Visual Outcomes of Phacomorphic Glaucoma in Filipino Adults: A Single-Center Retrospective Review

Maria Krystella D. Guevara, MD, Raquel Joaquin-Quino, MD, MHPEd and Nilo Vincent D.G. FlorCruz, MD

Department of Ophthalmology and Visual Sciences, College of Medicine and Philippine General Hospital, University of the Philippines Manila

ABSTRACT

Background. Cataracts remain the leading cause of preventable blindness in the Philippines, affecting over one million Filipinos. Delayed surgical intervention leads to complicated cases, including phacomorphic glaucoma, a lens-induced glaucoma characterized by angle closure and pupillary block from a mature cataractous lens. Unlike the reversible visual impairment of cataracts, phacomorphic glaucoma causes irreversible optic nerve damage. While uncommon in developed countries, phacomorphic glaucoma persists in settings with limited healthcare access.

Objective. This study aimed to evaluate the clinical presentation, surgical management, and visual outcomes of patients with phacomorphic glaucoma at a tertiary referral center in the Philippines.

Methods. A retrospective chart review was conducted at the Department of Ophthalmology and Visual Sciences, University of the Philippines-Philippine General Hospital, identifying adult patients diagnosed with phacomorphic glaucoma from January 2018 to December 2022. Inclusion criteria comprised patients presenting with decreased vision or eye pain, elevated intraocular pressure, mature cataracts, and secondary angle closure who completed at least three months of follow-up. Patients with trauma-related lens subluxation, iridodialysis, or angle recession were excluded. Data collected included presenting symptoms and duration, ophthalmologic examination findings, preoperative biometry, surgical interventions, complications, and postoperative outcomes. Visual acuity was converted to log MAR, and cataracts were classified using the Lens Opacities Classification System III criteria. Descriptive statistics and correlational analyses were performed.

Results. Thirty (30) patients met the inclusion criteria. The majority were female (70%) and aged 60 years or older (80%), with a mean age of 65 years. Painless blurring of vision was the predominant presenting symptom (60%), with a prolonged delay to consult, with a mean of 11.4 months. Patients with painless blurring of vision demonstrated significantly longer delays (mean 15.5 months) compared to those with eye pain (mean 4.2 months). At presentation, mean visual acuity was 2.6 log MAR (hand movement), and mean intraocular pressure was 45.8 mmHg. All affected eyes had mature cataracts, with 56.7% presenting as total white cataracts and 73.3% with shallow anterior chambers. Surgical interventions included phacoemulsification with intraocular lens implantation (40%), combined phacoemulsification-trabeculectomy (20%), phacoemulsification with gonio-synechiolysis (10%), phacoemulsification with vitrectomy (13.3%), and other procedures (16.7%). Complications included prolonged corneal edema (20%), corneal decompensation (10%), aphakia (13.3%), and vitreous loss (10%). At three months postoperatively, 86.7% achieved intraocular pressure ≤21 mmHg and 90% were medication-free. However, while 40% achieved visual acuity better than 0.3 log MAR, 30% still had visual acuity ≥1 log MAR. Structural damage from glaucoma was evident in 73.3% of patients.

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Corresponding author: Raquel Joaquin-Quino, MD, MHPEd
Department of Ophthalmology and Visual Sciences
Philippine General Hospital
University of the Philippines Manila
Taft Avenue, Ermita, Manila 1000, Philippines
Email: rmjoaquinquino@up.edu.ph
ORCiD: https://orcid.org/0009-0007-6129-884X

Conclusion. Phacomorphic glaucoma in the Filipino population frequently presents as chronic, painless blurring of vision, leading to prolonged delays in seeking care. While surgical intervention effectively controls intraocular pressure, a significant proportion of patients sustain irreversible structural and functional damage. These findings underscore the urgent need for improved public awareness regarding cataract-related complications and enhanced access to timely ophthalmic care to prevent permanent visual impairment.

