TELEMEDICINE EVALUATION OF PRIMARY CARE REFERRALS FOR SUSPECT PAPILLOEDEMA: A 12-MONTH STUDY OF 224 CONSECUTIVE REFERRALS.

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Since 2016, referrals from primary care to hospital neuro-ophthalmology clinics have increased by 600%, placing a considerable strain on specialist services[1].One of the diagnostic groups sent for urgent assessment is suspect pathological disc swelling, but previous hospital-based studies have indicated that up to 90% of possible papilloedema patients seen in clinic (from all referral sources) are false positives[2].
This UK based study was undertaken to evaluate the role that comprehensive data collection in the community plus asynchronous ophthalmologist telemedicine assessment, can play in addressing this problem.

METHOD

1. We evaluated the records of all patients seen in Evolutio Community Eye care clinics after referral from primary care (either from General Practitioners or high street optometrists) as suspect papilloedema/swollen discs, in the twelve-month period December 2023-November 2024.
2. All cases had their initial community assessment performed by trained optometrists, collecting a standard set of observations including visual acuity, colour vision and pupil reactions, threshold field analysis, disc photographs and OCT images. These results were then scrutinised by asynchronous telemedicine by any one of a panel of ophthalmologists.
3. Telemedicine decisions about possible papilloedema - and the need for onward referral for a formal neuro-ophthalmology opinion -were made on the basis of
   - Symptoms
     - Postural related headaches
     - Transient visual obscurations
     - Tinnitus
   - Disc appearance on 2-D photographs including
     - haemorrhages,
     - cotton wool spots
     - obscuration of the major blood vessels by the retinal nerve fibre layer
     - peripapillary wrinkles,
   - OCT features
     - nasal peripapillary retinal nerve fibre layer thickness of over 150 microns
     - peripapillary subretinal fluid
     - angulation of retinal pigment epithelium at the disc

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FINDINGS

- 224 patients were referred from primary care with possible swollen or elevated discs in the twelve month period. Ages ranged from 2 to 81 with 29 cases under the age of 16: 78% were female. 145/224 (65%) had been referred for urgently. Symptoms of headache were noted in less than half the group (104/224). No patient had noted transient visual obscurations or diplopia.
- 189/224 (84.4%) were assessed as having either normal or congenitally anomalous optic discs, including tilted or oblique discs.
- 35 /224 patients (15.6%) were referred on for further assessment of disc elevation. Figure 1shows the initial diagnoses made in community clinic. In the probable papilloedema group, only two were graded Frisen 3: none were worse (Figure 3).
- In this group, 28/35 were female (80%), 18/35 had symptoms of headache. 2/35 were under 16 years old.

FIGURE 1
Community clinic diagnoses of 35 cases referred to hospital

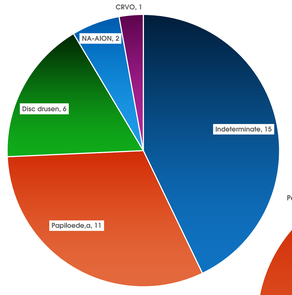
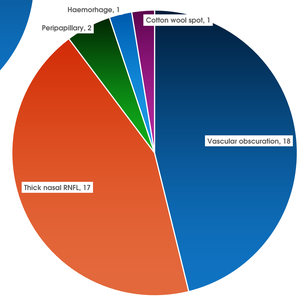


FIGURE 2
Signs of Papilloedema



DISCUSSION POINTS

- Elevation of the optic disc out of the plane of the retina is not of itself an abnormal physical sign and most patients (84%) referred into secondary care for possible papilloedema in the UK by optometrists or GPs do not appear to have pathological disc swelling. Only 11 of the total 224 cases (5%) seen were thought to have probable papilloedema. These are similar figures to those recently reported using a model virtual clinic in hospital2.
- It would be useful to have automated systems in place to identify these 95% false positives, but while AI solutions are in development, they are not yet in place for clinical use REF and performing full investigations (including neuroimaging and fluorescein angiography) would be time and resource consuming.
- Clinically, the most widely used clinical classification of disc swelling has been the Frisen system4 – however, this was developed in patients with established papilloedema and is not very consistent when assessing mild/early disc swelling.5 In this study, (probably biased away from marked papilloedema and patients with obvious neurological conditions as these would be sent directly to hospital Emergency departments), no single feature was specific to indicate the need for onward referral and investigation:

Figure 3a: example of one of the referrals not sent on to hospital eye services. No haemorrhages or cotton wool spots, no vascular obscuration on the discs or peripapillary wrinkles, nasal RNFL less than 150 microns.

