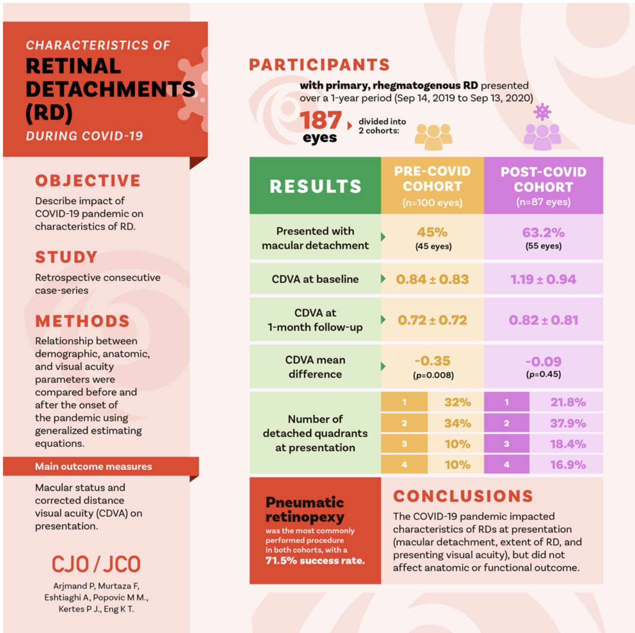


Resident Perspective: OCTA findings in patients with COVID-19

On January 5, 2020, the World Health Organization (WHO) published a report on a pneumonia of unknown cause in Wuhan City, China.[1] Lower respiratory tract samples isolated from affected cases implicated a novel enveloped positive-sense single-stranded RNA virus belonging to the family Coronaviridae, which was later named the SARS-CoV-2 virus.[2] The most frequently reported signs and symptoms of COVID-19 include fever, cough, shortness of breath, fatigue, and loss of taste and smell.[3] However, multiple recent studies have reported a wide array of ophthalmic manifestations of SARS-CoV-2 infection, including anterior segment, posterior segment, and neuro-ophthalmic manifestations.

Many of these aforementioned studies attribute the described retinal findings to the microangiopathic hypercoagulable state induced by SARS-CoV-2. Three main factors have been suggested to be involved in the pathogenesis of coagulopathy in patients with COVID-19. These include: a) endotheliitis, which causes mechanical problems through vasoconstriction, b) hyper-inflammation and cytokine storm, which activate clotting factors, and c) stasis and hypoxia, which also activate coagulation mechanisms.[4]

In this issue, Turker and colleagues describe findings of ocular coherence tomography angiography (OCTA) studies in patients diagnosed and hospitalized with COVID-19.[5] The group studied 54 eyes of 27 patients and control subjects, each. Vessel density in the parafoveal area in patients recently diagnosed with COVID-19 was found to be significantly lower in the superior and nasal quadrants of the superficial capillary plexus and in all quadrants of the deep capillary plexus; however, choriocapillaris flow was found to be significantly increased in these patients.[5] Given the significant vascularity of the retina and choroid, these tissues are suggested to be especially susceptible to the microangiopathic hypercoagulable state induced by the SARS-CoV-2 virus, resulting in the parafoveal blood flow impairment observed in the current study. The study authors also suggest that the increased choriocapillaris flow may be due to reactive vasodilation in response to hypoxia resulting from ischemia of the choroidal tissue.

It would be interesting to investigate whether these changes in blood flow to the parafoveal region and choriocapillaris have any impact on visual acuity or are otherwise symptomatic in patients treated for COVID-19. Although this data was collected in the current study, it was unfortunately not reported. A recent study by Abrishami et al. found similar results to the current study, also reporting significantly reduced superficial and deep capillary plexus vessel densities.[6] Interestingly, in the study by Abrishami et al., all patients included had a visual acuity of 20/20 in spite of the OCTA findings. More studies with larger sample size would be beneficial to our understanding of pathogenic changes induced by the SARS-CoV-2 virus and their implications on visual outcomes of affected patients.

In summary, Turker and colleagues have demonstrated alterations of retinal and choriocapillaris microvasculature associated with SARS-CoV-2 infections compared to healthy controls. This study adds to the constantly growing body of literature investigating ophthalmic manifestations of this deadly virus and demonstrates implications of microangiopathic changes induced by the virus on ocular structures.