Keywords: phacomorphic glaucoma, glaucoma, cataract

INTRODUCTION

The Philippine National Survey of Blindness and Eye Disease Study Project 2018 showed that cataracts remain the leading cause of preventable blindness in the Philippines. Cataracts were revealed to have a prevalence of 1.06%, affecting more than 1.112 million Filipinos in the year 2017, with an estimated 333,639 Filipinos in need of cataract surgery.[1] These numbers continue to reflect the suboptimal access to healthcare in the archipelago.

With delays in consultation and surgical intervention, we continue to see more complicated cataract cases, and that includes the development of phacomorphic glaucoma. Phacomorphic glaucoma is one of the types of lens-induced glaucoma that is associated with angle closure and pupillary block precipitated by the mass effect of the cataractous lens. This may be a gradual process along with the maturation of cataracts; however, in some cases this may occur rapidly. While the nature of blindness in cataracts is reversible, development of phacomorphic glaucoma causes irreversible structural damage to the optic nerve that may then lead to permanent visual impairment.

The incidence of phacomorphic glaucoma may not be as significant in developed parts of the world; however, the Philippines is one of the countries that continues to see more of these cases. A 2005 paper reviewing the profile of glaucoma cases at the same tertiary hospital as this study showed that 5.9% of cases from 2000-2002 were phacomorphic glaucoma.[2]

Phacomorphic glaucoma presents with eye pain, blurring of vision, evidence of mature cataracts on slit-lamp examination, along with elevated intraocular pressure (IOP). A swollen or dense thickened lens and anterior chamber reaction differentiate a phacomorphic process from plain primary angle-closure glaucoma. In practice, however, distinguishing them is not always straightforward.

Phacomorphic glaucoma is managed by cataract extraction with or without laser iridotomy and is usually the definitive treatment for patients caught early enough in the disease process. However, as was shown in a 1983 study by Jain et. al, patients would consult as late as 3 months from the time of presentation, and complications during the cataract surgery were not uncommon, thereby affecting the visual prognosis of patients with phacomorphic glaucoma.[3]

Given the persistence of phacomorphic glaucoma cases in the Philippines, it is of value to determine the impact of this disease in terms of the visual impairment it causes for our patients. This study aims to characterize the clinical presentation of phacomorphic glaucoma, identify the challenges encountered in its management, evaluate long-term visual outcomes, and assess the associated healthcare burden, including additional surgical interventions and anti-glaucoma medications required. These findings may contribute to efforts aimed at raising awareness about the complications of delayed cataract consultation and treatment, ultimately achieving an impact on both health education initiatives and policies geared towards achieving Universal Health Care (UHC) in the country.

METHODS

A retrospective chart review of surgical procedures performed at the Department of Ophthalmology and Visual Sciences from January 2018 to December 2022 was conducted to identify adult patients diagnosed with phacomorphic glaucoma. Clinical charts of identified patients were subsequently reviewed. Patients who presented with decreased vision or eye pain, elevated intraocular pressure, mature cataracts, and secondary angle closure consistent with a diagnosis of phacomorphic glaucoma were included in the study. Charts were further reviewed to identify patients who completed at least three months of follow-up. Patients with presentations inconsistent with the above clinical criteria for phacomorphic glaucoma were excluded. A history of trauma with associated lens subluxation or other trauma-related glaucoma (iridodialysis and angle recession) also warranted exclusion.

Charts of identified phacomorphic glaucoma patients with at least three months of follow-up were reviewed in detail. The following data were recorded: presenting symptoms, duration of symptoms prior to consultation, and presenting ophthalmologic examination findings including visual acuity, intraocular pressure, and slit-lamp examination findings. Pre-operative biometry parameters including axial length, lens thickness, and anterior chamber depth were documented. Subsequent medical and surgical interventions, as well as any management complications, were recorded. Post-operative examination findings at one and three months were collected, including visual acuity, intraocular pressure, cup-to-disc ratio, and requirement for additional anti-glaucoma medications. Results of perimetry and optical coherence tomography of the optic nerve head (OCT-ONH), when available, were also recorded.

