP by up to 35% (Li et al., 2025). A single dose of apraclonidine 0.5-1%, timolol 0.5%, and prednisolone 1% is instilled in the affected eye, with an interval of 3–5 minutes between drugs (Salmon, 2024). KSR (potassium chloride, sustained release), a potassium supplement, was given as prophylaxis against the complication of hypokalemia from acetazolamide administration (Ramadani et al., 2023). Beta blockers lower IOP by reducing aqueous humor production through a decrease in cAMP levels. Prostaglandin analogs (PGAs) are useful for increasing uveoscleral outflow therefore PGAs can lower IOP by approximately 30% (Li et al., 2025). Based on research, combination antiglaucoma therapy with latanoprost (PGAs) and the beta blocker timolol is more effective than monotherapy in lowering intraocular pressure (Annisa et al., 2025). Analgesics and antiemetics may be required as symptomatic therapy. After the attack has been controlled, laser iridotomy may be considered (Salmon, 2024).

Although the IOP in the right eye decreased by approximately 27% after one week of medical therapy, it remained markedly elevated (38.6 mmHg). This partial response may be because the acetazolamide dose was lower than recommended and given orally, no other eye drops were added, and the angle was still closed because no iridotomy had been done. This underscores that medical therapy alone is often insufficient in acute angle closure and supports early definitive intervention, such as lens extraction, once feasible.

In this patient, thickening of the lens due to cataract was a contributing factor for angle closure and elevated IOP. Phacoemulsification with intraocular lens implantation was therefore planned for both eyes, including the left eye, which had a narrow anterior chamber angle (Van Herick grade 1), cataract, and thinning of the retinal nerve fiber layer (RNFL). This plan is consistent with previous studies showing that phacoemulsification is highly effective as definitive management of acute angle-closure glaucoma once the IOP has been controlled and corneal edema has resolved (Mohamed A. Anbar et al., 2023). In addition, preventive phacoemulsification in eyes with hyperopia and a thickened lens at risk of an acute attack enhanced anterior chamber depth and angle dimensions 2-3 days after surgery, and these results remained stable for 4-5 years (Sorokin et al., 2022). Because the IOP in the right eye remained high despite medical therapy (38.6 mmHg), the

patient underwent phacoemulsification with IOL implantation combined with goniotomy. Goniotomy lowers IOP by incising the trabecular meshwork and the inner wall of Schlemm's canal, restoring aqueous humor drainage (Xie et al., 2026). In patients with primary angle-closure glaucoma and cataract, combining phacoemulsification, goniosynechialysis, and goniotomy has been reported to reduce IOP and the need for glaucoma medication with an acceptable safety profile (Firdaus et al., 2026). Consistent with this, the IOP in this patient fell to 18 mmHg one week after surgery, with a clear cornea and a deep anterior chamber (Van Herick grade 4). When medical therapy alone fails to control IOP in acute angle closure with coexisting cataract, early lens extraction combined with angle surgery may be a useful option.

Long-term outcomes of acute primary angle closure appear to be favorable with current management. In a retrospective cohort of 146 East Asian patients with APAC followed for at least one year, 6.2% became blind, and 76.0% had a final decimal visual acuity of 0.5 or better (Jeong et al., 2024). Cataract surgery was performed in 64.4% of the patients, at a median of 4 months after the attack (Jeong et al., 2024). In this patient, the visual acuity of the right eye improved from light perception to 6/21 one week after surgery. This is below the final visual acuity of 0.5 or better achieved by most patient in that cohort (Jeong et al., 2024), but the cohort was followed for at least one year, whereas the patient was only one week. Long-term monitoring of visual acuity, IOP, and the optic nerve is therefore needed.

CONCLUSION

This case emphasizes how important it is to recognize acute angle-closure features early in patients complaining a painful red eye, blurred vision, halos, and headache, blurred vision, halos, and headache, and of examining the fellow eye, which may also have a narrow angle. Prompt IOP-lowering therapy is essential to limit irreversible optic nerve damage. In this patient, medical therapy alone was insufficient, and the IOP in the right eye fell to 18 mmHg one week after phacoemulsification combined with goniotomy.

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