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Supplementary Material

Use of a smartphone-based, non-mydriatic fundus camera for patients with red flag ophthalmic presentations in a rural general practice

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Research protocol: Use of a smartphone-based portable fundus camera in a rural general practice

Recruitment process:

Patients presenting to Dargaville Medical Centre with visual disturbance, headache, hypertensive urgency (systolic BP > 200 or diastolic BP > 120), TIA or stroke will be invited into the study to be examined and image their retina. Following standard care the research health care assistant (HCA), medical student, nurse or GP will take the patient to a consultation room and explain the research, provide the information sheet, and obtain written informed consent. Ambulatory patients 16 years and older will be invited to participate in the study. Inclusion criteria of ambulatory, well enough to participate 16 year and older patients presenting with visual disturbance, headache, hypertensive urgency (BP systolic >200 or diastolic >120) transient ischaemic attack or stroke. Exclusion criteria of those unable to consent, ambulate or who are too unwell.

Recruitment numbers:

Aim to enrol 200-350 patients over a 12-month period.

Intervention:

1. Standard care is delivered with initial assessment by the attending GP. The GP takes a history and examines the patient, formulating a diagnosis and plan. They comment on retinal findings including optic disc oedema, pallor, retinal vascular occlusion, intraocular haemorrhage, hypertensive retinopathy, and retinal detachment following direct ophthalmoscopy.
2. Patients meeting the inclusion criteria are invited, informed, consented and retinal photographs taken. A nurse/GP/medical student or HCA uses the oDocs nun IR smartphone-based camera to photograph the patient's retina, including maculae and optic nerve heads. If the patient's pupils are too small to obtain an adequate photo, 1% tropicamide is used to dilate the pupil of one of the eyes or the effected eye for 15-30 mins and another attempt at examination by direct ophthalmoscopy and photography of the retina will be undertaken.
3. Ophthalmologist assessment: De-identified retinal photographs and clinical information are available online through the secure encrypted online platform for the Whangarei Hospital-based ophthalmologists to review and record results. The lead author reviews these results, actions and reports back to the to the attending GP any difference in diagnosis or management by the reviewing ophthalmologist. Re-identified clinical information and retinal images may also be forwarded to the acute or outpatient ophthalmology service at Whangarei hospital for management advice and consultation if necessary.
4. Data management and analysis:
    a. Data set held on site includes date/ time of presentation, National Health Index number, date of birth, name, gender, ethnicity, email address, co-morbidities,

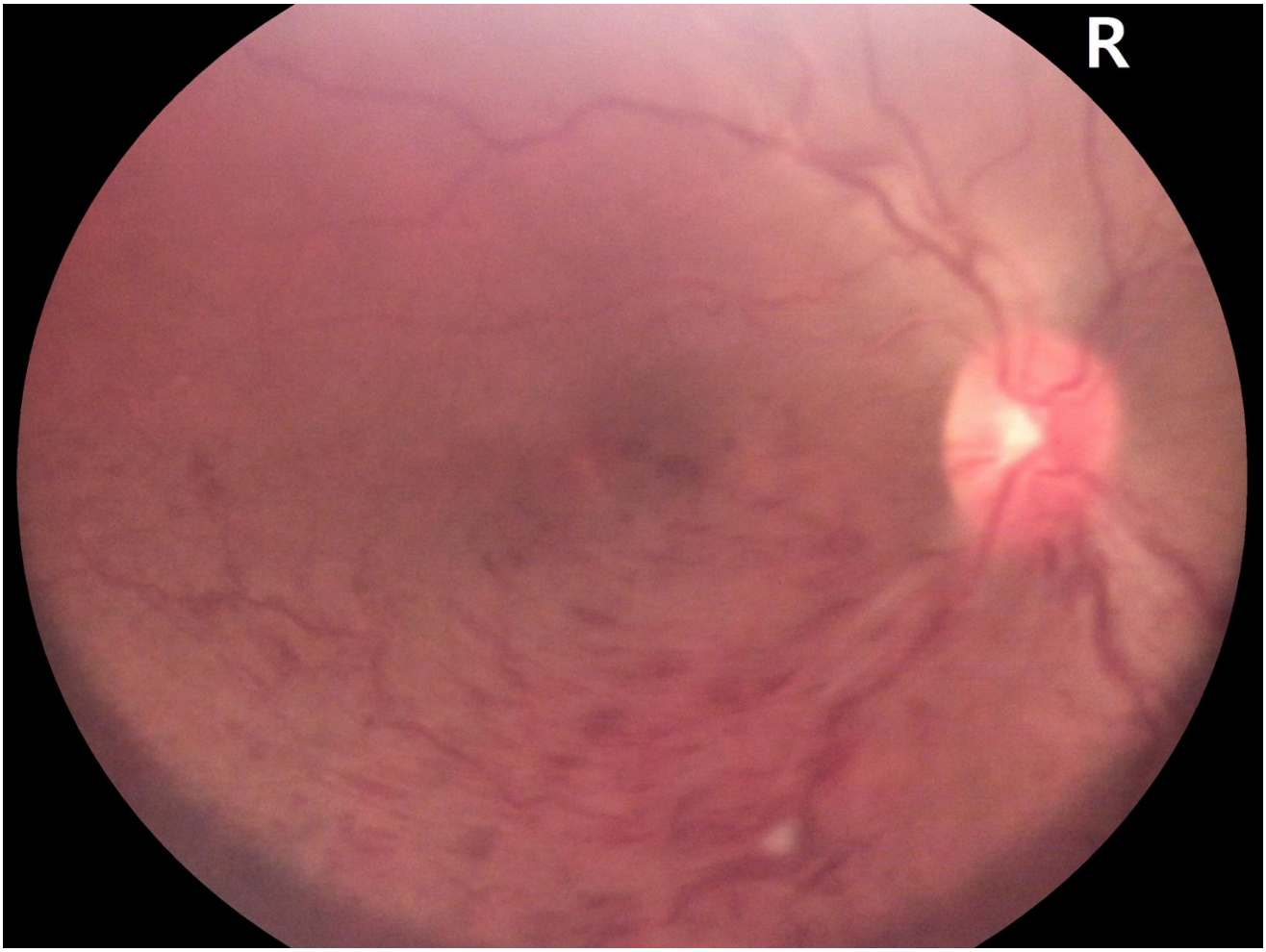
symptoms, visual acuity, pupillary reflexes, fundus photograph findings (disc oedema/pallor, retinal haemorrhage, soft/hard exudate, embolism, vascular occlusion, retinal detachment), provisional diagnosis, management of patient. The lead author or a medical student sequentially codes and de-identifies the A4 data sheet and enters the code and de-identified information onto a spread sheet on the secure online platform. The identified A4 patient data sheet and de-identified coded A4 data sheet are held in a locked filing cabinet in the lead authors consulting room.

b. De-identified patient data will be statistically analysed using contingency tables and R software, using chi-square, fisher's exact test, and interrater agreement kappa coefficients. Variables included: age, gender, ethnicity, comorbidities, symptoms, signs, diagnosis, and management, reporting means and comparative data including comparison of the utility of GP assessed direct ophthalmoscopy and retinal photography and photograph assessment by GP and ophthalmologist.

Reporting:

Literature review, results and discussion will be written up for publication and presentation.

Branch retinal vein occlusion, not seen on direct ophthalmoscopy



Toxoplasmosis recurrence. ”Headlight in the fog”, not seen on direct ophthalmoscopy