Helya Aghazadeh, PGY-3

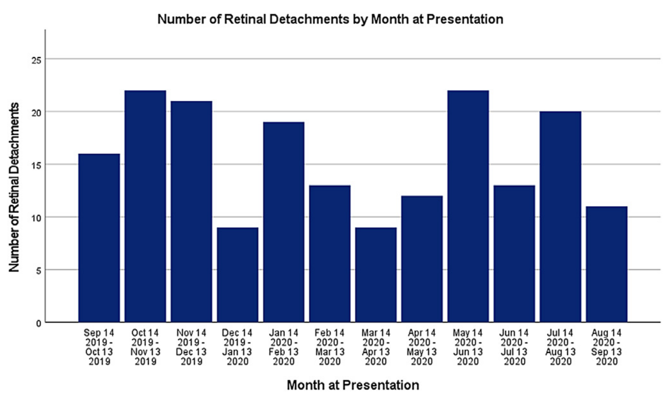
Article being referenced: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(21)00006-5/fulltext

References

1. World Health Organization. Pneumonia of unknown cause China. www.who.int/csr/don/05-january-2020-pneumonia-of-unkown-cause-china/en/. Accessed February 2, 2021.
2. World Health Organization. Coronavirus disease 2019 (COVID-19) Situation Report 51. https://apps.who.int/iris/bitstream/handle/10665/331475/nCoVsitrep11Mar2020-eng.pdf?sequence=1&isAllowed=y. Accessed February 2, 2021.
3. Government of Canada. COVID-19 signs, symptoms and severity of disease: A clinician guide. https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance-documents/signs-symptoms-severity.html#toc0. Accessed February 3, 2021.
4. Varga Z, Flammer AJ, Steiger P, et al. Endothelial cell infection and endotheliitis in COVID-19. Lancet 2020;395:1417–8.

https://doi.org/10.1016/j.jcjo.2021.03.003
ISSN 0008-4182

5. Turker I, Dogan C, Guven D, et al. Optical coherence tomography angiography findings in patients with COVID-19. Can J Ophthalmol 2021;56(2).
6. Abrishami M, Emamverdian Z, Shoeibi N, et al. Optical coherence tomography angiography analysis of the retina in patients recovered from COVID-19: a case-control study. Can J Ophthalmol 2021;56(1):24–30.



Resident Perspective: Impact of the COVID-19 pandemic on the characteristics of retinal detachments

Public health measures introduced to curb the COVID-19 pandemic have had profound impacts on health care access and delivery. There have been concerns about patients experiencing delays in accessing care for a number of urgent and emergent conditions, including in ophthalmology. In the current issue, Arjmand and colleagues examined these concerns in relation to rhegmatogenous retinal detachment (RRD). They performed a retrospective cohort study of patients with primary RRD presenting to a single hospital during the 6 months prior to and after the start of the first-wave lockdown in Ontario. Compared to those presenting prior to the lockdown, the patients that presented during the lockdown tended to have a larger area of detached retina, were more likely to have macula involvement, and had worse baseline visual acuity. Despite this, the authors did not find a difference in single surgery anatomic success rates or visual acuity outcomes 1-month postoperatively. Unexpectedly, time from symptom onset to presentation to the retina service also did not differ between the 2 time periods.[1]

Other studies looking at the same question in different settings have found conflicting results. A study in the United States found a higher rate of macula-off detachments during the pandemic compared to the corresponding period one year prior, but also found longer average delay to presentation and higher rates of proliferative vitreoretinopathy.[2] In contrast, a similar study in Germany found no difference in time to presentation, macula status, or baseline visual acuity.[3]

It is interesting to consider the causal mechanisms underlying these associations, and how they might account for inter-study variability. As the key issue appears to be impaired access to care, the theoretical model proposed by Levesque et al. may be useful. It distinguishes 6 sequential steps:

i. health care needs
ii. perception of needs and desire for care
iii. health care seeking
iv. health care reaching
v. health care utilization
vi. health care consequences.[4]

From the demand side, patients' fear of contracting SARS-CoV-2 infection and their lack of awareness of the urgency of retinal detachment symptoms could influence their perceived need and desire for care. Direct costs of using health services, as well as indirect costs (such as transportation and missed work), affect ability to reach and receive appropriate care. We might hypothesize that such barriers would be less significant in settings with publicly insured health services and pandemic income relief programs. On the supply side, public health messaging to avoid medical clinics and emergency departments, as well as closures of private optometry and ophthalmology clinics, may have impacted on patients' desire for care and ability to reach it. Restrictions on operating room volumes would affect health care reaching and utilization. One might expect, in settings with more restrictive lockdowns, that these factors would be significant.