For standardization, cataracts were classified using the Lens Opacities Classification System III (LOCS III), specifically nuclear opalescence grading, with NO3 designated as the threshold for a mature cataract.[4] Anterior

chamber depth was assessed using Van Herick's method, with shallow anterior chambers defined as those with a ratio of ≤1:1/4 between corneal slit image and anterior chamber depth, interpreted as indicative of likely angle closure.[5]

Visual acuity, initially recorded in feet, was converted to logarithm of the minimum angle of resolution (logMAR). Hand movement, light perception, and no light perception were converted to their logMAR equivalents.[6]

Descriptive statistics were used to analyze the data. Percentages were calculated for categorical variables, while measures of central tendency were computed for numerical data. Stratified analyses were performed for patients with intraoperative and post-operative complications, such as vitreous loss and persistent corneal edema, to differentiate visual outcomes attributable to phacomorphic glaucoma from those associated with these confounding factors. Correlational statistics were employed to explore the relationship between the following factors and visual outcome: time to consultation, presenting intraocular pressure, and biometry values for lens thickness and anterior chamber depth.

RESULTS

Sixty-four (64) patients were identified based on the operating room census to have a diagnosis of phacomorphic glaucoma. Of these, 57 had charts available for review. Further review of presentation and diagnosis of these patients showed 46 had a diagnosis of phacomorphic glaucoma, while 11 had other diagnoses such as primary angle closure glaucoma, primary angle closure, and phacolytic glaucoma. Thirty (30) of these 46 patients were able to complete at least 3 months of follow-up and were deemed for inclusion in the study.

Eighty percent (80%) of the patients were aged 60 and above, with a mean age at presentation of 65. The majority of the patients (70%) were female (Table 1).

The majority of patients came in with blurring of vision (60%), while the remaining presented with eye pain. Symptom duration ranged from 3 days to 10 years, with a mean of 11.4 months. Patients with eye pain tended to have shorter delay from presentation to consult (Table 2).

Almost all the patients presented with a vision of 1logMAR (20/200) or worse, with the mean being 2.6 logMAR, translating to hand motion. Mean presenting IOP for affected eyes was 45.8 mmHg compared to the mean of 15.8 mmHg for the fellow eyes.

Affected eyes either had a total white cataract (56.7%) or a cataract with mature nucleus, with a grading of NO3 or denser (43.3%). Fellow eyes, in comparison, had less dense cataracts. Shallow anterior chamber was noted in 73.3% of patients based on slit-lamp examination as recorded in the charts using the Van Herick technique for screening. The findings based on screening pointed towards narrowing and closure of the angles, while bedewing was seen in almost a quarter of the patients. No anterior chamber reaction was documented. Five (5) patients (16.7%) had shallow anterior chambers as well in the fellow eye, and no bedewing was recorded (Table 3). The majority of patients who came for initial consult had no anti-glaucoma medications at 70% (Table 4).

Review of biometries showed fewer glaring differences between the affected and fellow eyes. Axial length mean was 23.31 mm and 23.03 mm for the affected and fellow eye, respectively. Recorded anterior chamber depth was deeper in affected eyes at 4.18mm compared to the 2.89mm in fellow eyes. Fellow eyes had thicker lenses on record, with a mean of 4.37 mm, compared to the 3.47mm in affected eyes (Table 5).

Medical management was insufficient in managing these cases, with more than 70% of patients receiving more than three anti-glaucoma medications. A variety of surgical interventions were done to address the cause of elevated IOP within the three month follow-up period. Forty percent of patients underwent phacoemulsification with intraocular lens implantation, with an additional 10% having goniosynechiolysis as well. Twenty percent underwent a combined phacoemulsification trabeculectomy procedure. The rest underwent extracapsular cataract extraction with

Table 1. Patient Characteristics

	No. of Patients (%)
Age at Consult (years)	
41-50	3 (10%)
51-60	3 (10%)
61-70	17 (56.7%)
71-80	5 (16.7 %)
>80	2 (6.7 %)
Range 45-85 years old, Mean 65 years old	
Sex	
Male	9 (30%)
Female	21 (70%)

