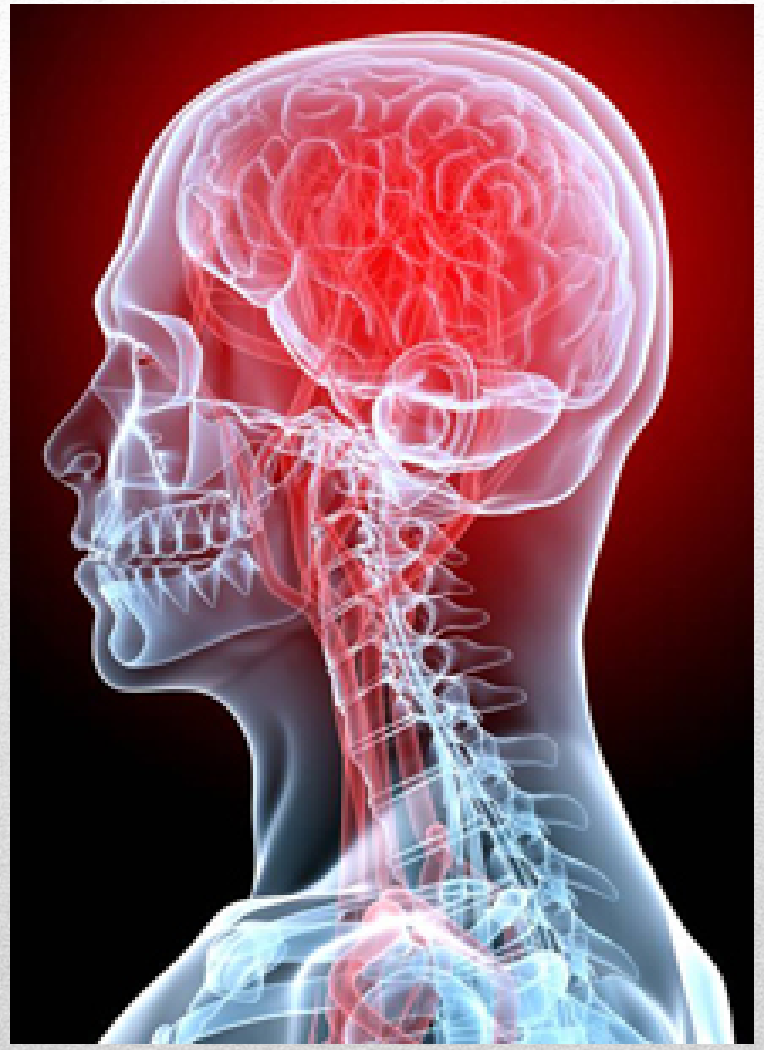
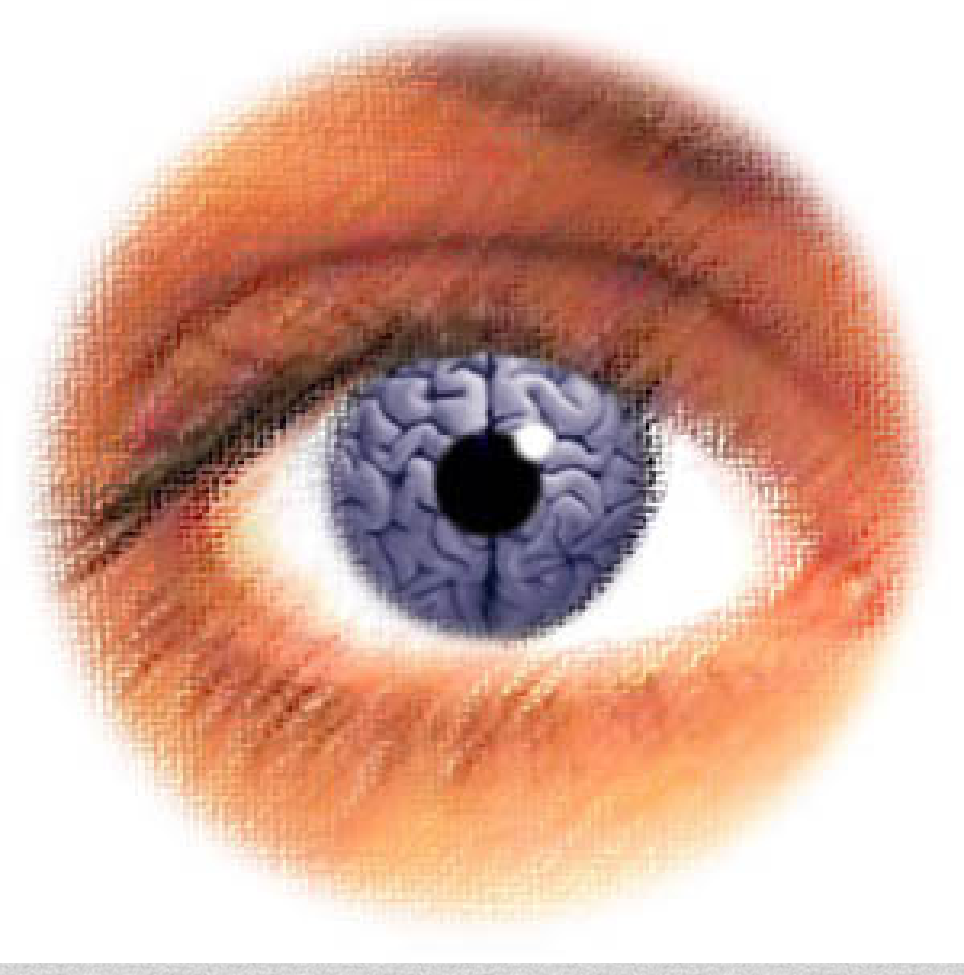
HEADACHE





