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Time interval for emergency ophthalmic surgery in Hospital Kuala Lumpur during the peak of the COVID-19 pandemic

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Abstract

Purpose: The coronavirus disease 2019 (COVID-19) pandemic led to staff shortages and repurposing of health facilities, thus affecting the workflow of emergency ophthalmic surgery in Hospital Kuala Lumpur (HKL). The objective of this audit was to ensure that there was no time delay for emergency ophthalmic surgery in HKL during the peak of the COVID-19 pandemic.
Study design: Retrospective clinical audit.
Methods: Data of patients who underwent emergency ophthalmic surgery for a period of 8 months in HKL were collected from the operation theatre records and patient medical records of HKL.
Results: A total of 49 patients underwent emergency ophthalmic surgery from May 2020 to December 2020. There was male 34 male patients (69%) and the majority of patients belonged to the age group of 21–30 years. Most of the cases were sight-threatening (80%), which included ocular trauma, vitreoretinal cases, and evisceration. Meanwhile, non-sight threatening cases comprised eyelid/conjunctival laceration, iris repositioning, and glaucoma surgery. Most of the surgeries (36%) were performed within 6 hours of admission/decision for surgery. Only 4% of surgeries were delayed more than 24 hours. A vitreoretinal case was delayed for 26 hours due to presence of electrocardiogram changes and hypokalaemia. The second case was a case of planned for evisceration for panophthalmitis and was

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delayed due to syndrome of inappropriate antidiuretic hormone. Both patients were referred to the medical team for stabilisation prior to surgery.
Conclusion: The cause of the delay in both patients were not due to the COVID-19 pandemic but due to medical co-morbidities. Despite the limitation of staff and resources-during the COVID-19 pandemic, ophthalmic emergency surgeries were carried out on appropriate timing without delay.

Keywords: COVID-19 pandemic, emergency ophthalmic surgery, Malaysia

Selang masa bagi pembedahan kecemasan oftalmik semasa kemuncak pandemic Covid-19 di Hospital Kuala Lumpur

Abstrak

Tujuan: Terdapat masalah kekurangan staf dan mengguna semula fasiliti kesihatan semasa pandemic akibat dari jangkitan coronavirus 2019 (COVID-19) menyebabkan aliran kerja pembedahan kecemasan oftalmik t erganggu d i Hospital Kuala Lumpur (HKL). Tujuan utama audit ini adalah untuk memastikan tiada kelewatan pembedahan kecemasan oftalmik s emasa k emuncak p andemic Covid-19.
Bentuk kajian: Kajian audit klinikal secara retrospektif
Keputusan: Sejumlah 49 pesakit telah melalui pembedahan kecemasan oftalmik bermula dari Mei 2020 sehingga Disember 2020. Seramai 34 orang adalah lelaki dan kebanyakkan berada dalam lingkungan umur 21–30 tahun. Kebanyakkannya adalah kes yang melibatan kes yang mengancam penglihatan (80%) yang meliputi kes trauma ocular, vitreoretinal dan pembuangan mata. Sementara itu terdapat kes yang tidak mengancam penglihatan termasuk kes melibatkan luka pada kelopak mata/konjunktiva, membetulkan kedudukan iris dan pembedahan glaukoma. Kebanyakkan pembedahan ini (36%) dilakukan dalam masa 6 jam selepas kemasukkan pesakit ke hospital atau dari waktu keputusan dibuat untuk pembedahan. Didapati bahawa jankamasa menunggu melebihi 24 jam untuk 4% daripada kes kecemasan ini. Terdapat satu kes pembedahan vitreoretinal yang mengalami kelewatan sehingga 26 jam, Dimana pesakit ini mengalami perubahan elektrokardiogram dan hipokalemia. Kes kedua yang mengalami kelewatan adalah kes pembuangan mata akibat panoftalmitis, d i m ana p esakit m engalami sindrom rembesan hormon antidiuretik yang tidak sesuai (SIADH). Kedua-dua kes ini telah dirujuk kepada pakar penyakit dalam bagi menstabilkan keadaan fizikal sebelum pembedahan.

Kesimpulan: Kes kelewatan pembedahan bukan diakibatkan oleh pandemik Covid-19 tetapi akibat dari penyakit sistemik yang tidak dikawal. Secara keseluruhan pembedahan kecemasan oftalmik t idak m engalami k elewatan walaupun terdapat kekangan kekurangan staf dan kemudahan lain.