Table 2. Presenting Symptom and Duration

	Number of Patients (%)		
Presenting Symptom			
Blurring of vision (BOV)		18 (60%)	
Eye pain		12 (40%)	
	All Patients	**BOV**	**Eye Pain**
Duration of Symptoms			
0-14 days	8 (26.%)	1 (3.3%)	7 (23.3%)
2-4 weeks	2 (6.7%)	0	2 (6.7%)
1-3 months	5 (16.7%)	4 (13.3%)	1 (3.3%)
>3 months	15 (50%)	13 (43.3%)	2 (6.7%)
Range	3 days to 10 years	2 weeks to 10 years	3 days to 3 years
Mean	11.4 months	15.5 months	4.2 months

Table 3. Physical Examination on Initial Consult

	Number of Patients (%)	
	Affected Eye	Fellow Eye
Visual Acuity		
≥1 logMAR	28 (93.3%)	4 (13.3%)
1 logMAR > VA ≥0.7 logMAR	2 (6.7%)	1 (3.3%)
0.7 logMAR > VA ≥0.3 logMAR	0	7 (23.3%)
<0.3 logMAR	0	18 (60%)
Range	0.7-3.7 logMAR	0.7-2.7 logMAR
Mean	2.6 logMAR	0.48 logMAR
Intraocular Pressure		
≤21	2 (6.7%)	27 (90%)
22-30	2 (6.7%)	1 (3.3%)
31-40	8 (26.7%)	1 (3.3%)
>40	18 (60%)	1 (3.3%)
Range	14-76 mmHg	7-59 mmHg
Mean	45.8 mmHg	15.8 mmHg
Cataract Grading		
Total White Cataract	17 (56.7%)	2 (6.7%)
≥NO3	13 (43.3%)	13 (43.4%)
<NO3	0	14 (46.7%)
Pseudophakic	0	1 (3.3%)
Slit-lamp examination findings		
Shallow anterior chamber	22 (73.3%)	5 (16.7%)
Anterior chamber reaction	0	0
Bedewing	7 (23.3%)	0

Table 4. Medications at Initial Presentation

No. of anti-glaucoma medications	No. of Patients (%)
None	22 (73.3%)
1	0
2	2 (6.7%)
≥3	6 (20%)

Table 5. Pre-operative Biometry Characteristics

	Affected Eye	Fellow Eye
Axial Length		
Range	22.02-24.47 mm	22- 24.07 mm
Mean	23.31 mm	23.03 mm
No data	2 patients (6.7%)	2 patients (6.7%)
Anterior Chamber Depth		
Range	2.54- 6.61 mm	2.15-4.09 mm
Mean	4.18 mm	2.89 mm
No data	3 patients (10%)	3 (10%)
Lens Thickness		
Range	1.64-6.23 mm	2.94-5.33 mm
Mean	3.47 mm	4.37 mm
No data	4 patients (13.3%)	4 patients (13.3%)
Pseudophakic	0	1 patient (3.3%)

Table 6. Initial Management

	No. of Patients (%)
Anti-glaucoma medications Initiated	
None	1 (3.3%)
1	1 (3.3%)
2	4 (13.3%)
≥3	22 (73.3%)
No data on medications initiated	2 (6.7%)
Surgical Intervention	
Phacoemulsification with IOL implantation	12 (40%)
Phacoemulsification with goniosynechiolysis	3 (10%)
Phacoemulsification trabeculectomy	6 (20%)
Extracapsular cataract extraction with trabeculectomy	2 (6.7%)
Intracapsular cataract extraction (ICLE)	2 (6.7%)
ICLE with trabeculectomy	1 (3.3%)
Phacoemulsification vitrectomy	4 (13.3%)

Table 7. Complications and Additional Surgical Management

	No. of Patients (%)
Complications	
Aphakia	4 (13.3%)
Prolonged corneal edema (>1 month)	6 (20%)
Corneal decompensation	3 (10%)
Vitreous loss	3 (10%)
Dropped cataract	2 (6.7%)
Zonulysis	1 (3.3%)
Retinal detachment Choroidal detachment Toxic anterior segment syndrome Descemet membrane detachment	
None	14 (46.7%)
Additional Surgical Intervention	
Pars plana vitrectomy	1 (3.3%)
Secondary IOL implantation with anterior vitrectomy	3 (10%)
Trabeculectomy	3 (10%)
Glaucoma drainage device implantation	1 (3.3%)

trabeculectomy (6.7%), intracapsular lens extraction (ICLE) (6.7%), ICLE with trabeculectomy (3.3%), and phacoemulsification with vitrectomy (13.3%) (Table 6).

