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## Limitations of Telemedicine Vs. Face-to-face Eye Examination in a Patient with New Headaches

Joseph Hallak, OD

Northport VAMC, Private Practice, drjhallak@aol.com

Danielle Kalberer, OD

Northport VAMC, danielle.kalberer@va.gov

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## Limitations of Telemedicine Vs. Face-to-face Eye Examination in a Patient with New Headaches

### Abstract

**Background:** During the emergence and rise of COVID-19, precaution directives and limitations on in-person eye examinations re-routed a significant portion of care to telemedicine and virtual modalities. While these technologies allowed for healthcare communications that otherwise could not occur during such trying times, there are major limitations to these sanctioned applications. This report will present a seemingly benign case that could have easily been re-routed from an in-person examination to a telemedicine version due to the patient's seemingly "routine" vision complaints.

**Case Report:** A 50-year-old male patient contacted the eye clinic with a complaint of a minor, new, unexplained headache that he felt may have been related to a change in his vision. The patient requested a telehealth examination with the eye clinic to avoid exposure to COVID-19. After due consideration, the optometry clinic recommended an in-person eye examination despite the very heavy limitations requiring "emergency only" patients in the hospital. On examination it became evident that the cause of the headaches was a rebound hypertensive crisis and the patient did require emergency medical services to stabilize his condition.

**Conclusion:** This case was ultimately a serious emergency that would have been missed via a remote evaluation. The patient was fortunate to have been given a face-to-face appointment during a time of heavy restrictions and essentially emergency-only appointments. This should serve as a reminder to all eye care practitioners that new headaches are a symptom requiring an in-person evaluation, should a future event require similar clinical limitations. Despite the rarity, even a light headache in an early presbyope, as seen in this case, could be the only overt sign of an emergent condition.

### Keywords

covid-19, telehealth, disc edema, hypertensive crisis, headache

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## INTRODUCTION

Doxy.me, Teledoc, Zoom and even Facetime are a few of the platforms being widely utilized by healthcare providers to connect with their patients amid the COVID-19 pandemic. While some of this re-routing was due to a mandated government policy, some was also due to provider and patient discretion, and preference to avoid risk. The extensive use of telemedicine is somewhat new, and providers and patients alike struggle to discern when it may or may not be appropriate going forward. Generally, for “routine care” in certain medical fields, telemedicine can be enough. Eyecare is not one of those fields. While we can check vision on a calibrated acuity chart, perform Amsler grid testing, examine the external ocular health and perform several other auxiliary tests, we do not have readily available ways to evaluate the retina, perform neurological testing or imaging such as visual fields or optical coherence tomography (OCT). While there are ways to provide a remote “comprehensive” eye examination, and new emerging technology to perform remote visual field testing and fundus photography, they are not without extensive and expensive technological accommodations that most optometrists do not have at their fingertips.

## CASE STUDY

### *PATIENT HISTORY*

[Note: At the time of this interaction, the medical center was under strict pandemic protocol and only permitting emergency medical care; all routine care was cancelled with re-routing to telehealth modalities when possible.]

A 50-year-old male patient called the optometry clinic requesting a virtual appointment. He reported a new, light headache for several weeks and thought that he may need reading glasses to alleviate his symptoms. On further probing, the patient mentioned the headache presented with “strange vision on the left side for the past two weeks” and without any other associated factors. He did not recall ever having a previous eye examination or previous glasses. Based on his symptoms and status as a new patient it was recommended that he be evaluated in-person. The patient was very hesitant to agree to an in-person eye examination due to risks of COVID-19 exposure. After some hesitation and back-and-forth, the patient agreed.

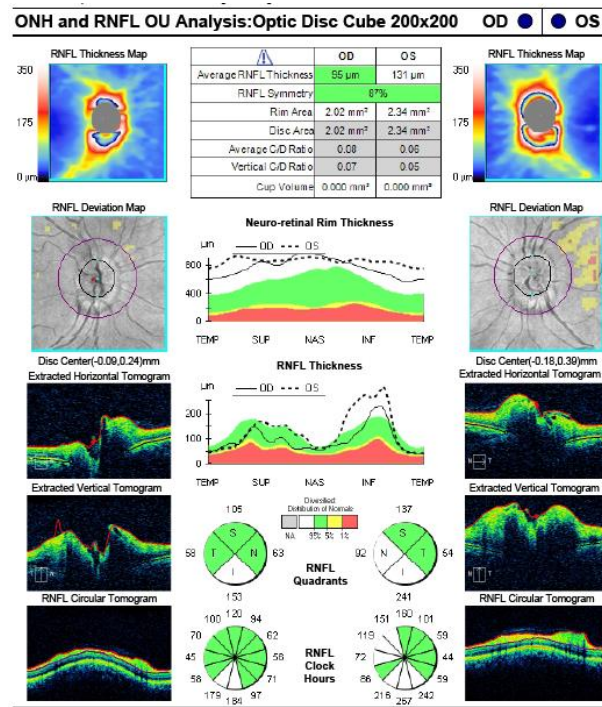
A few hours later, when the patient presented for his eye examination, the aforementioned chief complaint was confirmed and consistent. His medical history included post-traumatic stress disorder (PTSD), hyperlipidemia, asthma, hypertension, and morbid obesity. It is worth noting that he moved with a slow