Kata kunci: Malaysia, pandemic Covid-19, pembedahan kecemasan oftalmik

Introduction

The novel severe acute respiratory syndrome corona virus-2 (SARS CoV-2) was first detected in the Wuhan City, Hubei Province, China in December 2019 and spread to the rest of the world. Hospital Kuala Lumpur (HKL), nestled in the heart of Kuala Lumpur, is the largest public tertiary hospital in Malaysia, consisting of 53 different departments and units. It is located on 150 acres of land with 83 wards and 2,300 beds.[1] HKL has a staff of 7000 workers, with 200 consultants and specialists, 500 medical officers and registrars, 32 matrons, and 3,101 registered nurses.[1]

The pandemic greatly impacted patient care and ophthalmologic workflow. The waves of COVID-19 infection led to shortages of operation theatre staff, ophthalmology medical officers, and anaesthesiologists, thus affecting HKL's workflow. A portion of the general operation theatres were converted into intensive care units, while ophthalmology wards were converted into COVID-19 wards/ medical wards or were shared with other disciplines such as the otolaryngology team depending on the number of COVID-19 cases.

Many factors delayed emergency ophthalmic surgery during the COVID-19 pandemic, such as the availability of operation theatres, anaesthesiologists when general anaesthesia was required, and hospital beds, as well as the turnover time of swab results which may have negatively affected patient outcomes.[2] It became necessary to modify standard operating procedures to ensure that patient care and health care worker safety were not compromised.[3-6] Although elective cases were postponed, we were able to proceed with emergency ophthalmic surgery.

It became important to stratify patients depending on their level of risk for visual loss; thus, treatment for patients with lower-risk conditions was deferred.[7] According to the guidance document for prioritisation of ophthalmic procedures (dated May 2020) by the Royal College of Ophthalmologists (RCO), emergency procedures are defined as procedures required to be conducted within 24 hours and urgent procedures were defined as those required within 72 hours.[7] The emergency procedures according to the RCO guidelines were similar to that of the "Guidelines for ophthalmologists during the COVID-19 pandemic in Malaysia" by the Malaysian Society of Ophthalmology.[8] Table 1 presents examples of emergency ocular surgery. We at HKL adapted the guidelines by the Malaysian Society of Ophthalmology.[8] However, we were not able to perform emergency

corneal transplants due to the unavailability of donor corneas, and procedures such as corneal gluing were performed in a designated treatment room under aseptic technique in the eye outpatient clinic.

The objectives of this retrospective audit were:

1) evaluate the impact of the COVID-19 pandemic on emergency ophthalmic surgery in HKL.
2) ensure that the timing of emergency ophthalmic surgery complied with current standards without delays.
3) To analyse whether the current practices were acceptable to handle emergency ophthalmic cases without delay during the COVID-19 pandemic.

Table 1. Examples of emergency ophthalmic surgeries according to the "Guidelines for Ophthalmologists During COVID-19 Pandemic in Malaysia"[8]

Paediatric ophthalmology	• Essential interventions: • Acute emergencies (e.g., penetrating injury, intraocular foreign body, lid lacerations, orbital abscess, retinal detachment) • Cataract in children under 8 months of age or where there is a risk of causing irreversible, severe amblyopia • High IOP which cannot be managed medically • Retinoblastoma and other tumour treatments • EUAs where it is critical to manage a potentially sight- or life-threatening disease • Surgery for imminently sight-threatening disease, e.g., orbital decompression • Treatment for ROP • Patients with corneal blindness in both eyes in their amblyopic period • Probing of nasolacrimal duct: dacryocystocele
Vitreoretinal surgery	• Scleral buckle • Vitrectomy: macular or retinal detachment, ocular trauma, intraocular infection, intraocular foreign body, misdirected aqueous, malignant glaucoma • Drainage of choroidal effusion: Appositional choroidal effusion, suprachoroidal haemorrhage, or flat anterior chamber • Pneumatic retinopexy

