

Pivoting to teleconsultation for paediatric ophthalmology and strabismus: Our experience during COVID-19 times

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Purpose: The objective is to analyse and report the data of teleconsultations provided to paediatric ophthalmology and strabismus patients during COVID-19 times and to elaborate our experience for guiding future teleconsultation practices to General, paediatric Ophthalmologists and Strabismologists. **Methods:** Retrospective analysis of electronic medical record data of teleconsultations provided in the department of Strabismus, Paediatric and Neuro-ophthalmology was done. Patients with optic nerve related disorders were excluded. Study period was one month. Statistical analysis of collected data was done using Microsoft excel. **Results:** A total of 198 patients were provided teleconsultations (an average of seven teleconsultations/day). The final analysis included 161 patients after excluding optic nerve related disorders. The median age was seven years. We had a near equal gender distribution (53% males and 47% females) of whom a third were new cases. Video calling was used in 14%, review of clinical photos shared was used in 53%. Rest of the 33% were given telephonic advice. Allergic conjunctivitis (14%), pseudophakia (9%), strabismus (12%), status post strabismus surgery (8%), cranial nerve palsies (11%) were common diagnoses. 19% (n = 30) were advised/needed visit in emergency services on same or next day. **Conclusion:** Our experience of teleconsultation during COVID-19 times for paediatric ophthalmology and strabismus patients was very encouraging. Pivoting teleconsultation platform can provide primary eye care to most of the patients and work as essential forward triage for rest. As we continue to further explore the currently available avenues in multimedia such as video conferencing and web/mobile based applications, we believe that tele-ophthalmology platform can provide a reliable service in patient care.

Key words: COVID-19, paediatric ophthalmology, strabismus, teleconsultation

The World Health Organisation (WHO) has declared the novel Corona Virus Disease 2019 (COVID-19) as a global pandemic and health emergency.^[1] To date, there are over 125,000 confirmed cases in India of which over 70,000 are active cases.^[2] India is in its fourth consecutive nationwide lockdown to contain the spread of infection.^[2] This has led to a surge in teleconsultations and are in accordance with the telemedicine guidelines issued by the Ministry of Health and Family Welfare (MoHFW), in collaboration with NITI Aayog and Board of Governors (BoG) Medical Council of India (MCI).^[3] Nair and associates^[4] have reported a change of practice patterns among ophthalmologists in India during this pandemic with ophthalmologists having switched to telemedicine in its various forms to assist patients.

At our tertiary eye care centre, we provided teleconsultation to a large number of patients during lockdown period. In this retrospective study we aim to analyse and report the data of teleconsultations provided to paediatric ophthalmology and strabismus patients during COVID-19 times and to elaborate our experience for guiding

future teleconsultation practices to general ophthalmologists Paediatric Ophthalmologists and strabismologists.

Methods

At the start of teleconsultation services, a specific protocol was formulated for addressing patients, the purpose of which was to provide uniform guidelines for delivering teleconsultation services in the department of Strabismus, Paediatric and Neuro-ophthalmology. According to this protocol, patients were divided into three categories A, B and C, respectively. Category A included emergency cases which must be seen in hospital. Category B included cases which could be managed by teleconsultation alone. Category C included cases where follow up visits could be reduced by intermittent teleconsultations. Details of these categories are included in Table 1.

A separate digital platform was developed for smooth patient teleconsultation flow and ease of documentation for

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follow up, in existing electronic medical record (eyeSmart EMR[®]) software. An informed consent on the call was sought from the patients before initiating the teleconsultations and a summary of the conversation was then appended by the consulting ophthalmologist to the electronic medical record of the patient to ensure continuity of information post the lockdown period. Further details of flow of teleconsultation can be found in the article by Das and associates.¹⁶ The prescription of medicines adhered to the telemedicine practice guidelines of India¹⁷ and the previous medications advice given during the last visit of the follow-up patients was asked to be continued where relevant. The medical report with the ophthalmologist advice was sent to the patient via short message, email or WhatsApp at the completion of the call in PDF format on an official letter head which was electronically signed by the consulting ophthalmologist.