Eye – window to the brain

- Does Retinal Examination improve the diagnosis and management of patients with headache?

Comparative Effectiveness

Critical Info from Fundus Exam

NLP

LP

Do you check?

- 1850:
  - Hermann von Helmholtz
  - Inventor of the ophthalmoscope

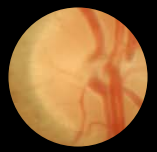
… not easy for everyone

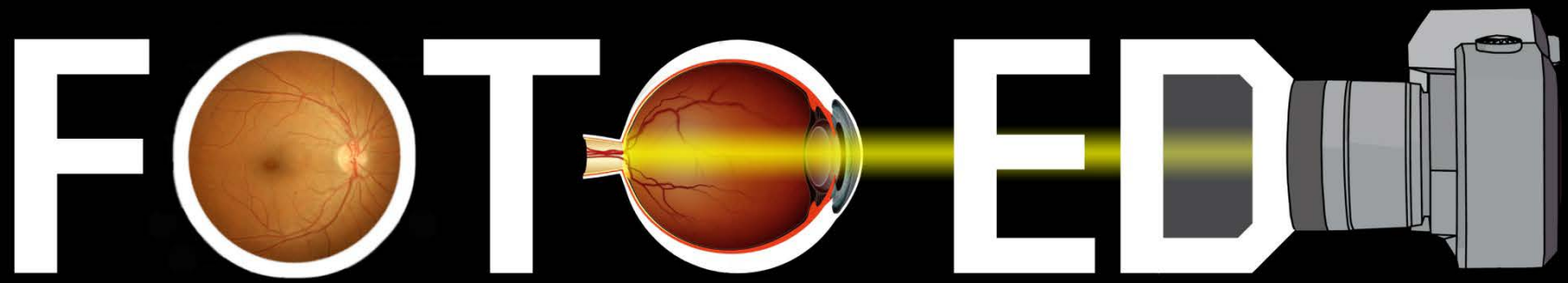
- Limited training
- Difficult without pupillary dilation
- Inability to recognize the findings when observed

Med Teach 1993;15:321-325. Eye 1997;11:744-750.
Int J Qual Health Care 2004;16:363-365. Postgrad Med J 1999;75:282-284. Scott Med J 2002;47:60-63. Acta Ophthalmol 2011; PMID: 22040169.