Glaucoma surgery	• Filtration surgery (XEN, iStent): Sight-threatening, uncontrolled IOP in poor candidates for trabeculectomy or aqueous tube shunts • Goniotomy (ab externo or ab interno): Sight-threatening, uncontrolled IOP • Insertion of drainage implant with or without graft: Catastrophic or rapidly progressive glaucoma • Repair of operative wound(s): Bleb leaks, wound leaks, overfiltration, underfiltration, bleb scarring, sight-threatening hypotony, or shallow anterior chamber
Oculoplastic surgery	• Orbit biopsy: Suspected intraocular malignancy or immediate sight- threatening conditions • Cantholysis: Sight-threatening conditions • Canthotomy: Sight-threatening conditions • Decompression of dacryocele: Neonate with obstructive respiratory compromise • Decompression of orbit: Orbital tumour with impending vision loss • Drainage of abscess: Orbital cellulitis • Enucleation: Ocular trauma, infection, intractable glaucoma, globe perforation, intractable pain, or intraocular malignancy • Evisceration: Sight-threatening infection, or intractable pain • Excision of tumours: Malignancy or sight-threatening tumour • Exenteration: Life-threatening infection • Exploration of orbit: Life-threatening or sight-threatening conditions • Fenestration of optic nerve sheath: Progressive vision loss • Repair of canalicular laceration: Injury or trauma to their canaliculus
Corneal surgery	• Corneal transplantation: corneal blindness in both eyes with/ without local donor availability • Reconstruction of ocular surface or other tectonic procedures: Acute chemical injury, or acute Stevens Johnson Syndrome • Removal of aqueous drainage implant: Endophthalmitis, corneal touch, corneal decompensation, or exposed plate • Repair of anterior segment or cornea: Lacerations, blunt rupture, or deeply embedded corneal foreign body • Repair of dehiscence of corneal graft or other anterior segment wound: Wound dehiscence or other wounds, including dislocated LASIK flaps • Repair of extrusion or complication of keratoprosthesis: Complications with implanted devices in their cornea or anterior segment

Miscellaneous	• Brachytherapy: Intraocular malignancy • Cataract surgery: Congenital cataract in the amblyopic period, monocular patients with documented vision loss precluding driving, reading or self-care, lens-induced glaucoma, angle-closure glaucoma, acute lens complications, or severe anisometropia of fellow eye post recent lens extraction in first eye • Closure of cyclodialysis cleft: Sight-threatening hypotony due to trauma • Frontalis sling: Sight-threatening congenital ptosis • Laser photocoagulation: sight-threatening proliferative retinopathy • Repair of eyelid/face: Lacerations of eyelid or face • Repair of facial fractures: Displaced facial bone fractures • Repair of open globe: Ocular trauma • Intravitreal injection of anti-VEGF /steroids/antibiotics

IOP: intraocular pressure: EUA: examination under anaesthesia; ROP: retinopathy of prematurity

Methods

This study is a retrospective clinical audit that included all emergency ophthalmic surgeries (Table 1) conducted at HKL from May 2020 to December 2020. The data was collected from operation theatre records and patient medical records of HKL for a total of 49 cases of emergency ophthalmic surgeries.

Surgery waiting time was calculated from the time of admission/time of decision for surgery to the actual time the surgery was performed. The standard was set as 100% for an acceptable waiting time of 24 hours, without delays, between the time of admission/time of decision for surgery to the time the surgery was performed. To our best knowledge, there are no established standards available in literature. As such, we used an arbitrary standard as we did not want any delay in emergency ophthalmic surgery.

Results

A total of 49 patients underwent emergency ophthalmic surgery from May 2020 to December 2020. Patient ethnicity was as follows: Malay (*n* = 26;54%), Chinese (*n* = 6; 12.5%), Indian (*n* = 14.5%), and foreigner (*n* = 9; 19%). As shown in Figure 1, male patients (34, 69%) outnumbered female patients (15, 31%). Table 2 presents the cases divided into age groups, with the highest number of cases in the age group of 21–30 years (13), followed by the age group of 31–40 years (12) Only 1 patient was under 10 years old.

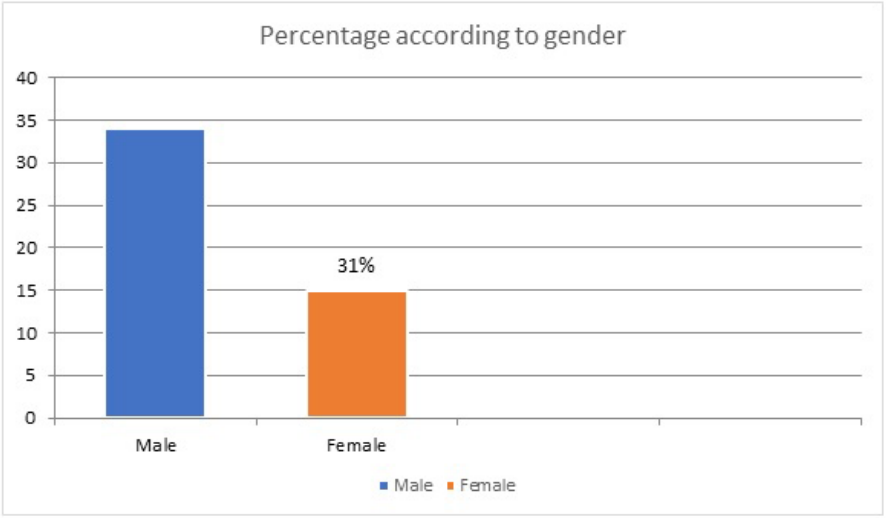

Fig. 1. Percentage of patients according to gender.

