



The surge of acute angle-closure glaucoma during the outbreak of Omicron in a tertiary hospital in Shanghai

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Abstract

Background Since December 2022, China has eliminated the compulsory nucleic acid screening, which led to a new pandemic of Omicron. We observed a surge of primary angle-closure glaucoma (PACG) at a largest tertiary hospital in Shanghai. We evaluated the potential relationship between the infection of Omicron and the occurrence of PACG.

Methods In this retrospective cross-sectional study, we identified 41 patients diagnosed with PACG from 523 individuals registered in ophthalmic emergency from December 2022 to January 2023. We compared the proportion of PACG patients in all the patients registered at the ophthalmic emergency department in the corresponding period (December and January) from 2018 to 2023.

Results The proportion of PACG patients rose to 6.74% and 9.13%, nearly a five-fold increase compared to the previous 1.90%. The proportion of PACG patients throughout 2022 also increased in the recent 2 months. All PACG patients in our center from Dec. 21st 2022 to Jan. 27th 2023 had positive nucleic acid tests at their initial visits. The peak of glaucoma came around Dec. 27th 2022, while the peak of the internal medicine emergency came around Jan. 5th 2023.

Conclusions The behavior pattern of the infected people and anxiety mood would induce the PACG attack. Some ophthalmic advice should be added to the Chinese treatment guidelines for COVID-19. Also, a shallow anterior chamber and narrow angle need to be ruled out when necessary. Further studies on larger populations are needed to explore the relationship between PACG and Covid.

Keywords Chinese · COVID-19 · Omicron · Primary angle-closure glaucoma

Key Messages:

What is known

- Asians, especially Chinese descents, have the highest prevalence of primary angle-closure glaucoma (PACG) throughout the world.

What is new

- During the new pandemic of Omicron caused by the full openness policy, a surge of PACG at a tertiary hospital in Shanghai was noted.
- Some ophthalmic advice should be added to the Chinese treatment guidelines for COVID-19 to avoid acute angle-closure glaucoma.

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Asians, especially Chinese descents, have the highest prevalence of primary angle-closure glaucoma (PACG) worldwide [1]. Since Dec. 5th 2022, Shanghai has eliminated the implementation of the health code, followed by