Future studies ought to consider a theory-grounded cross-contextual analysis to inform strategies to mitigate the impact of pandemic control measures on patients' access to health care. Beyond the pandemic, focus groups exploring the public's awareness of retinal detachment symptoms, the urgency of these symptoms, and the most appropriate routes to care could be used to develop information campaigns and health system adjustments aimed at decreasing visual morbidity from this condition.

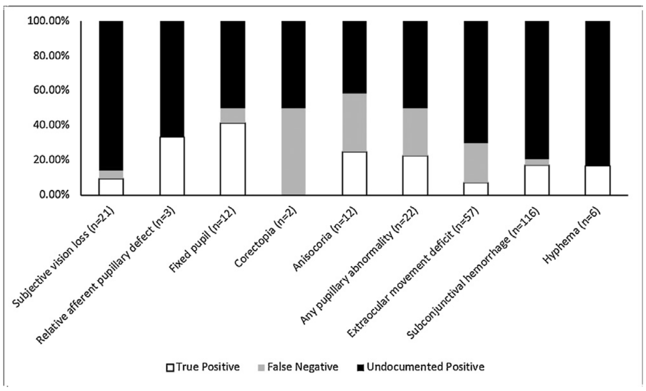
Gareth D. Mercer, PGY-4

Article being referenced: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(20)30842-5/fulltext

References

1. Arjmand P, Murtaza F, Eshtiaghi A, Popovic MM, Kertes PJ, Eng KT. Impact of the COVID-19 pandemic on the characteristics of retinal detachments: the Canadian experience. Can J Ophthalmol 2021;56(2).

2. Patel L, Peck T, Starr M, Ammar M, Khan M, Yonekawa Y, et al. Clinical Presentation of Rhegmatogenous Retinal Detachment during the COVID-19 Pandemic: A Historical Cohort Study. Ophthalmology 2020 Oct 13.
3. Kaupke N, Spitzer M, Kromer R. Treatment of retinal detachment during the COVID-19 pandemic: Did patients with retinal detachment seek treatment later during the COVID-19 pandemic? Results from a German university eye hospital J Ophthalmologe 2020 Oct 10.
4. Levesque JF, Harris MF, Russell G. Patient-centred access to health care: Conceptualising access at the interface of health systems and populations. Int J Equity Health 2013;12:18. Mar 11.



Resident Perspective: Primary care assessment of orbital trauma at a level 1 assessment centre

Facial trauma resulting in orbital fractures are often associated with orbital and periorbital injuries. Previous studies have reported rates of ocular injury in the context of orbital fractures ranging between 26% to 40%.[1,2] With serious visual impairment as a potential consequence of traumatic ocular injuries, a proper and timely ophthalmological assessment is paramount. However, ophthalmologists are often not the first physician to encounter an acute trauma patient. The conveyed urgency of ophthalmology consultation in such situations is, in part, influenced by the examination findings of the primary assessing physician. Yet, most nonophthalmologist physicians report a lack of familiarity with ocular pathology and their evaluation.[3] The resulting ineffective triage can increase morbidity and mortality for ocular trauma patients.

In this issue, Gaffar and colleagues conducted a retrospective chart review of 243 patients with orbital fractures to compare the initial assessment by primary care physician (the first physician to evaluate the patient) to that of the ophthalmology service.[4] The primary care assessment (PCA) performed by the initial assessing physician included less examination elements than the assessment performed by ophthalmology. Specifically, the PCA less often included inquiry about reduced vision, visual acuity measurements, intraocular pressure, afferent pupillary defect, and examination of ocular motor deficits. However, there was generally a high percentage agreement between assessment elements that were completed by both examiners. The kappa coefficient was highest in relative afferent pupillary defects and hyphemas. The average sensitivity and specificity of PCA elements were 60.6% ± 34.9% and 84.2% ± 28.3%, respectively. Taking these results together, the good specificity suggests when an examination element is completed, it is usually correct. However, the sensitivity of PCA elements has a large variation because there were many undocumented examination elements. It is unclear whether this is due to the element being undocumented or not simply completed. Gaffar and colleagues found that there were also a high percentage of undocumented positives and false negatives.