Non-mydriatic fundus photography

Direct ophthalmoscopy





Implementation and Utility of Non-mydriatic Fundus Photography in the Emergency Department

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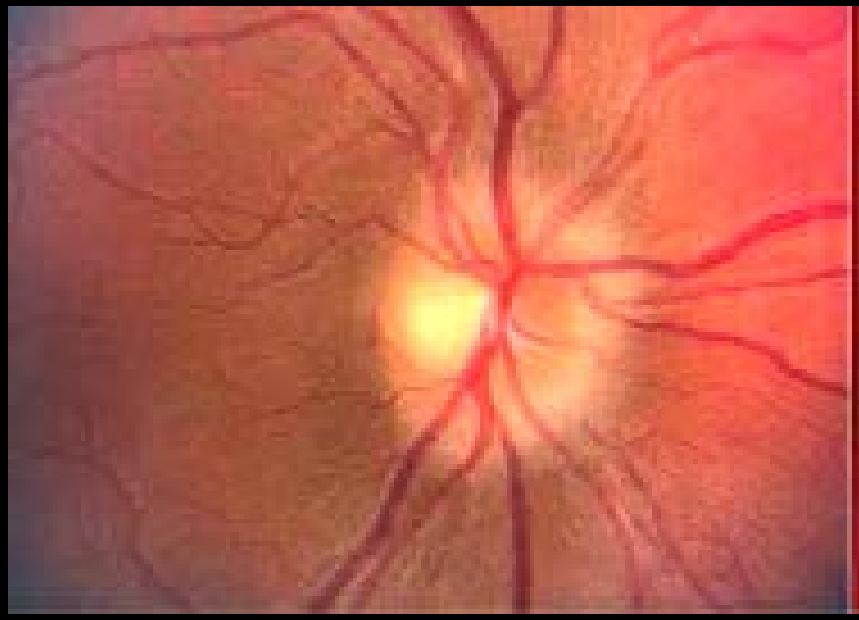
Carolyn D. Drews-Botsch, PhD (Chair)
Mitch Klein, PhD
William M. McClellan, MD, MPH
David W. Wright, MD

EMORY
ROLLINS SCHOOL OF PUBLIC HEALTH
EMORY EYE CENTER

How might we help?

- Non-mydriatic fundus photography
  - Easy for non-ophthalmic trained individuals to perform
  - No pupillary dilation
  - Able to take quality photographs of the posterior pole

The camera is easy to use

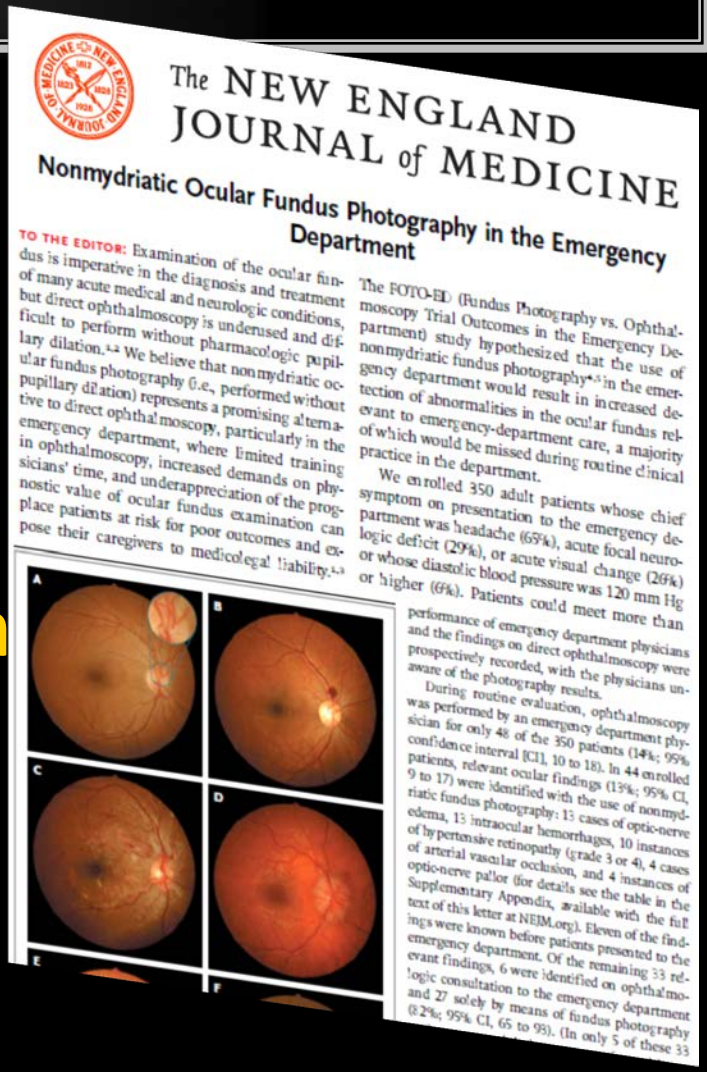


Experienced professional photographer in a dimly lit room with the Zeiss FF4 and a dilated patient

