

Look beyond the retinopathy: The incidental finding of a brain tumour

Journal of Telemedicine and Telecare
0(0) 1–3
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1357633X20955123
journals.sagepub.com/home/jtt



Caroline Vloka  and Evan Waman

Abstract

We report the case of a 33-year-old woman who was found to have optic-nerve head swelling on fundus photographs obtained for telemedicine diabetic retinopathy screening. The patient was found to have a large vestibular schwannoma on brain imaging. This case shows the added benefit of implementing timely changes in management in response to significant incidental findings on tele-ophthalmology diabetic retinopathy screening, which can lead to potentially life- and vision-saving interventions.

Keywords

Tele-ophthalmology, diabetic retinopathy, optic-nerve head swelling, headache, brain tumour, telemedicine

Date received: 18 July 2020; Date accepted: 8 August 2020

Introduction

Tele-ophthalmology for the purpose of diabetic retinopathy screening has been shown to be accurate and cost-effective.^{1,2} Prior studies have also demonstrated that primary care-based telemedicine screening increased exam rates among individuals with diabetes and among those subgroups of patients who are at a high risk of missing recommended eye examinations.^{3,4}

In offices that are equipped to obtain screening fundus photographs, screening is often incorporated into the general diabetic care visit. The photographs are then transmitted to a remote-reading ophthalmologist via a secure network connection. The reading physician reviews the patient history and image quality and will then determine a screening diagnosis and provide recommendations for appropriate follow-up. In one Italian study, efficient screening of large populations has led to the discovery of a large number of incidental fundus abnormalities. Age-related macular degeneration was found in 11%, features suspicious for glaucoma in 15% and hypertensive retinopathy in 34% of 3679 gradable eyes.⁵ We present a case in which the incidental findings on images from a tele-ophthalmological diabetic retinopathy screening led to drastic changes in patient management.

diabetes mellitus without retinopathy presented to her primary-care physician's (PCP) office for a routine diabetic evaluation. The exam included a diabetic retinopathy screen using fundoscopic images obtained at her PCP's office and interpreted remotely by an ophthalmologist. The patient was found to have bilateral optic-nerve head (ONH) swelling (Figure 1). The interpreting physician contacted the patient's PCP and recommended urgent evaluation by an ophthalmologist at the emergency department (ED).

In the ED, the patient reported headaches that had been different from her usual migraines for a month prior to presentation. The pain was described as dull and aching, 3–4/10 in intensity and mainly in the occipital region and behind the eyes. She endorsed pulsatile tinnitus, exacerbation with positional changes and occasional nausea and vomiting. On exam, she had a visual acuity of 20/20-3 bilaterally, no RAPD, normal colour vision and normal extraocular motion. A dilated fundus exam confirmed bilateral ONH swelling with 360° oedema and obscuration of vessels. Magnetic resonance imaging revealed a 3.7 cm extra-axial right cerebellopontine angle mass with mass effect on the pons

Case presentation

A 33-year-old woman with a past medical history of obesity, hypercholesterolemia, migraines and type 2

University of Pittsburgh Medical Center, USA

Corresponding author:

Caroline Vloka, 203 Lothrop St, Pittsburgh, PA 15213, USA.
Email: vloka@cnp@upmc.edu

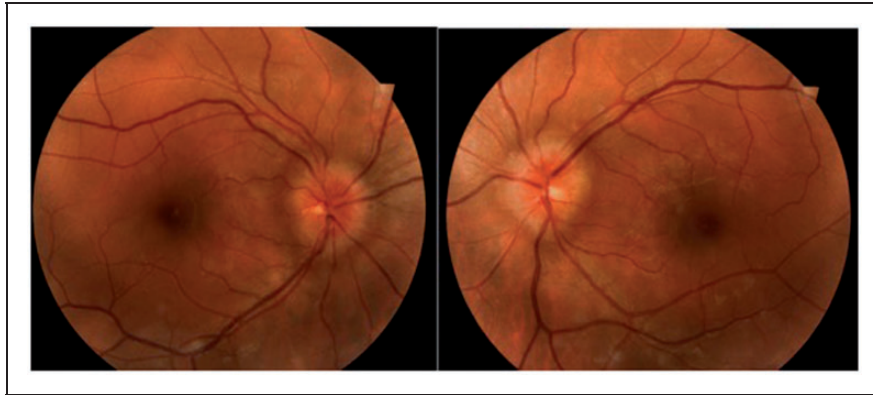


Figure 1. Fundus photographs of right and left eye showing bilateral optic-nerve head swelling, with 360° blurring of disc margins and mild obscuration of blood vessels. There is no evidence of diabetic retinopathy in either eye.