Complications were not uncommon, with 20% presenting with persistent corneal edema and 10% progressing to corneal decompensation. Aphakia was noted in 13.3%, later requiring additional surgical intervention. Posterior pole complications were also noted: dropped cataract (6.7%), vitreous loss (10%), retinal detachment (3.3%), and choroidal detachment (3.3%). Other complications were zonulysis, toxic anterior segment syndrome and Descemet's membrane detachment.

Several patients required additional surgical procedures such as pars plana vitrectomy for retinal detachment, secondly IOL implantation with vitrectomy, trabeculectomy, and glaucoma drainage device implantation (Table 7).

At 1 month post-operatively, 40% still had visual acuity 1 log MAR or worse in the affected eye. IOP, however, was decreased, with most having IOP of 21 mmHg or less (86.7%), and the mean at 14.43 mmHg. Eighty percent were already off medications at this time. Examination of the optic disc revealed that 66.7% of the patients already had a cup-disc ratio of 0.5 or worse.

Table 8. Post-operative Follow-up Findings

	Number of Patients (%)	
	1 month post-operatively	3 months post-operatively
Visual Acuity		
≥1 logMAR	12 (40%)	9 (30%)
1 logMAR >VA ≥0.7 logMAR	5 (16.7%)	1 (3.3%)
0.7 logMAR >VA ≥0.3 logMAR	6 (20%)	8 (26.7%)
<0.3 logMAR	7 (23.3%)	12 (40%)
Range	0-4.7 logMAR	0-4.7 logMAR
Mean	1.2 logMAR	1.064 logMAR
Intraocular Pressure		
≤21	26 (86.7%)	26 (86.7%)
22-30	2 (6.7%)	3 (10%)
31-40	2 (6.7%)	1 (3.3%)
>40	0	0
Range	4-40 mmHg	2-34 mmHg
Mean	14.43 mmHg	13.13 mmHg
Cup-Disc Ratio		
<0.5	5 (16.7%)	5 (16.7%)
≥0.5	20 (66.7%)	22 (73.3%)
No view	5 (16.7%)	3 (10%)
# of Anti-Glaucoma Mediations		
None	24 (80%)	27 (90%)
1	2 (6.7%)	1 (3.3%)
2	2 (6.7%)	1 (3.3%)
≥3	2 (6.7%)	1 (3.3%)

Post-operative examination after 3 months showed an improvement in visual acuity, with 40% of patients having VA better than 0.3logMAR. 30% of patients still had vision of 1 logMAR or worse. Intraocular pressure control was roughly the same as at 1 month post-op, with the majority of patients (86.7%) having IOP of 21 mmHg or better, and more patients off medications (90%). Disc examination showed more patients with a cup-disc ratio of 0.5 or worse (73.3%) (Table 8).

Separating the patients with corneal and posterior pole complications, mean visual acuity was 2.2-2.25 log MAR. Mean IOP across the three groups was all below 21 mmHg (Table 9).

A further look into the visual acuity of patients according to their time-delay to consult shows the best mean VA if the patient presented 2 weeks or less from initial symptom presentation. While the cup-disc ratio was shown to be increased at 0.59, this group showed the lowest CDR (Table 10).

While two-thirds of the patients did not have additional perimetry or optical coherence tomography of the optic nerve head (OCT ONH), available results for review supported glaucomatous changes in affected eyes. Almost all the patients with perimetry had functional evidence of glaucoma. All patients with OCT ONH showed structural changes of either RNFL thinning or GCL thinning (Table 11).