Table 2. Age of patients who underwent emergency ophthalmic surgery in HKL

Age group (years)	**Number of patients**
≤ 10	1
11–20	2
21–30	13
31–40	12
41–50	4
51–60	7
61–70	5
> 70	5
Total	49

There were 39 (80%) sight-threatening cases and 10 (20%) non-sight threatening cases. As seen in Figure 2, sight- or life-threatening cases consisted of trauma cases (corneoscleral laceration, globe rupture), vitreoretinal cases (vitrectomy for giant retinal tear, retinal detachment, endophthalmitis), and evisceration for panophthalmitis. The non-sight threatening cases (Fig. 3) consisted of lid laceration with or without canalicular cut, conjunctival laceration, iris repositioning, intraocular lens repositioning, and glaucoma surgery, such as reimplantation of Xen Gel stent implant. A total of 32 cases required general anaesthesia, while 17 patients required local anaesthesia.

Vitreoretinal cases and corneoscleral laceration cases each comprised 45% of the sight-threatening cases, followed by globe rupture with 8% and panophthalmitis with 2%. Most of the sight-threatening and non-sight threatening cases in HKL were due to trauma, accounting for 26 cases out of 49 emergency ophthalmic cases.

As described in Table 3, most surgeries (18 cases) were performed within 6 hours of admission/decision for surgery. Only 2 surgeries were delayed more than 24 hours. A vitreoretinal case had a waiting time of 26 hours due to electrocardiogram changes and hypokalaemia. The second case was a case of planned for evisceration for panophthalmitis that was delayed due to syndrome of inappropriate antidiuretic hormone. Both patients were referred to the medical team for stabilisation prior to surgery. The cause of the delay in both patients was not due to the COVID-19 pandemic but to their medical comorbidities.

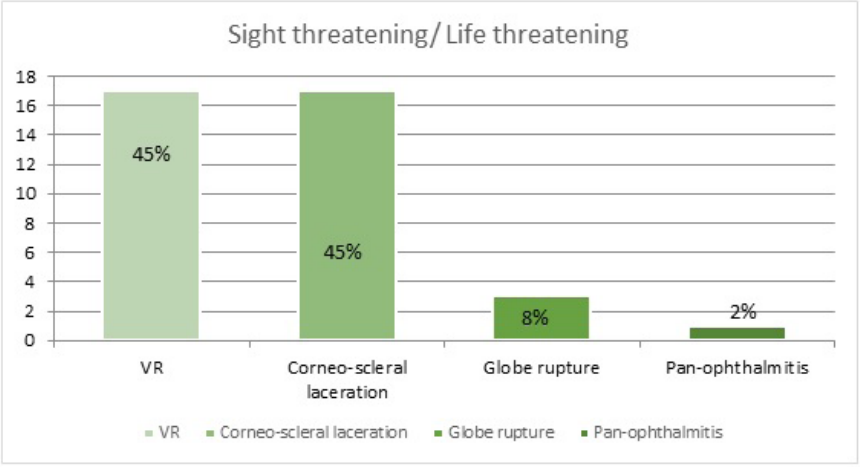

Fig. 2. Sight-threatening and life-threatening ophthalmic emergencies.

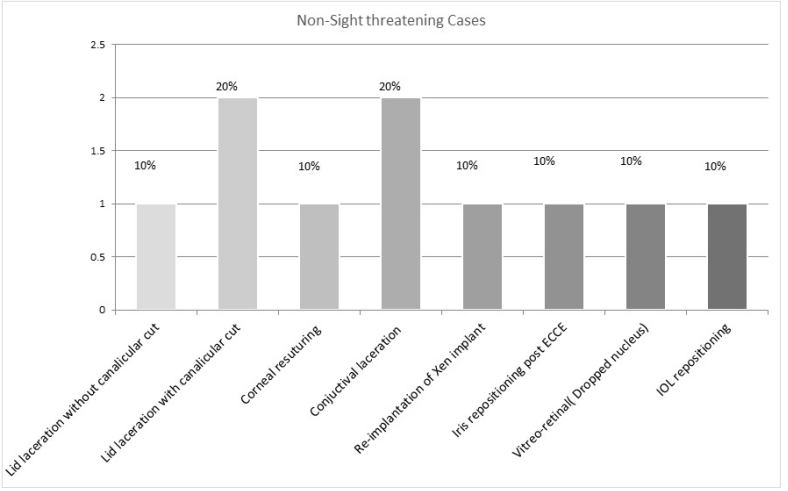

Fig. 3. Non-sight threatening ophthalmic emergencies

Table 3. Waiting hours for emergency ophthalmic surgery

Hours from admission/decision for surgery to surgery (hours)	**Number of surgeries**
≤ 6	18
7-12	13
13-18	3
19-24	13
> 24	2

