Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Visual Case Discussion

From acute angle-closure to COVID-19 during Omicron outbreak☆

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1. Visual case discussion

A 54-year-old Chinese lady attended the emergency department at 3 AM for acute onset right eye pain since midnight. There were associated right eye blurring of vision, right sided headache radiating from the eye; and nausea, but no vomiting. She denied any trauma or chemical injury, nor application of any eye drops. She was of good past health, and without any past ophthalmic history.

Examination showed right eye ciliary injection (Fig. 1A) with mid dilated non-reactive pupil (Fig. 1). Cornea was mildly haze, but no hypopyon seen. There was no hyphaema (Fig. 1B), and intraocular pressure (IOP) measured was 47 mmHg. The left eye was not injected, with clear cornea and reactive pupil, IOP was 16 mmHg. Slit lamp examination with the van Herick methods suggested both eyes were of narrow angles. Right eye acute primary angle closure (APAC) and left eye primary angle closure suspect (PACS) were diagnosed.

Upon further history taking on the precipitation of APAC, patient volunteered that she had taken cough and cold medications for her recent onset upper respiratory tract symptoms. She visited a general practitioner the night before, and was prescribed with promethazine compound linctus for her cough, chlorpheniramine for her runny nose, and paracetamol. She took the whole set of medications shortly before her sleep, and started to experience right eye pain an hour after. Since COVID-19 was rapidly spreading in the city with the Omicron dominating other variants by that time,[1] attending emergency physician ordered investigation of deep throat saliva with polymerase chain reaction for SARS-CoV-2 RNA. The test came back later to be positive, cycle threshold (Ct) value of 16.04, and recent COVID-19 was diagnosed.

Patient was managed with immediate intravenous acetazolamide 500 mg injection, and topical anti-glaucomatous eye drops including 4% pilocarpine, 0.5% timolol, 1% prednisolone acetate instilled to right eye. Ophthalmologists were consulted, and emergency argon laser peripheral iridoplasty on right eye was done to abort the APAC attack. After IOP was lowered to 19 mmHg, the cornea was clearer, and gonioscopy confirmed Shaffer Grade 0 angle (i.e. very narrow) in all quadrants (Fig. 2). Patient's cough medication was changed to ammonia and ipecacuanha mixture instead.

APAC is defined as narrow angle with markedly raised IOP, whereas PACS is defined as narrow angle with normal IOP, and without glaucomatous changes, such as optic disc rim thinning and visual field defect.[2] PACS patients are at risk of turning into APAC upon pupil dilation because of the shallow anterior chamber triggering the pupil block mechanism.[2] Risk factors for PACS include old age, female, East Asian and hyperopia eyes (short axial length).[2] Other than mydriatic eye drops, antitussive and nasal decongestants are common precipitants to pupil dilation, thus APAC attack. Possible triggers include promethazine compound linctus, diphenhydramine compound linctus, actified syrup

Abbreviations: IOP, intraocular pressure; APAC, acute primary angle closure; PACS, primary angle closure suspect; COVID-19, coronavirus disease 2019; Ct value, cycle threshold value.

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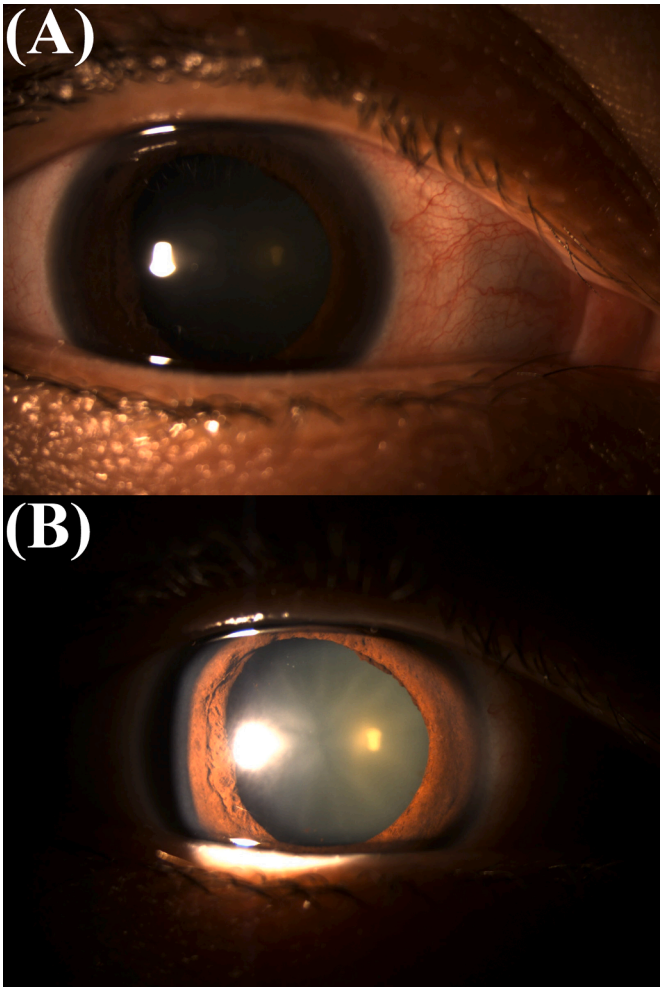