DISCUSSION

Eighty percent (80%) of patients included in this study were older than 60 years of age, consistent with the disease process involving mature cataracts.[7] Comparable to other studies, there was a female predominance among patients presenting with this condition.[8] Gupta et al. theorized that aside from societal factors, this may be attributed to shorter

Table 9. Comparison of Visual Acuity and IOP

3 months	Corneal Decompensation	Posterior pole complications	Without posterior pole complication and corneal decompensation
Number of patients	3	6	21
Visual Acuity at 3 months	Range 0.54-4.7 logMAR Mean 2.2 logMAR	Range 0.3-4.7 logMAR Mean 2.25 logMAR	Range 0-4.7 logMAR Mean 0.56 logMAR
IOP	Range 10-28 mmHg Mean 16.7 mmHg	Range 2-25 mmHg Mean 11.5 mmHg	Range 8-34 mmHg Mean 14.8 mmHg

Table 10. Sub-analysis of Visual Acuity and Cup-disc Ratio under Symptom Duration

Duration of Symptoms	≥1 logMAR	1 logMAR > VA ≥0.7 logMAR	0.7 logMAR > VA ≥0.3 logMAR	<0.3 logMAR	Mean	<0.5 CDR	≥0.5 CDR	No view	Mean
0-14 days	1	0	3	4	0.5 logMAR	2	5	1	0.59
2-4 weeks	1	0	1	0	2.9 logMAR	0	2	0	0.75
1-3 months	3	0	1	1	2.2 logMAR	0	4	1	0.80
>3 months	4	0	4	7	1.23 logMAR	11	3	1	0.67

Table 11. Diagnostic Examination Findings

	No. of Patients (%)
Perimetry	
With evidence of glaucomatous field defects	10 (33.3%)
No evidence of glaucoma	1 (3.3%)
No data	19 (63.3%)
Optical Coherence Tomography of the Optic Nerve Head	
RNFL Thinning	10 (33.3%)
GCL thinning	7 (23.3%)
Unremarkable OCT	0
No data	20 (66.7%)

axial lengths in females, predisposing them to a crowded anterior chamber, particularly in the presence of a dense cataract.[9]

Delay to consultation was notably prolonged in this study, with a mean of 11.4 months. Similar studies reported much shorter intervals, with most patients presenting within one to two weeks.[7-9] This is a significant finding given that prior studies have demonstrated a correlation between better visual outcomes and shorter time to consultation.[9,10] In our setting, the majority of patients (60%) presented with painless blurring of vision, leading to considerably delayed presentation ranging from two weeks to ten years, with a mean of 15.5 months. Eye pain, observed in 40% of patients, resulted in less delay to consultation, with a range of three days to three years and a mean of 4.2 months. This emphasizes that pain is not a necessary feature of phacomorphic glaucoma and, interestingly, can be beneficial as it prompts patients to seek consultation earlier. Blurring of vision spanning years, despite being painless, remains a health concern that should not be dismissed, as it may indicate progression to irreversible blindness. In addition to the insidious presentation, several other factors contribute to the delay, including limited knowledge and understanding of risks associated with hypermature cataracts and glaucoma, limited access to healthcare, and an inadequate support system.[11]

More than 90% of patients had visual acuity worse than 1 logMAR (20/200) in the affected eye, with a mean of 2.6 logMAR (equivalent to hand movement). However, more than 80% retained good functional vision in the fellow eye, with a mean of 0.48 logMAR, which may have further contributed to the delay in seeking consultation.

Presenting intraocular pressure for the affected eye in this study was notably on the higher side compared to similar studies at 45.8 mmHg.[8,9] At presentation, 73.3% of patients didn't have any medications. The rest had 2-3 anti-glaucoma medications initiated prior to consult at our institution. Despite this, elevated IOPs still persisted for almost all patients, further emphasizing the surgical nature of the management of this condition. Fellow eyes had a better IOP of 15.8 mmHg; however, 3 patients (10%) also presented with elevated IOP and a mature cataract.

Consistent with the pathophysiology of dense mature cataracts causing angle closure, more than half of affected eyes had total white cataracts, the remainder had dense cataracts of at least NO3 grading, and almost three-fourths had shallow anterior chambers. The severity of cataracts is also consistent with the marked delay in time to consultation.