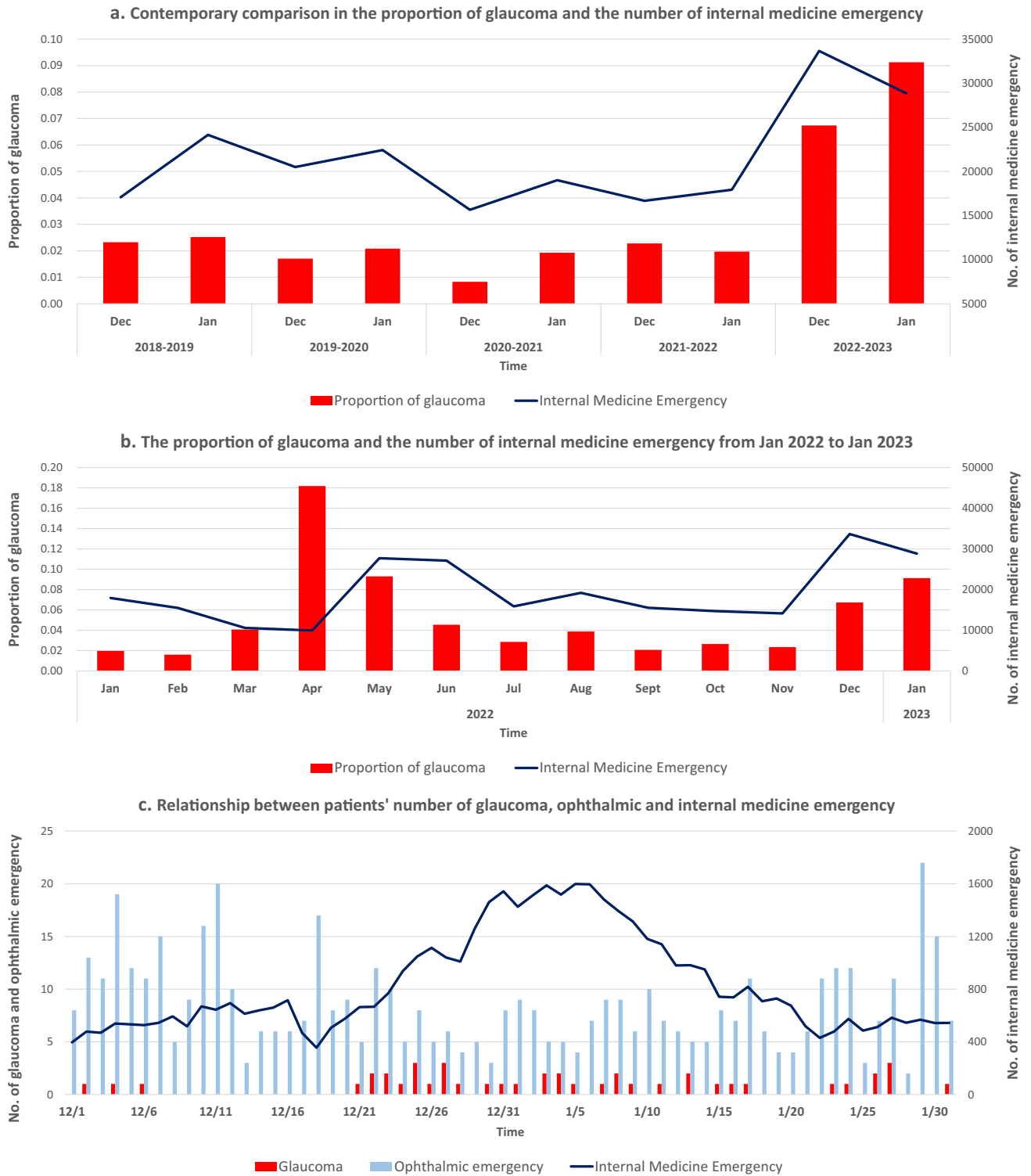


Fig. 1 Surge in acute angle-closure glaucoma during Omicron pandemic in a tertiary hospital in Shanghai. **a** The contemporary comparison in the proportion of acute glaucoma at the ophthalmic emergency and the number of internal medicine emergency from 2018 to 2023. **b** The trend of the proportion of acute glaucoma at

ophthalmic emergency and the number of internal medicine emergency from January 2022 to January 2023. **c** The daily change of the number of acute glaucoma, ophthalmic emergency, and internal medicine emergency from Dec. 1st 2022 to Jan. 31st 2023

the elimination of the compulsory nucleic acid screening throughout China, which led to a new pandemic of Omicron, a variant of the coronavirus disease 2019 (COVID-19). According to the statistical data from the Chinese Center for Disease Control and Prevention, the number of positive nucleic acid tests began to rise and reached a peak (6.94 million) on Dec. 22nd 2022, and then fell gradually. During the new pandemic of Omicron caused by the full openness policy, we observed a surge of PACG at Renji Hospital, the largest tertiary hospital in Pudong District that accounts for 20% (about five million) resident population in Shanghai.

Here, we evaluated the potential relationship between the infection of Omicron and the occurrence of PACG. In this study, we identified 41 patients diagnosed with PACG from 523 individuals registered in ophthalmic emergency from December 2022 to January 2023.

We evaluated the proportion of PACG patients in all the patients registered at the ophthalmic emergency department in the corresponding period (December and January) from 2018 to 2023. We excluded the patients diagnosed with secondary glaucoma, primary open-angle glaucoma, and Posner-Schlossman syndrome. We saw a remarkable rise in PACG in December 2022 and January 2023. (Fig. 1a) The proportion of PACG patients rose to 6.74% and 9.13%, nearly a five-fold increase compared to the previous 1.90%. The proportion of PACG patients throughout 2022 also increased in the recent 2 months. (Fig. 1b) The uncommon surge in April and May of 2022 can be explained by the Shanghai home quarantine policy, which may affect patients' access to the hospitals. Notably, although the patients' number of ophthalmic emergencies showed a 30% decrease in December 2022 and January 2023 (282 and 241, respectively, compared to the previous average of 380 per month), the number of PACG showed a more than two-fold increase (19 and 22 respectively, compared to a previous average of 9 per month). We noticed that all PACG patients in our center from Dec. 21st 2022 to Jan. 27th 2023 had positive nucleic acid tests at their initial visits. The peak of glaucoma came around Dec. 27th 2022, while the peak of the internal medicine emergency came around Jan. 5th 2023 (Fig. 1c). This delay was probably due to the window period before patients developed severe symptoms and came to the internal medicine emergency. It may indicate that glaucoma develops when people are infected rather than after infection. We also found that the median age of these patients was 68, and females were at higher risk of PACG.

The behavior pattern of the infected people, such as long-time rest in dark environment, cold medicine (sedative components) and antihistamines taken [2], the prone position taken by those with pneumonia [3], increased water taken, and anxiety mood will all induce the PACG attack [4]. Hyponatremia caused by COVID-19 and other potential pathological mechanisms of Omicron (since we did not observe such a trend in the previous period of the COVID-19 epidemic) can also contribute to the PACG [5].

Some ophthalmic advice should be added to the Chinese treatment guidelines for COVID-19, including taking water rich in electrolytes but less at each and adding more lights to the living place. Also, a shallow anterior chamber and narrow angle need to be ruled out by slit-lamp examination and gonioscopy, combined with anterior segment optical coherence tomography and ultrasound biomicroscopy when necessary.

Declarations

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the Renji Hospital, Shanghai Jiao Tong University, School of Medicine and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The research committee of Renji Hospital, Shanghai Jiao Tong University, School of Medicine approved the study. No informed consent is needed.

Conflict of interest The authors declare no competing interests.

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