The study adhered to declaration of Helsinki and was approved by Institutional Ethics Committee. Retrospective analysis of electronic medical record data of teleconsultations provided in the department of Strabismus, Paediatric and Neuro ophthalmology was done. Study period was one month, from 20th April 2020 to 21st May 2020. Paediatric ophthalmology and strabismus patients (paediatric and adults) were included in final analysis. Neuro ophthalmology patients

were selectively included (those with cranial nerves palsy were included) and rest with new optic nerve related disorders like optic neuritis, optic neuropathies, etc., were excluded, as the scope of teleconsultation in these disorders was limited. Collected data was statistically analysed in Microsoft excel version 2019 16.0.6742.2048.

Results

A total of 198 teleconsultations were provided in the given period with an average of about 7 patients daily on 28 working days. Out of these, 37 were consults pertaining to optic nerve related disorders, and were excluded from analysis. A total of 161 teleconsultations catered services to Paediatric Ophthalmology and Strabismus patients. Age range was one month to 79 years, with a median age of seven years (Interquartile range Q3-Q1 = 15-3 = 12). About 53% (n = 85) were males and 47% (n = 76) were females. One third (29%, n = 46) patients were new cases, and two-third (71%) were follow-up cases. More than 50% of our follow-up consultations were patients who resided in a different city or state. Various multimedia platforms were used for visual analysis of the patient's condition, wherever deemed necessary. These platforms included live video call on Skype (Skype 8.59.0.77. Microsoft Inc.; 2020), WhatsApp (WhatsApp 2.19. Facebook Inc.; 2020) or Facetime (FaceTime 10.6. Apple Inc.; 2020). For younger patients, parents were encouraged to record a video on their phone and forward it on email/WhatsApp. Patients were asked to click clinical photographs of eye and ocular motility using camera in mobile phone or using a mobile application called '9 gaze' (9 Gaze 1.0. See Vision, LLC Inc.; 2020) [Fig. 1] which is available for android and iOS users. Wherever possible vision assessment was done using fixation pattern monocularly and binocularly. Feature of video calling was used in about 14% (n = 22) patients and review of images forwarded through above mentioned platforms was made in about 53% (n = 85) patients [Fig. 2].

Table 1: Triage categories for Teleconsultation

Category A: Emergencies - MUST SEE in clinic
Any acute optic neuropathy unless stabilized (<20 days)
Acute optic disc oedema
Acute pupillary abnormalities
Acute onset strabismus or diplopia till evaluation and stabilization
All preterm babies for Retinopathy of Prematurity (ROP) screening/management should be seen as emergency. Asymptomatic stable post ROP babies more than four months of age can have delayed appointments after 2-3 months
Any previously stable patient with acute vision change, acute onset diplopia, leukocoria/pain/redness or new neurological/Ophthalmological symptoms
Any leukocoria, infantile cataract, glaucoma, anterior segment cases, retinoblastoma acute onset of proptosis or ptosis etc.
Acute red eye in a child- If Conjunctivitis, follow conjunctivitis protocol only
Category B: Can be managed by teleconsultation alone
Stable refractive errors and amblyopia follow-up
Strabismus post-surgical follow-up
Paediatric cataract 6 months Follow-up
Cranial nerve palsy (resolving) cases follow up
Optic neuritis intermittent follow up
Accommodative esotropia and intermittent exotropia follow up
Post suture removal follow up in Paediatric cataract
Review with MRI, blood work report
Follow up of stable nystagmus, retinal dystrophy, Low vision
Stable allergic conjunctivitis
Category C: Cases where we can reduce follow-up visits with intermittent teleconsultation
Stable optic neuropathies in general (Nutritional/Toxic/Hereditary optic neuropathy/optic neuritis/traumatic optic neuropathy)
Resolving or resolved papilledema (e.g. IHH)
Stable Paediatric glaucoma/cornea/retina/strabismus follow up cases
Stable myasthenia cases