shuffling gait. Medications included albuterol, atorvastatin, bupropion, clonidine, amlodipine, and hydrochlorothiazide.

His best corrected visual acuities (BCVAs) were 20/20 and 20/20- in the right and left eyes respectively. There was no afferent pupillary defect (APD) or color deficiency on Ishihara or red cap, albeit the patient remarked that the color plates “looked funny with the left eye.” Extraocular motilities were normal, as were confrontation visual fields (CVF). Intraocular pressures were 17 mm Hg in each eye (8:30 AM) via applanation and the external slit lamp examination was unremarkable.

A dilated fundus examination revealed cup-to-disc ratios of 0.15 in both eyes with frank edema; hyperemic and edematous optic nerves of grade 1 disc edema in the right eye and grade 2+ edema of the left eye with one small splinter hemorrhage upon careful inspection. The blood vessels appeared somewhat tortuous in each eye.

An OCT of the optic nerves showed increased retinal nerve fiber layer (RNFL) thickness which was consistent with the mild disc edema in the right eye and profound in the left (see Figure 1).



The patient's blood pressure (BP) was taken; it was 211/139 mm Hg, measured in the right arm with the patient in a seated position at 9:50 am. On further discussion, the patient admitted that he had self-discontinued two of his hypertension medications (clonidine: alpha agonist and amlodipine: Ca channel blocker) due to undesirable side effects. He had experienced lower limb edema from amlodipine and dizziness and lethargy from clonidine. Further testing, such as Humphrey visual field (HVF), was deferred and the patient was immediately sent to the Emergency Department for urgent management of a hypertensive crisis.

#### *TREATMENT*

Prompt Emergency Department referral in a multidisciplinary setting was made for BP control as well as magnetic resonance imaging (MRI) to rule out increased intracranial pressure that would have serious consequence. According to the Emergency Department report, BP taken on arrival was 220/118 mm Hg, and 178/100 mm Hg when repeated at the conclusion of the exam; the rest of the physical exam was within normal limits. The treatment plan at that time included an adjustment of hypertensive medications and an MRI with and without contrast the same day. The MRI showed no infarct and no brain mass; however, chronic small vessel disease was noted. Lumbar puncture was not deemed necessary by the Emergency Department physician upon discharge.

#### *EXAM FINDINGS, 2 WEEKS LATER*

At the subsequent follow up, the patient's BCVAs were stable at 20/20 in each eye. His pupillary reactions, ocular motility, color vision and confrontation visual fields all remained normal. Repeated fundus exam showed little to no improvement in the appearance of the disc edema. His BP was taken and found to be 160/100 mm Hg in right arm, seated. This was close to the level recorded upon discharge from the Emergency Department encounter. The patient was educated about strict blood pressure control and urged to maintain strong doctor-patient communication.

#### *MANAGEMENT*

The treatment plan did not consist of any ocular components, but the systemic management was emphasized. The recommendations given by his primary care provider (PCP) included weight loss management, compliance with his new hypertensive treatment regimen, and continued communication with his PCP if undesirable adverse effects should occur (rather than self-discontinuing prescribed medications). A follow up with optometry was scheduled after 1 month to re-

evaluate the optic nerves and perform a HVF, for which an enlarged blind spot was anticipated. Referrals to social work and dietician services were also considered.

## **DISCUSSION**

### *OPTIC DISC EDEMA*

Optic disc edema can suggest an array of conditions including inflammatory status, increased intracranial pressure, or ischemia. It is a common red flag for eyecare providers and emergency department physicians alike. Immediate work-up often includes blood pressure evaluation, MRI and lumbar puncture. According to Sachdeva et al., the factors most associated with optic nerve edema from an emergency room standpoint are headache (which was a primary presenting symptom for this patient), blurred vision, neurologic deficit, and increased BP.<sup>1</sup>

### *HYPERTENSIVE CRISIS*

Hypertensive crisis is defined as a systolic BP reading of >180 mm Hg or a diastolic reading of >120 mm Hg. This is further classified as a hypertensive urgency versus emergency depending on the organs of involvement. If no end organ damage has occurred, the condition is classified as a hypertensive urgency; if end organ damage occurs (such as cardiac, renal, or neurologic involvement), the condition would be classified as a hypertensive emergency.<sup>2</sup>