Examination of the fellow eye revealed that 50% already had at least a cataract grading of NO3. A 1983 study by Jain et al. noted bilateral phacomorphic glaucoma in 14% of cases but recommended against prophylactic iridectomy, as attacks were only noted more than ten years later in the fellow eye.[3] This intended prophylaxis was also purported to hasten the progression of cataracts. As such, fellow eyes should be subject to accepted indications for cataract surgery, including significant visual loss, difficulty with activities, and poor contrast and glare sensitivity. If any difference in approach is to be made, emphasis on regular follow-up and timely management of fellow eye cataracts should be prioritized.

As for the three fellow eyes with elevated IOP, the patients were all males aged 63, 54, and 61 years old. While the first two patients had IOP elevation within the 20s (22 and 28 mmHg), the third patient had a markedly increased IOP of 59 mmHg. The cataracts weren't significant for all three (NO1-NO2), but their chambers were slightly shallow (0.5x/3x/0.5x) with iris touch on one periphery for the third patient. These fellow eyes were signed out as primary angle closure. While fellow eyes of phacomorphic glaucoma cases usually have normal anterior chamber depth to differentiate them from primary angle closure glaucoma, the affected eyes were still managed as phacomorphic cases in the setting of asymmetrically dense and intumescent cataracts. One may argue about the semantics of the diagnoses for these patients, but this just emphasizes how intertwined the presentation and management of primary angle closure glaucoma (PACG) and phacomorphic glaucoma are. Shorter axial lengths predispose patients to both PACG and phacomorphic glaucoma.[7] Whereas lens extraction is the definitive treatment for phacomorphic glaucoma, it remains one of the surgical options in PACG alongside filtering procedures.

Review of biometry results demonstrated relatively similar values for the affected and fellow eyes, with means of 23.31 mm and 23.03 mm, respectively. While some studies have identified that an axial length of ≤23 mm increases the risk of phacomorphic glaucoma and therefore should warrant earlier elective cataract extraction, others have found no correlation between axial length and risk for this condition.[7,8,12]

Prior studies have identified shallow anterior chamber as a risk factor for phacomorphic glaucoma, quantified by anterior chamber depth values on biometry.[7] Pre-operative anterior chamber depths as low as 1.3 ± 0.5 mm were recorded, with improvement to 2.3 ± 0.2 mm post-operatively.[7,8] The values for anterior chamber depth and lens thickness in our study were variable, which may be due to the widened range of symptom presentation with a mean of eleven months.

Anterior chambers were recorded to be deeper in affected eyes, inconsistent with slit-lamp examination findings, and lens thickness values were lower in affected eyes. These two parameters have been noted to be unreliable in other studies as well, particularly during an acute attack.[12] The use of an ultrasound type of biometry, which is favored for dense cataracts, rather than the optical type, may have contributed to the findings. This must be considered when interpreting biometry results.

The majority of patients (73.3%) were started on at least three medications. The initial goal of this approach is to reduce intraocular pressure while awaiting definitive treatment. Aqueous suppressants and hyperosmotic agents are usually initiated. In the presence of bedewing, observed in a quarter of patients, glycerin may be applied topically to improve visualization and assessment of the affected eye. Topical prednisolone may also be initiated pre-operatively to control inflammation.

Surgical management was facilitated as soon as possible for these patients. In this study, phacoemulsification was the procedure of choice and was successfully performed in 40% of patients. Phacoemulsification alone has been demonstrated to be effective in the management of phacomorphic glaucoma in both short-term and long-term studies.[12,13] Additional goniosynechiolysis was performed in three patients (10%). This procedure may help further reduce peripheral anterior synechiae and intraocular pressure when performed within six to twelve months from the formation of peripheral anterior synechiae, as irreversible damage to the trabecular meshwork occurs beyond that period.[14]

One-fifth of patients underwent combined phacoemulsification with trabeculectomy. A study comparing outcomes of phacoemulsification alone versus combined phacoemulsification with trabeculectomy revealed similar intraocular pressure control at six months.[15] Visual recovery, however, was noted to be faster and better with phacoemulsification alone, owing to complications that may arise with trabeculectomy, such as hypotony or shallowing of the anterior chamber.