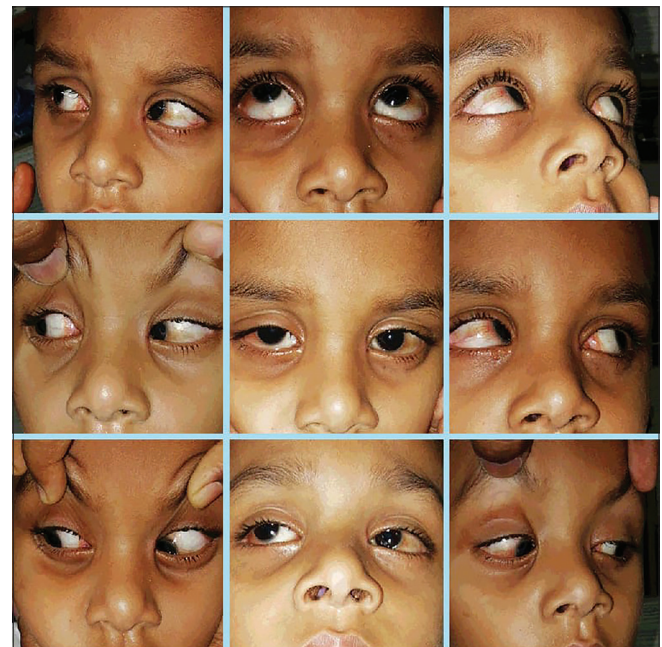


Figure 1: A sample photo demonstrating a clinical photograph clicked and forwarded by patient using mobile application '9 gaze'

Patients seeking teleconsultations had a wide spectrum of diagnoses as shown in Fig. 3. Allergic conjunctivitis (14%, n = 22) was the most common diagnosis followed by pseudophakia (Nine percent%, n = 14) and status post extraocular muscle (EOMS) surgery (eight percent, n = 13) for strabismus. 12.4% patients had comitant strabismus, of which 9 percent (n = 15) had exotropia (intermittent in ten, constant five); three percent (n = 5) had esotropia. One patient was diagnosed to have Duane retraction syndrome (DRS type I) through video call consultation. Two patients had pseudo strabismus. Cranial nerve (CN) palsies were present in 11% (n = 15) patients, seven of which were III CN, and four each of IV and VI CN. Congenital or developmental cataract was present in 3% (n = five) patients; whereas 3% (n = 5) were follow-up cases of surgical aphakia. One patient had bilateral congenital cataract, operated for one eye just before the start of lockdown and was awaiting another eye to be operated. Five percent (n = eight) patients had vernal keratoconjunctivitis and six percent (n = 10) had microbial conjunctivitis/keratoconjunctivitis. Nine percent