Fig. 1. Clinical photo of the patient's right eye showing (A) ciliary injection and a mid dilated pupil under normal room light; (B) non-reactive mid dilated pupil under bright light illumination over the patient's right eye.

(containing pseudoephedrine and triprolidine), chlorpheniramine, and different types of anti-histamine.[3]

The highly contagious Omicron caused a surge of just mildly ill patients in the community. The widespread use of antitussive and nasal decongesting medications by them were posing a risk to precipitate pupil dilatation, thus APAC amongst the susceptible PACS patients in our predominantly Asian population in Hong Kong.[4] General practitioners, family physicians, emergency doctors, and ophthalmologists should be cautious with adequate personal protection equipment upon attending these APAC cases, to avoid the occupational risk of contracting Omicron infection.[5]

2. Multiple-Choice questions

Q1. Which of the following clinical signs is compatible with acute primary angle closure (APAC)? (a) Normal intraocular pressure (IOP) (b) Low IOP (hypotony) (c) High IOP (d) Miosis (constricted pupil) (e) Shaffer Grade 4 (widely open) angle over 360° on gonioscopy

Answer: (c) High IOP

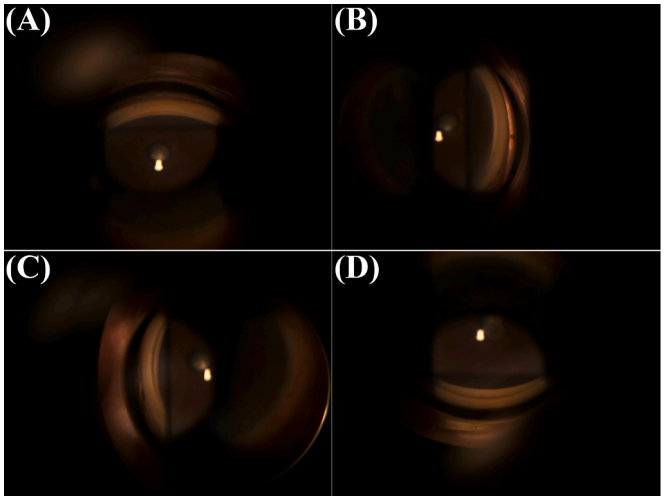

Fig. 2. Gonioscopy showing the (A) inferior, (B) temporal, (C) nasal, and (D) superior quadrant of the right eye angle. Ciliary body, scleral spur, trabeculum and Schwalbe's line are all invisible on gonioscopy. Therefore, it is a Shaffer Grade 0 angle, meaning this eye has a very narrow angle. Gonioscopy is a contact lens put onto the eye with coupling agent gel, it aims to eliminate total internal reflection of light rays by the cornea. Angle image seen is reflected by the mirror inside the gonioscopy, thus of the opposite direction towards the mirror position. Note the pupil is now miosed after abortion of the acute primary angle closure.

APAC would present with high IOP, mid dilated pupil and narrow angle. Normal IOP with narrow angles are seen in primary angle closure suspect (PACS) eyes.

Q2. Which of the following cough medications is suggested for PACS patients? (a) Promethazine compound linctus (b) Diphenhydramine compound linctus (c) Actified syrup (containing pseudoephedrine and triprolidine) (d) Ammonia and ipecacuanha mixture (e) All of the above

Answer: (d) Ammonia and ipecacuanha mixture

Promethazine compound linctus, diphenhydramine compound linctus, actified syrup (pseudoephedrine and triprolidine), chlorpheniramine are possible triggers of APAC in PACS patients.

Q3. Which of the following is NOT risk factor for PACS? (a) Old age (b) Female gender (c) East Asian ethnicity (d) Hyperopia (short axial length) (e) Paracetamol use

Answer: (e) Paracetamol use

Risk factors for PACS include old age, female, East Asian and hyperopia eyes (short axial length).

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