In their study, Gaffar and colleagues postulate reasons for their findings and discrepancies in examination components. There may be time constraints on primary care physicians given the acute trauma situation and need for an entire head-to-toe examination. Additionally, ophthalmology uses specific equipment to perform parts of the examination, such as tonometers and slit lamps. Another reason is that perhaps primary care physicians only document findings of which they are certain. Ophthalmology does not usually constitute a significant portion of medical school training and one study showed that 26% of physicians reported having no training in ophthalmic emergencies and 69% stating they have no confidence in dealing with ophthalmic cases.[5]

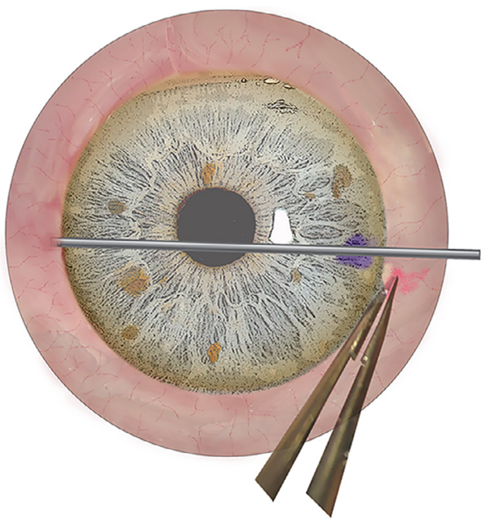
With an increasing number of emergency department visits and ophthalmology being one of the most frequently consulted services in the hospital,[6] effective consultation is necessary for resource allocation and optimizing wait times. Gaffar and colleagues suggest the need to improve the sensitivity of the initial ophthalmologic assessment by primary care physicians and a potential overdependence on ophthalmology service assessments in trauma cases. How best can these services work together to provide effective consultation and optimize patient care? As ophthalmology residents in academic centres, some of which are level 1 trauma centres, many of us have had the experience of triaging consults for trauma patients with orbital fractures. Being in this position opens up excellent opportunities for interdisciplinary learning and teaching to improve assessment and management of acute patients in a timely manner.

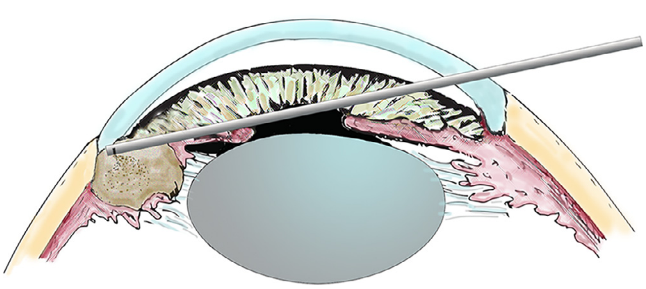
Jenny Qian, PGY-2

Article being referenced: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(20)30713-4/fulltext

References

1. Kreidl KO, Kim DY, Mansour SE. Prevalence of significant intraocular sequelae in blunt orbital trauma. Am J Emerg Med 2003;21(7):525–8.
2. Al-Qurainy IA, Stassen LF, Dutton GN. Moos KF, el-Attar A. The characteristics of midfacial fractures and the association with ocular injury: a prospective study. Br J Oral Maxillofac Surg 1991;29(5):291–301.
3. Tan MM, Discoll PA, Marsden JE. Management of eye emergencies in the accident and emergency department by senior house officers: a national survey. J Accid Emerg Med 1997;14 (3):157–8.
4. Gaffar J, Nassrallah G, Kondoff M, Ross M, Deschênes J. Primary care assessment of orbital trauma at a level 1 trauma center. Can J Ophthalmol 2021;56(2).
5. Flitcroft DI, Westcott M, Wormald R, Touquet R. Who should see eye casualties? A comparison of eye care in an accident and emergency department with a dedicated eye casualty. J Accid Emerg Med 1995;12(1):23–7.
6. Sridhar J, Isom RF, Schiffman JC, et al. Utilization of Ophthalmology-Specific Emergency Department Services. Semin Ophthalmol 2018;33(2):185–90.





Minimally invasive ciliary body tumor biopsy: a modified FIT

Innovations in the front lines of ophthalmology continue to shape the standard of care, introducing more effective and safer alternatives to diagnose challenging intraocular pathology. In this issue, Paul Finger and colleagues demonstrated a modified Finger Iridectomy Technique (FIT) to biopsy ciliary body tumors.[1] To identify the underlying diagnosis of any ciliary body mass and direct further management, a biopsy is often required. In general, intraocular biopsy techniques include paracentesis, fine-needle aspiration biopsy (FNAB), iridocyclectomy, and incision and excisional biopsies. However, these techniques may carry the risk of laceration to the iris vessels, damage to the lens, larger wound creation, or seeding of the tumor.[2,3]