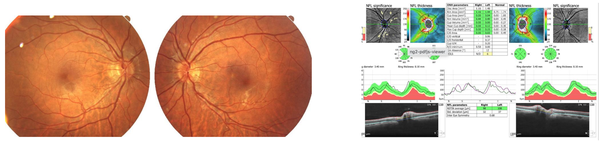
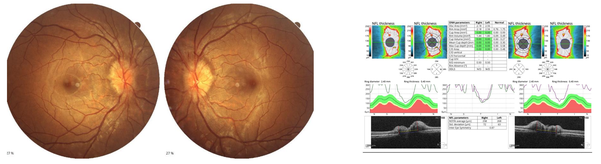


Figure 3B: example of one of the referrals sent on to hospital eye services with papilloedema equivalent to Frisen 3 grading.



symptoms were commoner in the subset of patient needing referral, but not enough to be a sole discriminator of the need for referral. Signs indicative of the need to refer on from initial assessment were most commonly nasal retinal nerve fibre layer thickness of over 150 microns6 and obscuration of any part of the major vessels on the disc.

- Females were much more commonly referred for suspect swollen discs and were similarly commoner in the group then sent on to hospital. Women are more common in all series of true papilloedema,7possibly because of the prevalence of IIH: why they should also be over represented in the overall group of suspects referred is not clear.

CONCLUSION

Most primary care referrals for papilloedema /disc swelling were assessed to be false positives and did not require onward hospital referral.

Evaluating patients with suspect disc elevation using community data collection plus a telemedicine system to check for specific features of papilloedema is effective in reducing the burden of referrals to hospital neuro-ophthalmology services.

1. McNicholl C, Gill A, Harrison R, Atan D. Impact of the COVID-19 pandemic and Honey Rose case on hospital attendances of patients suspected to have papilloedema. Eye (Lond). 2023;37(10):2157-2159. doi:10.1038/s41433-022-02310-0
2. Jefferis JM, Griffith N, Blackwell D, Batty R, Hickman SJ, Pepper IM. Is a virtual clinic model a safe and effective way for assessing patients referred with suspiciously blurred optic discs? The blurred disc clinic. Eur J Ophthalmol. 2021;31(6):3456-3462. doi:10.1177/1120672120976043
3. Poostchi A, Awad M, Wilde C, Dineen RA, Gruener AM. Spike in neuroimaging requests following the conviction of the optometrist Honey Rose. Eye (Lond). 2018;32(3):489-490. doi:10.1038/eye.2017.274
4. Frisén L. Swelling of the optic nerve head: a staging scheme. J Neurol Neurosurg Psychiatry. 1982;45(1):13-18. doi:10.1136/jnnp.45.1.1
5. Sinclair AJ, Burdon MA, Nightingale PG, et al. Rating papilloedema: an evaluation of the Frisén classification in idiopathic intracranial hypertension. J Neurol. 2012;259(7):1406-1412. doi:10.1007/s00415-011-6365-6
6. Pramil V, Tam M, Vuong LN, Hedges TR 3rd. Upper Limit of Retinal Nerve Fibre Layer Thickness in Patients with Pseudopapilloedema. Neuroophthalmology. 2022;46(6):390-398. Published 2022 Sep 7. doi:10.1080/01658107.2022.2116458
7. Reier L, Fowler JB, Arshad M, et al. Optic Disc Edema and Elevated Intracranial Pressure (ICP): A Comprehensive Review of Papilledema. Cureus. 2022;14(5):e24915. Published 2022 May 11. doi:10.7759/cureus.24915