

# Experience for Glaucoma Patients During the COVID-19 Outbreak

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## Research Article

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# Abstract

*Purpose:* To reviewed our measures and other experiences associated with the treatment of glaucoma patients during the 2019 novel coronavirus disease (COVID-19) outbreak .

*Methods:* Measures consistent with the clinical situation and the type of glaucoma were implemented in each case.

*Results:* Consultation for treatment was provided through a WeChat glaucoma patient group. In our survey, 58.5%patients indicated an increase in negative emotions during the outbreak, and psychological counseling was provided frequently. Difficulties in purchasing eye drops were reported by 79.2% of glaucoma patients, so an online medicine supply system was set up and eyedrops from the pharmacy or hospital pharmacy were mailed to the patients. Phacoemulsification with goniosynechialysis was performed in7acute primary angle-closure glaucomapartients (11eyes) who experienced sustained high IOP(onset time, 12-65d). The IOP decreased significantly after the operation( $t=7.895$   $P<0.01$ ) without showing serious complications or infections. In addition, lectureson glaucoma prevention were promoted online.

*Conclusion:* Effective measures can relieve thepsychological pressure and intraocular symptoms in glaucoma patientsin epidemic outbreak areas.

## 1. Introduction

The 2019 novel coronavirus disease (COVID-19) was first reported in late December and has since quickly spread became a global health threat [1, 2]. As of March 27, 2020, more than 500,000 people were infected, and more than 20,000 people have died of COVID-19. [3]. In China, a total of 81,439 cases have been diagnosed. As of March 28, 2020, including 50,006 cases in Wuhan.[4]. COVID-19 is more likely to affect elder adults with underlying health conditions and may cause serious or even fatal respiratory disease.[5]. The novel coronavirus mainly spreads through the respiratory tract and has been found in fecal and conjunctiva [6-8]. The spread of COVID-19 has slowed down after effective measures were taken to avoid gathering and self-isolate at home. Our ophthalmology department belongs to the central theater general hospital of the Chinese People's Liberation Army that was designated for admission of patients with COVID-19. To minimize cross-infection of COVID-19 among patients in the hospital, ophthalmology clinic services were temporarily stopped at the peak of the outbreak. However, as a result of this decision, the diagnosis and treatment of glaucoma changed dramatically.

Glaucoma is a multifactorial, progressive neurodegenerative optic neuropathy that can develop at a variable rate and affects people of all ages [9].Glaucoma affects about 64.3 million people worldwide. About 10% of patients eventually develop blindness in both eyes, [10.]. which makes glaucoma the leading cause of irreversible blindness in the world. Although some patients with glaucoma in endemic areas experience pain caused by vision loss and high IOP, no previous study has been conducted on this topic. We reviewed the status of glaucoma patients in endemic areas through questionnaire surveys and

evaluated the measures taken. This article aims to share our experiences, which may help ophthalmologists worldwide treat and manage glaucoma patients under these conditions.

## 2. Glaucoma Management During The Outbreak

It is necessary to track basic information, such as IOP measurements and the findings of fundus examinations, for most glaucoma patients. Social media applications like WeChat are powerful tools to maintain communication between medical doctors and their patients. We started a WeChat group with our patients four years ago and use it now for our surveys and other communications. A questionnaire survey was conducted on 53 patients (26 male and 27 females) with glaucoma in the WeChat group by using the "Questionnaire Web" application. The average age of the patients was 48.9 years (SD, 15.3 years), including 26 patients with primary open-angle glaucoma, 20 patients with primary angle-closure glaucoma, 6 patients with secondary glaucoma, and 1 patient with ocular hypertension.

In our survey, the patients' greatest difficulties were inability to follow-up (34 [64.2%] patients), insufficient eye drops (14 [26.4%] patients), and lack of medical guidance (5 [9.4%] patients). Of the 53 glaucoma patients, 42 (79.2%) faced difficulties in buying eye drops. During the two-month epidemic, 48 patients (90.6%) did not check eye drops, and only 2 patients (3.8%) measured IOP using a home tonometer.