Finger's iridectomy technique was first described in 2005 in the British Journal of Ophthalmology as a minimally invasive and effective biopsy technique for anterior segment tumors using a 25 gauge aspiration cutter (vitrector).[4] This technique was found to be highly effective, yielded large amounts of tissue and resulted in minimal complications. This same technique was re-employed in the ciliary body tumor case series using a 27-gauge aspiration cutter. In the current article, the authors described their surgical techniques.[1] Prior to surgery, miosis was achieved with 2% topical pilocarpine. In the operating room, with standard preparation and draping, a clear corneal microincision was made to access the anterior chamber 180 degrees from the tumor site. The anterior chamber was stabilized using sodium hyaluronate 1%. Next, a 27-gauge aspiration cutter was introduced and advanced across the chamber to the iris root and ciliary body junction. The settings of the vitrector were set at 300 mm Hg and 600 cuts/minute. The cutter was advanced to the tumor and samples were obtained through the iridotomy. Once the vitrector was withdrawn from the eye, a 3-cc syringe was attached to the effluent connector to flush the specimen from the tubing into the syringe. Adequate sampling was obtained without any crush injury to the samples. The wound closure was made watertight via hydroseal. Although 4/5 cases experienced transient hyphema, there were no post-operative elevation in intraocular pressures, trauma to the lens or zonules or any clear indication of seeding of the tumors. Cases of ciliary body melanoma (3/5), leiomyoma and melanocytoma were diagnosed followed by prompt treatment.

As the FIT technique is a hybrid of the FNAB and incisional biopsy, it allows for acquisition of both cells and tissue for immunohistochemistry, histopathology and cytology. This technique also reduces the incidence of inadequate sampling often observed in FNAB, and minimizes the defect that would otherwise be caused by larger incisional/more invasive punch biopsies.[1] When, FNAB samples are inadequate, an open flap incision biopsy can be performed to yield greater tissue sample.[5] However, there appears to be a consensus that transcorneal approach reduces concerns about tumor seeding.[6] Finger's study also addressed that although liberating tumor cells may still remain a risk during transcorneal FIT biopsy[2], there have not been any documented cases of seeding reported to date.

In summary, ciliary body tumors reside behind the iris and remain asymptomatic until growth is enough to affect neighboring structures. They can be visualized if the pupil is adequately dilated on slit lamp examination or using gonioscopy and imaged using ultrasound biomicroscopy. If left untreated, patients may suffer visual loss, visual field alteration, elevated intraocular pressures or metastasis in up to 25% in 5 years[7], in the case of uveal melanoma. This study introduces a 27-gauge aspiration cutter to perform minimally invasive biopsies of ciliary body mass when lesions are suspected. The procedure appears highly effective and safe with few short-term complications.

Prima Moinul, PGY-5

Article being referenced: https://www.canadianjournalofophthalmology.ca/article/S0008-4182(20)30710-9/fulltext

References

1. Finger PT, Chua MR, Iacob CE. Micro-incision, trans-iridal aspiration cutter biopsy for ciliary body tumours. Can J Ophthalmol 2021;56(2). doi: 10.1016/j.jcjo.2020.08.002.
2. Schefler AC, Gologorsky D, Marr BP, Shields CL, Zeolite I, Abramson DH. Extraocular extension of uveal melanoma after fine-needle aspiration, vitrectomy, and open biopsy. JAMA Ophthalmol 2013;131(9):1220–4. doi: 10.1001/jamaophthalmol.2013.2506.
3. Petousis V, Finger PT, Milman T. Anterior segment tumor biopsy using an aspiration cutter technique: clinical experience. Am J Ophthalmol 2011;152(5):771–5 .e1. doi: 10.1016/j.ajo.2011.04.032.
4. Finger PT, Latkany P, Kurli M, Iacob C. The Finger iridectomy technique: small incision biopsy of anterior segment tumours. British Journal of Ophthalmology 2005;89(8):946–9. doi: 10.1136/bjo.2004.062653.
5. Salvi SM, Singh AD. Diagnostic and Management Challenges of Ciliary Body Tumor in an African-American Patient. Ocul Oncol Pathol 2015;2(1):16–9. doi: 10.1159/000381809.
6. Karcioglu ZA, Gordon RA, Karcioglu GL. Tumor seeding in ocular fine needle aspiration biopsy. Ophthalmology 1985;92(12):1763–7. doi: 10.1016/s0161-6420(85)34105-2.
7. Intraocular Tumors: An Atlas and Textbook. Accessed February 9, 2021. https://shop.lww.com/Intraocular-Tumors—An-Atlas-and-Textbook/p/9781496321343