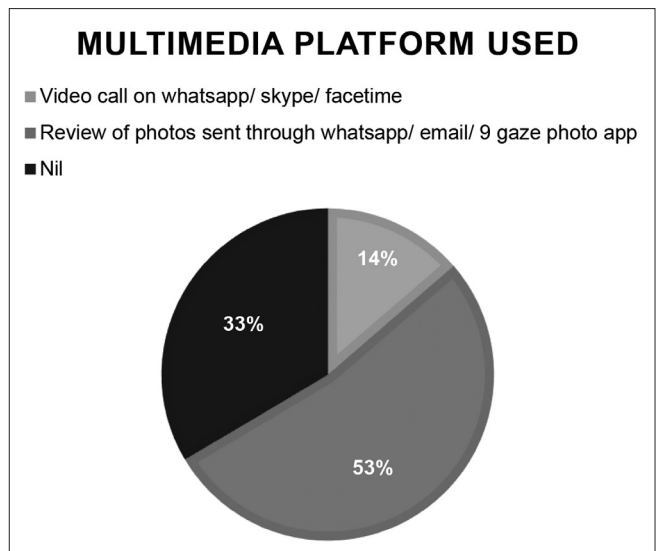


Figure 2: A pie diagram showing usage of various multimedia platforms

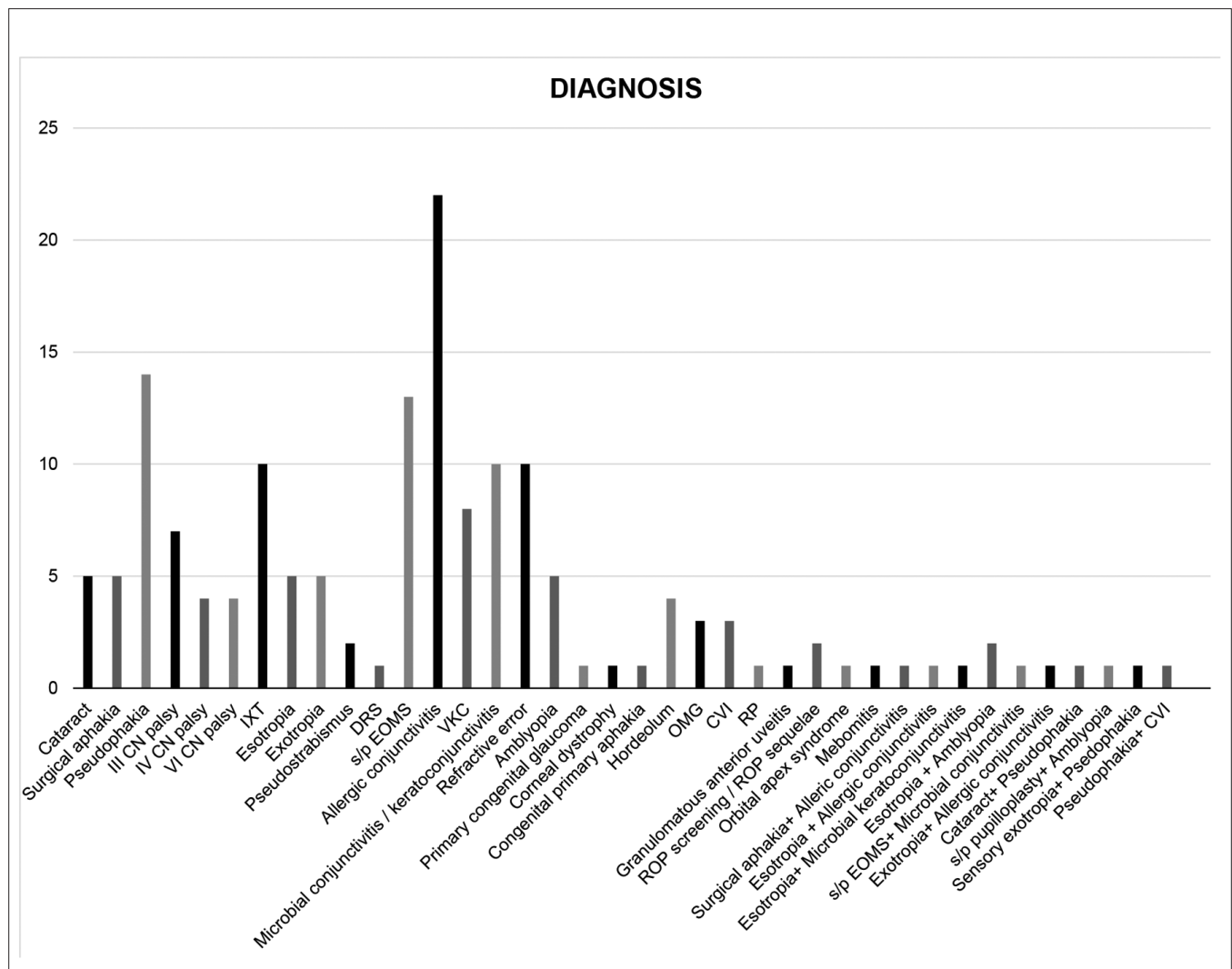


Figure 3: A bar diagram showing various diagnosis

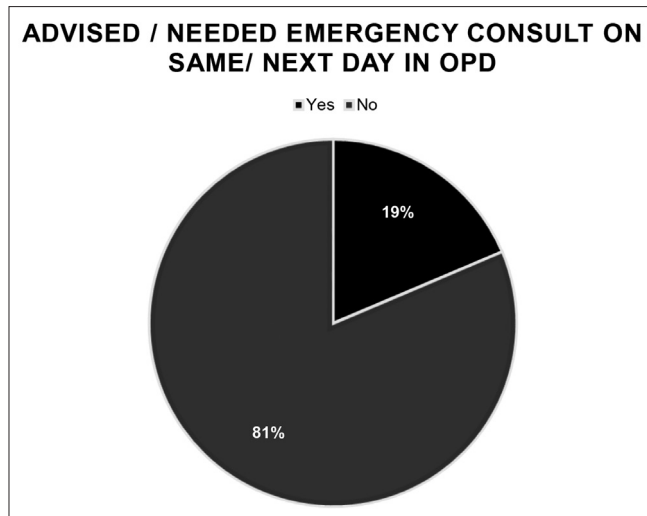


Figure 4: A pie diagram showing number patient who were advised/needed emergency consultation in hospital on same/next day

patients (n = 15) had refractive errors or amblyopia. Four patients had hordeolum, three patients had ocular myasthenia gravis (OMG) and cortical visual impairment (CVI) each. Other rare diagnoses included- primary congenital glaucoma, corneal dystrophy, congenital primary aphakia, retinitis pigmentosa (RP), granulomatous anterior uveitis (GAU), orbital apex syndrome, meibomitis, status post pupilloplasty, retinopathy of prematurity (ROP) screening and ROP sequelae (n = one, each).