Phacomorphic glaucoma presents as one of the more challenging cataracts that ophthalmologists may encounter due to a combination of factors: denser cataracts, shallow chambers, elevated intraocular pressure leading to corneal compromise, poor dilation from synechiae or ischemia, limited visualization, and risk for intraoperative zonulysis given the difficulty of nuclear dissection. The complex approach to surgical management of this condition is evidenced by the need to perform intracapsular lens extraction and vitrectomy in some patients, along with the variability in surgical techniques. Complications were anticipated, with the most common being prolonged corneal edema (20%). At the end of the three-month follow-up, an additional 10% developed corneal decompensation. These corneal complications were similar to those noted in prior studies.[7] In the setting of an already compromised cornea from elevated intraocular pressure, further compromise from prolonged nuclear dissection requiring increased phacoemulsification energy places these patients at high risk of corneal edema and decompensation. Aphakia was observed in four patients (13.3%), requiring secondary intraocular lens implantation. Posterior segment complications were also noted, including vitreous loss, dropped nucleus, and retinal detachment. Four patients required additional glaucoma surgery.

On follow-up, almost 90% of patients had intraocular pressure less than 21 mmHg and were off medications. While the majority demonstrated improved vision, a significant number of patients still had visual acuity of 1 logMAR or worse at one and three months post-operatively (40% and 30%, respectively). The majority of patients were noted to already have structural changes in the form of an enlarged cup-to-disc ratio, signifying the irreversible impact of this condition on vision. As noted by Moraru et al., the worst functional outcomes occurred in patients presenting at 20 days or later.[7] Lens extraction cleared the visual pathway for the majority of patients; however, glaucomatous changes had already developed, particularly given the prolonged delay to consultation in this study. Additionally, complications such as corneal decompensation and posterior segment pathology also contributed to the poor visual outcomes.

Diagnostic tests were performed for only a third of patients. Almost all patients who underwent diagnostic testing demonstrated either glaucomatous field changes, retinal nerve fiber layer thinning, or macular ganglion cell layer thinning, thus supporting the glaucomatous changes observed in this study.

CONCLUSION

Phacomorphic glaucoma remains a significant threat to vision, particularly in resource-limited settings. While 40% of patients achieved post-operative visual acuity better than 0.3 log MAR (20/40), a substantial proportion (30%) had visual acuity worse than 1 log MAR (20/200). Patients presented with blurring of vision with or without eye pain, and the delay to consultation was notably prolonged, particularly among those with painless visual symptoms. The suboptimal visual outcomes observed can be attributed to the extended delay in seeking care, compounded by the significant complication rates including prolonged corneal edema, corneal decompensation, and vitreous loss. While surgical intervention effectively reduced intraocular pressure in the majority of cases, with most patients achieving controlled IOP and discontinuing anti-glaucoma medications by three months post-operatively, permanent structural changes in the optic nerve indicative of glaucomatous optic neuropathy had already occurred in most patients.

This study underscores that painless progressive blurring of vision should not be dismissed as a benign condition. Prolonged delays in consultation exacerbate structural damage from sustained elevated intraocular pressure and

increase the risk of surgical complications, cumulatively compromising visual prognosis. Concerted efforts are needed to enhance public awareness of this condition and improve access to ophthalmic care for Filipinos.

This study should be interpreted within the context of its limitations. As a retrospective chart review, there was no control over the completeness of data obtained from patient records. Sampling bias is acknowledged, as the study was conducted at a tertiary referral center that may receive more severe cases while also having greater access to surgical interventions compared to other institutions. The limited sample size restricts the generalizability of the findings. Additionally, the study period coincided with the COVID-19 pandemic, during which many health concerns were deprioritized. Future prospective studies utilizing standardized data collection instruments would address variations in data quality. A multi-center study examining visual outcomes in phacomorphic glaucoma would expand the evidence base and provide a more comprehensive understanding of how this condition presents across different clinical settings in the country. A larger sample size would also facilitate the establishment of more robust correlations and support stronger conclusions.

Statement of Authorship

All authors certified fulfillment of ICMJE authorship criteria.

Author Disclosure

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