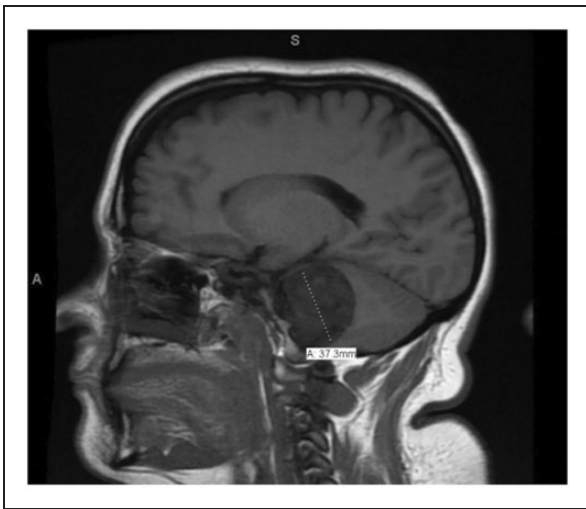


Figure 2. Magnetic resonance imaging of the brain showing 3.7 cm extra-axial right cerebellopontine angle mass with mass effect on the pons and right middle cerebellar peduncle, as well as partial effacement of the fourth ventricle.

and right middle cerebellar peduncle, as well as partial effacement of the fourth ventricle (Figure 2). There was also evidence of cerebrospinal fluid outflow obstruction and flattening of the optic discs compatible with increased intracranial pressure (ICP). A preoperative Humphrey visual field test (24-2) was normal without any scotomas.

The patient was diagnosed with a likely vestibular schwannoma and was scheduled for a staged resection with neurosurgery and otolaryngology one week after initial evaluation. At one month follow-up, fundus examination revealed persistent ONH swelling. The patient was started on Diamox. However, her headaches continued, and so a ventriculoperitoneal shunt was placed. Four months later, the patient presented for completion of the staged resection of the vestibular

schwannoma. On her preoperative exam, there was an improvement in the appearance of her optic nerves. After the full tumour was resected, the patient reported improvement in her headaches. She will continue to be followed up by the neurosurgery and ophthalmology departments.

Discussion

Images obtained for telemedicine diabetic retinopathy screening encompass the vitreous, retina and nerve. This technique has the potential to capture pathologies in any of the aforementioned structures. Our patient was found to have bilateral ONH swelling on imaging. She was sent to the ED for further work-up and was found to have a large vestibular schwannoma causing elevated ICP.

In two studies evaluating patients in the ED found to have ONH swelling, the most common cause of the fundus findings was elevated ICP due to idiopathic intracranial hypertension.^{6,7} On the other hand, the overall incidence of vestibular schwannomas is only about 1/100,000 person-years in the USA.⁸ However, any elevation in ICP can be vision threatening and requires immediate evaluation and treatment.

Our patient did not report any visual symptoms but had been experiencing a change in her usual headache symptoms, which was the only red flag sign in the patient's history. One study found that 8.5% of patients presenting to the ED with a chief complaint of headache had relevant ocular fundus abnormalities.⁹

In the authors' unpublished data of approximately 13,180 gradable encounters collected over the course of five years, there was a fair number of incidental findings. These included 1695 patients with findings concerning for glaucoma, 418 patients with macular drusen concerning for macular degeneration, 100 patients with hypertensive changes, 25 patients with

ONH swelling, 15 eyes with macular holes and 13 patients with white-centred haemorrhages (Roth spots).

The efficacy of tele-ophthalmology for the monitoring and screening of diabetic patients has been well established. This case shows the added benefit of implementing timely changes in management in response to significant incidental findings which can lead to potentially life- and vision-saving interventions.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship and/or publication of this article.

ORCID iD

Caroline Vloka  <https://orcid.org/0000-0002-9064-6491>

References

1. Pasquel F, Hendrick A, Ryan M, et al. Cost effectiveness of different diabetic retinopathy screening modalities. *J Diabetes Sci Technol* 2016; 10: 301–307.
2. Scarpa G, Urban F, Vujosevic S, et al. The nonmydriatic fundus camera in diabetic retinopathy screening: a cost-effective study with evaluation for future large-scale application. *J Ophthalmol* 2016.
3. Daskivich L, Vasquez C, Martinez Jr C, et al. Implementation and evaluation of large scale teleretinal diabetic retinopathy screening program in the Los Angeles County Department of Health Services. *JAMA Intern Med* 2017; 177: 642–649
4. Jani P, Forbes L, Choudhury A, et al. Evaluation of diabetic retinal screening and factors for ophthalmology referral in a telemedicine network. *JAMA Ophthalmol* 2017; 135: 706–714.
5. Mastropasqua L, Perilli R, D'Aloisio R, et al. Why miss the chance? Incidental findings while telescreening for diabetic retinopathy. *Ophthalmic Epidemiol* 2020; 27: 237–245.
6. Sachdeva V, Vasseneix C, Hage R, et al. Optic nerve head edema among patients presenting to the emergency department. *Neurology* 2018; 90: e373–e379.
7. Deschamps R, Dehais C, Heran F, et al. Bilateral papilledema: prospective study of fifty patients. *Rev Neurol* 2008; 164: 42–46.
8. Propp J, McCarthy B, Davis F, et al. Descriptive epidemiology of vestibular schwannomas. *Neuro-oncol* 2006; 8: 1–11.
9. Thulasi P, Fraser C, Biousse V, et al. Nonmydriatic ocular fundus photography among headache patients in an emergency department. *Neurology* 2013; 80: 432–437.