Discussion

To reduce the COVID-19 cases, Malaysia enacted a movement control order (MCO) beginning March 18, 2020.[4] During the 1–4 phases of movement control order, elective surgeries were placed on hold. However, patients requiring emergency ophthalmic surgery were not diverted to other centres due to the hybrid status of the hospital, which handled both COVID-19 and non-COVID-19 patients. To cope with the increasing COVID-19 patient load, HKL repurposed its wards and converted its operating theatres into intensive care units for patients who needed ventilators.[4] Health services and personnel were redistributed and surgical wards, including ophthalmology, were affected.[4] To ensure an adequate number of medical officers and staff for on-call duty, they were redistributed on a rotation basis. The vacant Maternity Block and Paediatric Institute, whose services had been recently transferred to Hospital Tunku Azizah, were reopened as non-COVID and transition wards.[4]

The purpose of this audit was to identify whether there were delays in the waiting time for emergency ophthalmic surgery at HKL due to the COVID-19 pandemic, with its attendant the lack of staff and operation theatre time. The waiting time was calculated from the time of admission/time of diagnosis to the time of surgery. The standard was set as 100 % for acceptable waiting time of 24 hours. According to our results, a total of 47 cases out of 49 cases were performed within 24 hours.

The delay of more than 24 hours in the remaining 2 cases were due to the patients' systemic comorbidities. The vitreoretinal case had a waiting time of 26 hours due to electrocardiogram changes and hypokalaemia. This patient was diagnosed with proliferative diabetic retinopathy, rhegmatogenous retinal detachment, and vitreous haemorrhage in the left eye, and scheduled for vitrectomy, endolaser, and tamponade. The second case was a case of planned evisceration for panophthalmitis that was delayed due to syndrome of inappropriate antidiuretic hormone. Both patients were referred to the medical team for stabilisation prior to surgery. We are not able to say whether there was a delay in the management of this patient's medical comorbidities due to the COVID-19 pandemic. According to the RCO guidelines, evisceration for risk of sepsis is considered an urgent case with an acceptable waiting time of 72 hours.[7] Evisceration for our second patient was performed within 48 hours, so our team was able to adhere to the international standards despite the pandemic.

We performed COVID-19 diagnostic testing for all patients requiring emergency ophthalmic surgery. Since most of our patients performed the rapid test kit (RTK) antigen, they were able to undergo surgery in less than 24 hours. Fortunately, all 49 patients who underwent emergency ophthalmic surgery at HKL were COVID-19-negative. HKL's infection control team mandated COVID-19 diagnostic testing for all admitted patients to prevent intra-hospital transmission to other patients as well as HKL staff. Even though or management algorithm for emergency cases was similar

to that of Yeoh *et al.*, we did not routinely perform chest X-rays for all patients and most of our patients underwent rapid COVID-19 testing instead of PCR.[1]

The preponderance of men (69%) and patients aged 21–30 years might have been due to occupational factors. More than half our cases (53%) were caused by trauma, which is similar to the results found by Tang *et al.* These trauma cases could have been easily avoided if personal protective equipment had been used. Although there might have been a general reduction in ocular trauma due to the MCO itself, further studies are needed to confirm this. While in China Hao *et al.* reported mostly emergency glaucoma cases, our ophthalmic emergency team had only one glaucoma case.[5-6] The majority of our cases (65%) need general anaesthesia, similar to Tang *et al.*, for which 73% of cases also needed general anaesthesia.[6]

This retrospective audit has three main limitations. First, the management algorithm for emergency ophthalmic cases varied slightly during the pandemic. Second, the data for this audit was collected from the operation theatre record book. As this is a retrospective study, there may have been variations in the timings documented. Third, there might have been a generalized reduction in the total number of emergency ophthalmic cases during the COVID-19 pandemic compared to previous years due to the MCO, which might have made it easier to manage.

Conclusion

The cause of the delay in both patients were not due to the COVID-19 pandemic but due to medical co-morbidities. Despite the limitation of staff and resources during the COVID-19 pandemic, ophthalmic emergency surgeries were carried out on appropriate timing without delay.

Declarations

Ethics approval and consent to participate

Competing interests
None to declare.

Funding
None to declare.

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