## 3. Difficulty Inpurchasing Drugs

While reducing IOP is the only effective method for the treatment of glaucoma, ophthalmic drug treatment will delay the progression of glaucoma. [11]. Many elderly patients need multiple drugs to maintain vision and quality of life. [12]. In our observation, the shortage of drugs during the outbreak was a serious problem for most glaucoma patients. Of the 53 glaucoma patients, 5 (9.4%) received eyedrops from the local community districts. The workers in each community processed a large number of transactions during the outbreak, including the purchase of medicines for patients with chronic diseases, purchase of edible items for residents, and hospitalization assistance for emergency patients. Nine patients (17.0%) bought eye drops online because some pharmacies were still open and did business online. However, these methods did not solve the problems of all patients. Twenty-four patients (45.3%) had to obtain eye drops from the glaucoma specialists in our group. We procured eye drops from the hospital pharmacy and mailed them to the patients' homes. Unfortunately, 2 (3.8%) patients stopped taking eye drops due to the drug shortage.

## 4. Anxiety And Depression

Because the whole city of Wuhan has been locked down since January 23, 2020, multiple aspects of the lives of residents of the city have been affected. A citywide lock down can cause various psychological problems, such as panic disorder, anxiety disorder, and depression. [13]. At the initial stage of the COVID-19 outbreak in China, Wang C observed that more than half of the respondents rated the psychological impact as moderate to severe, and about one-third reported moderate to severe anxiety. [14]. Previous

studies have shown that patients with glaucoma are more anxious or depressed than healthy people. [15]. The prevalence of anxiety and depression in glaucoma patients is, respectively, 22.92% and 16.40% in China, 64% and 30% in Singapore, and 44% and 41.8% in southeastern Nigeria. [16,17,18]. The fear of being blind and worries of financial problems associated with the treatment impose major burdens on the patients, which may result in anxiety and depression. We investigated the psychological conditions and sleep quality of glaucoma patients during the COVID-19 outbreak through a WeChat questionnaire. Of the 53 patients with glaucoma, 31 (58.5%) reported increased negative emotions (anxiety, depression, and indignation) during the outbreak. Thus, 29 (54.7%) patients were concerned about the progression of glaucoma; 10 (18.9%) patients were worried about being infected with COVID-19; while 13 (24.5%) patients were worried about the impact of COVID-19 on life and work.

The subjective sleep quality of glaucoma patients is related to their emotional state. [19]. In our survey, the 39 (73.6%) patients with insomnia included 27 patients with occasional insomnia and 12 (22.6%) people with frequent insomnia. This result is consistent with another analysis in our survey showing 40 (75.5%) cases of early waking (22 [41.5%] occasionally and 18 [34.0%] frequently).

During the period of personal isolation in the COVID-19 epidemic in China, increased social activity could improve sleep quality by reducing anxiety and stress. [20]. Of the 53 glaucoma patients, 44% (83%) chose to stay home by themselves with psychological cues, yoga, walking at home, or other activities such as reading, watching TV, and cooking. Two patients contacted a doctor for guidance. Only 9 (17.0%) patients wanted to communicate with family and friends. This result suggests that glaucoma patients generally have poorer sleep quality and fewer social activities.

According to a research conducted by Skalicky, treatment of glaucoma can reduce anxiety in newly diagnosed glaucoma patients. [21]. We recommend that patients with glaucoma should be offered treatment and psychological counseling online frequently in the form of text, pictures, and videos.