A nurse practitioner after 10 minutes of training in a lighted room with the Kowa α-D and an undilated patient

Phase 1 conclusions

- Ophthalmoscopy was performed infrequently and poorly by ED MDs
- Photography was easy to do in the ED and resulted in 12% critical disposition changing dx.



The NEW ENGLAND JOURNAL of MEDICINE

Nonmydriatic Ocular Fundus Photography in the Emergency Department

TO THE EDITOR: Examination of the ocular fundus is imperative in the diagnosis and treatment of many acute medical and neurologic conditions, but direct ophthalmoscopy is underused and difficult to perform without pharmacologic pupillary dilation.[1,2] We believe that nonmydriatic ocular fundus photography (i.e., performed without pupillary dilation) represents a promising alternative to direct ophthalmoscopy, particularly in the emergency department, where limited training in ophthalmoscopy, increased demands on physicians' time, and underappreciation of the prognostic value of ocular fundus examination can place patients at risk for poor outcomes and expose their caregivers to medicolegal liability.[1,3]

The FOTO-ED (Fundus Photography vs. Ophthalmoscopy Trial Outcomes in the Emergency Department) study hypothesized that the use of nonmydriatic fundus photography[4,5] in the emergency department would result in increased detection of abnormalities in the ocular fundus relevant to emergency-department care, a majority of which would be missed during routine clinical practice in the department.

We enrolled 350 adult patients whose chief symptom on presentation to the emergency department was headache (65%), acute focal neurologic deficit (29%), or acute visual change (26%) or whose diastolic blood pressure was 120 mm Hg or higher (6%). Patients could meet more than

performance of emergency department physicians and the findings on direct ophthalmoscopy were prospectively recorded, with the physicians unaware of the photography results.

During routine evaluation, ophthalmoscopy was performed by an emergency department physician for only 48 of the 350 patients (14%; 95% confidence interval [CI], 10 to 18). In 44 enrolled patients, relevant ocular findings (13%; 95% CI, 9 to 17) were identified with the use of nonmydriatic fundus photography: 15 cases of optic-nerve edema, 13 intraocular hemorrhages, 10 instances of hypertensive retinopathy (grade 3 or 4), 4 cases of arterial vascular occlusion, and 4 instances of optic-nerve pallor (for details see the table in the Supplementary Appendix, available with the full text of this letter at NEJM.org). Eleven of the findings were known before patients presented to the emergency department. Of the remaining 33 relevant findings, 6 were identified on ophthalmologic consultation to the emergency department and 27 solely by means of fundus photography (8.2%; 95% CI, 65 to 93). (In only 5 of these 33

N Engl J Med 2011;364:387-9.

- Difference in proportion of ocular fundus abnormalities identified during the routine course of clinical care in the emergency department (e.g., including consultation) depending on whether ocular fundus photographs were available or not.

Primary Hypothesis

Secondary Objectives

- Difference in proportion of ocular fundus abnormalities identified by emergency department physicians who had access to photographs vs. those who did not (and who likely only had access to direct ophthalmoscopy if used).
- Difference in number and type of neuroimaging studies, procedures (particularly lumbar puncture), and consultations performed between the experimental conditions
- Time to emergency department revisit, admission, or death.

Procedure

- Headache - non-mydriatic fundus photography
- Photographs uploaded to a centralized, web-based server – randomization provided on screen
- MD randomized to *view or not* prior to questionnaire
- Questionnaire about the final diagnosis and disposition
- Participating physicians will receive training in recognizing fundus findings of relevance

Why focus on the ED?

- Patients go there with acute problems
- No ophthalmologist in ED
- Pupillary dilation time consuming in ED
- Studies of headache management:
  - Direct ophthalmoscopy is *documented* in ED only 37-48% of time (overestimate?)

QJM 2008;101:435-443. Arch Intern Med 2001;161:1969-1973.