INTRODUCING EMERGENCY URBAN SMARTPHONE-TELEOPTHTHALMOLOGY … AN EVOLUTIONARY TALE

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Moorfields Eye Hospital NHS Foundation Trust

THE PROBLEM

A modern smartphone camera mounted on the slit-lamp can capture individual cells within the eye

99% of doctors and 95% nurses own a smartphone[1]

Clinical photography is not routine. Documentation is still by sketching, a source of medical error and losing valuable clinical information

Formal imaging appointments are limited, have long waiting lists and operate in-hours only

NHS-Scotland developed a Bring Your Own Device (BYOD) teleophthalmology service, facilitating remote consultations over great-distances

AIM

To investigate the efficacy of an out-of-hours smartphone-teleophthalmology service in an urban emergency setting (Moorfields eye casualty)

METHOD

DATA COLLECTION (3 months):

- Number of patient re-attendances to eye casualty
- Cost to Trust
- Baseline clinician needs (survey)

EQUIPMENT & TRAINING:

- Secure instant messaging (IM) app, Pando approved by Information Governance team
- Training on exporting images to CITO (patient image database)
- Appropriate mounts sought and tested
- Slit-lamp photography guide developed
- Eye casualty team briefed

August – December 2019

BASELINE RESULTS

RESIDENT (ST3-4) & NON-RESIDENT (ST5+) NIGHT DOCTORS

20% ST3-4 feel confident managing complex patients overnight without on-site senior presence

36% feel verbal descriptions of clinical findings provide sufficient information for remote decision-making

30% ST3-4 bring 1-3 patients back for daytime review per night because of diagnostic uncertainty

83% ST5+ receive 1-3 calls regarding patient management per night

92% would feel confident with clinical decisions made via telephone if a remote review of the patient was possible

90% would feel confident discharging patients without a face-to-face review if they had been examined remotely

100% thought being able to capture images/videos of examination findings would increase teaching opportunities and/or benefit learning

33% had concerns regarding implementing a smartphone teleophthalmology service. These were focussed on technical capabilities, image quality, data protection and increasing workload

3-4 patients attend daily for senior opinion in-hours

Cost to the Trust = £409 - £544 per day

January 2020

92% *would feel confident with clinical decisions made via telephone if a remote review of the patient was possible*

OUT-OF-HOURS COMMUNICATION

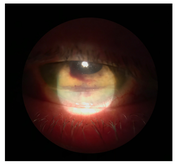
February 3 - 21st pilot:

Resident ST3s sent non-resident ST5+ photographs taken with smartphone of the patient via secure Pando app chat function
ST3 tepephonedST5+ for advice (as per usual communication)

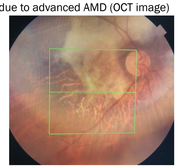
9 cases discussed with photographs taken via smartphone
3 patients managed remotely with the help of a photograph (otherwise ST5+ reports would have reviewed in person)

Pilot halted due to covid-19 pandemic and redistribution of staff

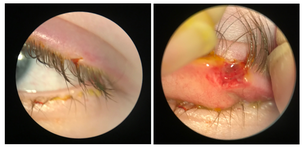
Patient 1
Full thickness corneal laceration following an accident



Patient 2
Retinal fibrosis and scarring due to advanced AMD (OCT image)



Patient 3
Lid laceration following blunt trauma



February - March 2020

April - August 2020

REMOTE TO ONSITE COMMUNICATION

Remote Doctor: 10:55am

Patient A 1234123: Myope (-7D)
1/7 flashes in LE & superior "curtain" in vision today

10:57am Onsite Consultant:

Tell them to come to A&E at 8:30am tomorrow

New use for Pando group identified

Moorfields iA&E video-consultation platform
Remote clinicians use Pando to inform onsite team of patients being sent in for review

Patients bypass on-site triage to prevent delays to care
Reduced crowding in eye casualty waiting room
Patient safety feature, so patients seen remotely were discussed with onsite consultant

APRIL 17TH – JUNE 17TH:

240 referrals to eye casualty, including:
- 52 retinal detachment warning symptoms
- 43 Other visual disturbance
- 38 Photophobia
- 27 IOP concerns
- 22 trauma or foreign body
- 1 Safeguarding referral for domestic violence

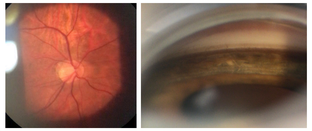
APRIL TO AUGUST 2020
436 referrals in total
From August this communication function moved to OpenEyes

100% thought being able to capture images/videos of examination findings would increase teaching opportunities and/or benefit learning

TEACHING AND TRAINING OPPORTUNITIES

Example 1: 09:02am

Patient B – photographs above. 36y M.
Referred from his optician for "suspicious discs" IOP 14
Describe the fundal photograph and grade the angle.
What else would you want to know from his history?



Pando group used for training and revision purposes to mitigate disruption to training, and following change in format to FRCOphth examination

58 trainee members to Pando group for training
27 cases shared for teaching purposes

- FRCOphth part 2 revision questions from senior trainees
- Signposting to associated reading
- Pathology covering cornea, adnexal, ocular oncology, trauma, medical retina, VR and pos-operative complications

March 2021 ongoing

April 2021 ongoing

CONCLUSION

This evolving use of smartphone photography and secure IM demonstrates the versatility of BYOD

BYOD has been able to enhance communication between teams working remotely in order to deliver timely and safe patient care

This has provided unexpected teaching opportunities, despite disruptions to training through redeployment

NEXT STEPS

Further projects using BYOD are being explored as part of the TOPOL digital health fellowship project work.

These include:
- Documentation and monitoring of lesions in ocular oncology and adnexal clinics
- Supporting clinical monitoring in optometrist-led glaucoma clinics
- Supporting advice and guidance for emergency glaucoma presentations
- Monitoring chemical injury and corneal ulcers in patient-review clinics to support patient management
- Supporting referrals from general A&E to ophthalmology – using smartphone magnification Quikvue bumper (see below)
- Exploring integration of images with EPR



REFERENCE
1. Mobasheri MH, King D, Johnston M, et al The ownership and clinical use of smartphones by doctors and nurses in the UK: a multicentre survey study. BMJ Innovations 2015;1:174-181.