## 5. Emergency Surgery

Acute primary angle-closure glaucoma (APACG) is an ophthalmic emergency characterized by a sudden increase in IOP. Failure to treat it urgently and effectively may result in irreversible blindness. [22]. Our ophthalmology department continued to perform surgeries on emergency patients during the COVID-19 epidemic. From March 2 to 30, 2020, 7 patients with APACG who experienced persistently high IOP were treated, including 1 male and 6 females with an average age of 67.43 years (SD, 9.96 years). The onset time was 12-65 days (average, 35.86 days). Of the 7 APACG patients, 4 (57.1%) showed binocular disease. In 11 eyes, phacoemulsification with goniosynechialysis was performed without serious complications or infection. SPSS 23.0 statistical software was used to analyze the IOP, and a statistical difference was observed between preoperative and postoperative IOP ( $t = 7.895$ ,  $P < 0.01$ ). The postoperative IOP was significantly lower. Only one patient who had high IOP for 65 days required postoperative treatment with eye drops. The length of hospitalization was 2-7 days (average, 4.3 days). The measurements of IOP (with ICARE) are shown in Table 1.

Due to concerns related to the outbreak and inconvenient transportation, failure to treat APACG patients in time resulted in severe delays, poor eyesight, and binocular attacks. Phacoemulsification combined with goniosynechialysis reopened the angle of APACG and significantly reduced the IOP, even inpatients who had high IOP for more than two months. [23,24]. Due to the short hospital stay and fewer complications and reexaminations, it is suitable for treating patients during the COVID-19 epidemic. Meanwhile, YAG laser iridotomy was performed on the preclinical eye. The treatment and operations were carried out under strict preventive measures, which can effectively ensure the safety of medical staff and patients. At the same time, due to protective clothing, goggles, and multi-finger gloves, the operations are more difficult, and the pressure experienced by the surgeon is greater. Fortunately, all operations were successfully performed without serious complications or infection.

## 6. Prevention Of Angle-closure Glaucoma

The incidence of APACG is high among Chinese and Asian patients. Female sex, advanced age, narrow peripheral angles, thick lens, and short axis are known risk factors for APACG. The onset of APACG appears to be related to meteorological factors and upper respiratory tract infections. [25,26]. COVID-19 is an acute respiratory disease showing clinical symptoms such as fever and cough. Elderly people are more vulnerable to the disease, resulting in an elevated risk for APACG. Among our surgical patients, a patient with binocular APACG was diagnosed with COVID-19. PACG is a preventable disease to some extent, and management measures must be taken to protect the anterior chamber angle and maintain its drainage function. Dilated pupils are a common mechanism underlying acute attacks, which usually occur in the dark or in eyes receiving certain medications. PACG is also a typical psychosomatic disease. [27]. Through social media such as WeChat, public accounts, and online courses, knowledge about APACG was disseminated to patients to avoid obvious factors that trigger acute attacks.

## 7. Prevention Of Open-angle Glaucoma

Primary open-angle glaucoma (POAG) is a neurodegenerative disease that is a common cause of blindness worldwide. It is characterized by damage to the optic nerve, leading to loss of peripheral vision. The pathogenesis of POAG is complex and unclear, but glaucoma appears to be associated with bad mood. [28]. Previous studies have confirmed that high levels of anxiety significantly predict an increase in IOP and heart rate, and a reduction in parasympathetic activity may be the underlying mechanism. [29].

The benefits of physical exercise on systemic and eye diseases have been extensively studied, including glaucoma. [30]. During isolation, glaucoma patients were encouraged to perform certain aerobic exercises or yoga, which resulted in a temporary decrease in IOP but showed an inconsistent increase in eye perfusion. In contrast, Tai Chi, Qi Gong, squats and weightlifting were not recommended.

Thus, during the COVID-19 epidemic in Wuhan, some measures were taken to help patients with glaucoma suffering from psychological and ocular system stress. The measures were based on the

prevailing clinical conditions and isolation protocols. We hope that our review of these experiences can help ophthalmologists around the world prepare for similar conditions in their communities

## Declarations

### Conflict of Interest

All the authors do not have any possible conflicts of interest.

### Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

### Informed consent

Informed consent was obtained from all individual participants included in the study.

### Declaration

The authors that they had full access to the data of this study and the authors take complete responsibility for the integrity of the study.

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