### *REBOUND HYPERTENSIVE CRISIS*

It was postulated that the hypertensive crisis in this case was, in fact, a rebound hypertension due to self-discontinuation of medications. Malaty reported a similar case in a 46-year-old male patient who presented with new headaches, albeit severe in that case, and a BP of 230/130 mm Hg. He had taken an erectile-dysfunction medication, an alpha-2-antagonist, which he did not know could counteract the clonidine he was prescribed. This led to inefficacious clonidine treatment and a rebound hypertensive emergency.<sup>3</sup> In the case described in this report, the patient was on a multiple medication regimen for hypertension treatment and had discontinued clonidine and amlodipine due to intolerable lower limb edema. This led to a similar hypertensive end point. The patient in this case report did not use erectile-dysfunction medication.

### *SIDE NOTE ON DIFFERENTIAL DIAGNOSIS*

Idiopathic intracranial hypertension (IIH) was one of the primary differential diagnoses. IIH is a diagnosis of exclusion in the absence of any intracranial

pathology. Headache is the most common symptom (reported in 85% or more of cases) followed by transient visual obscuration (reported in 68% or more of cases).<sup>4</sup> Obesity is the most associated risk factor along with female gender. Weight loss of as little as 15% of total body weight is helpful, but any gain thereafter poses a high risk of relapse.<sup>5</sup> Lumbar puncture would have been indicated with higher IIIH suspicion. In this case it was not deemed necessary since the diagnosis of hypertensive crisis had been made. Non-arteritic anterior ischemic optic neuropathy (NAION) was also high on the list of differential diagnoses. Giant cell arteritis (GCA) was not strongly considered due to the patient's lack of risk factors, lack of profound unilateral vision loss, jaw claudication and/or temporal artery tenderness. Additionally, optic disc drusen can give rise to pseudo-papilledema. Disc drusen were ruled out based in part on OCT image, on clear edema and the presence of a splinter hemorrhage.

#### *TELEHEALTH CONCERNS*

Given good visual acuity and vague non-descript symptoms, this case could have been missed and dismissed via telemedicine. Even the most perceptive examiner could not have possibly uncovered the shuffling gait suggestive of lower limb edema or had access to the patient's vital signs. At the very least, an astute examiner with special diagnostic acumen would have uncovered the self-discontinuation of hypertensive medications on medical history intake, then recommended referral to an internist, a walk-in clinic, or the Emergency Department for further evaluation. While this would have also led the patient to the appropriate care, it would have delayed it with possible serious complications.

This case raises questions about risk of misdiagnosis with telehealth and rerouting of seemingly routine chief complaints to virtual care over in-person care. Research in this area is scarce despite the volumes of research in support of telehealth benefits. Davoodi et al. validated the physician perspective that "something could be missed" since a patient may not realize it is a problem.<sup>6</sup> For example, in a telemedicine visit where only a patient's shoulders and up are in view, an extremity or mobility issue would be missed. In this particular case report, the patient's shuffling gait, due to extremity numbness, would not have been seen. More so, Davoodi et al. recognized the lack of access to check a patient's vital signs remotely if they do not have a device or ability to perform the task for him or herself.<sup>6</sup> In this particular case, vitals were the key to diagnosis and prompt treatment and could not have been obtained remotely.

It would not be surprising if other similar cases were re-routed to telemedicine during the COVID-19 pandemic because of the difficult judgement calls physicians were required to make. As we resume in-person care, more information will be available regarding the true success and applicability of telehealth examinations in eye care. Patient safety concerns regarding potential misdiagnosis due to telehealth limitations and the medicolegal impacts for physicians require and deserve further research and exploration.

## CONCLUSIONS

Hypertensive crisis was diagnosed in this patient due to uncontrolled hypertension, a life-threatening condition. This case illustrates the urgent steps that an eyecare professional needs to take under these circumstances, including urgent referral to an Emergency Department. If treatment can be initiated with haste, this decreases the risk of serious, even fatal, outcomes.

Since no ocular therapy is of value in this situation, the provider needed to ensure that underlying conditions were managed, and that the patient verbalized understanding of the severity of the condition and importance of therapeutic compliance.

Fortunately for the patient, he was evaluated in a hospital group setting with a readily established system of accessible referrals. The retina specialist who briefly looked at this case believed the patient's life had been saved by timely intervention. Given the COVID-19 pandemic, such a condition would have been easily missed via telemedicine examination and could have resulted in a life-threatening or at least quality of life altering situation.

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