Of the total tele-consultations 19% (n=30) [Fig. 4] were advised to visit in emergency services on same or next day for a detailed evaluation and possible emergent intervention/management in various forms like neuroimaging, ROP screening and laser, cataract aspiration etc., These included cataract (n = 5), pseudophakia (n = 2), pseudophakia + cataract (n = one), acute diplopia with CN palsies (n = 7), acute esotropia (n = 4), exotropia (n = 3). There was one patient each of GAU, ocular myasthenia, cerebral visual impairment, retinitis pigmentosa, ROP screening, ROP sequelae, orbital apex syndrome, and status post squint surgery.

Discussion

Current COVID-19 pandemic is changing the paradigm of health care with telemedicine taking centre stage. Telemedicine mitigates the need for clinician and patient to be in the same place. This protects both the patients by keeping them out from crowded hospital environment as well as the clinicians by reducing the time of patient exposure.^[8] The field of ophthalmology involves close proximity of clinician and patient during slit lamp examination, which presents an opportunity for disease transmission especially if personal protective equipment and strict disinfection regimens are not followed. Ophthalmology is predominantly an outpatient specialty, and utility of teleconsultation can play vital role in safe patient care delivery.

In view of patient, clinician and community wellness, our tertiary eye care centre started teleconsultation during lockdown. Calls for teleconsultation were received locally as well as from out of the state. In our department of strabismus,

paediatric and neuro ophthalmology, we consulted nearly 200 patients over a period of one month. Paediatric ophthalmology and strabismus warrant special examination for vision assessment, motor examination and anterior segment examination per se, considering specific age group, and patient profile. This was our first experience for evaluating patients in this age group and profile using the platform of tele consultation. Use of various multimedia tools like video calling, photography and mobile applications enabled specific examinations online. We experienced that patients and their parents are 'techno friendly' these days, and can use these platforms with great ease. Whereas a clinician must take additional effort, have the risk taking behaviour, experience and acumen to take elaborate history, interpret clinical signs seeing video/photographic images, draw a provisional diagnosis and treat the condition or refer the patient for further management to the emergency/outpatient services.

Teleconsultation provided treatment to many patients for conditions like ocular surface allergies/infections, mitigating the need for their travel and possible risk of transmission of infections to other patients, patient's attendants or staff in a crowded hospital environment. Most of the follow-up cases could be managed with elaborate history and photographic evaluation. Patients with refractive errors and amblyopia were given suitable advice based on their visual behaviour and use of mobile applications or a printed chart for assessment and documentation of visual acuity. Study has shown that mobile based applications are capable of accurate and repeatable acuity measurements consistent with published data on the test-retest variability of acuities.^[9] Parents can conveniently use these applications, thereby assisting clinicians in important aspect of vision assessment.

Convenient sharing of previous clinical/haematological/imaging reports using teleconsultation platform, made it feasible to advice patients who seek second opinions for their current eye condition.

While we could manage most of the patients with non-emergent conditions through teleconsultation itself, this new platform also worked as a 'Forward triage' to refer emergent/vision threatening conditions like ROP, cataract, orbital apex syndromes and nerve palsies to the hospital for further management. The health care surges can be managed by "Forward triage" strategy.^[8] It sorts the patients on the basis of need before they present physically to hospital. COVID-19 time calls for such safe practice to promote social distancing and self-isolation.^[10]

Conclusion

To conclude, our experience during the pandemic with respect to patient care has been very encouraging. Pivoting teleconsultation platform can provide primary eye care to most of the patients and work as an essential forward triage for the rest of the conditions. As we continue to further explore the currently available avenues in multimedia such as video conferencing and web- or mobile-based applications, we believe that this platform offered by tele-ophthalmology can provide a reliable service in patient care.

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Conflicts of interest

There are no conflicts of interest.

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