INTRODUCTION

The proficiency in using the traditional handheld direct ophthalmoscope continues to deteriorate. Most practicing physicians and medical students have directly demonstrated a lack in confidence in direct ophthalmoscopy (DO), a skill which is not only technically difficult but also affords a limited field of view (FOV) of the fundus (Fig. 2). The combination of lack of confidence and ever-increasing time pressures on all physicians to implement such a technically demanding skill is leading to the virtual abandonment of what is an essential aspect of the physical examination.1

In pathologies such as Idiopathic Intracranial hypertension (pseudotumor cerebri), patients can exhibit completely normal neuroimaging. Many of these patients present with headaches and associated visual complaints and are evaluated extensively with imaging without medical providers even attempting to visualize the fundus to look for swollen optic discs (papilledema), an imperative diagnostic indicator of this condition.2 Studies have shown that in the emergency department setting, only 14.48% of patients presenting with headaches and other neurological emergencies had documented ophthalmoscopic exams3-5. The expanded use of the conventional non-mydriatic fundus camera (NMOF; Fig. 2), traditionally reserved for use in the eye clinic, is strongly recommended over non-vision examination of the fundus until the SCOF device is further developed for routine use in clinical practice.

METHODS

The purpose of the initial study was to assess the confidence of staff physicians and academic family medicine residents in their DO skills. The study also determined their willingness to consider alternatives to the traditional but difficult to use handheld direct ophthalmoscope, including the non-mydriatic fundus camera (NMOF) and a smartphone-compatible oculur funduscope (SCOF).

A questionnaire was distributed to all family practice residents, fellows and staff physicians in family medicine (FM), psychiatry, internal medicine and emergency medicine (EM) at a community hospital. This questionnaire was crafted to assess training, practice patterns, adjunctive use of mydriatics and perceived competency in direct fundoscopy. A pilot study evaluating the feasibility of both NMOF and SCOF was conducted in both the FM outpatient clinics as well as in the ER. The results were obtained after an on-site demonstration with a commercially available SCOF camera, FDA-approved SCOF apparatus and a corresponding HIPAA-compliant smartphone application (Fig. 3-5).

RESULTS

Survey Results After On-site Demonstration of NM0F Camera

<table>
<thead>
<tr>
<th></th>
<th>FM Resident</th>
<th>FM Staff</th>
<th>ED Staff</th>
<th>Psychiatry</th>
<th>IntMed</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine Procedure DO</td>
<td>4/24</td>
<td>2/6</td>
<td>2/3</td>
<td>0/2</td>
<td>2/3</td>
<td>10/36 (26.3%)</td>
</tr>
<tr>
<td>Feels Confident in Level</td>
<td>1/24</td>
<td>2/1</td>
<td>1/3</td>
<td>0/2</td>
<td>1/3</td>
<td>5/36 (13.2%)</td>
</tr>
<tr>
<td>Utilizes Mydriatics to Enhance Visualization</td>
<td>0/23</td>
<td>0/6</td>
<td>0/3</td>
<td>0/2</td>
<td>0/3</td>
<td>0/36 (0%)</td>
</tr>
<tr>
<td>Would prefer NMOF/SCOF</td>
<td>24/24</td>
<td>4/6</td>
<td>3/3</td>
<td>2/2</td>
<td>3/3</td>
<td>36/36 (94.7%)</td>
</tr>
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CONCLUSION

- Our survey reflects both an under-utilization and low confidence in the examination of the ocular fundus via DO, despite its clinically imperative nature in the evaluation of patients with headaches.
- The widely available conventional fundus camera (NMOF) can serve as a bridge between DO and a long-overdue replacement device, SCOF. Evaluation of a headache patient is not complete until the fundus is visualized.6 If visualization is inadequate with the D.O. consider the fundus camera which ultimately will be replaced with a smart phone fundoscope.
- SCOF is a novel and evolving technology that takes advantage of the worldwide access and portable nature of the smartphone. It additionally allows for HIPAA-compliant electronic storage into electronic health records with capabilities of seamless transmission for remote expert interpretation6.
- We predict that SCOF will be effectively implemented into clinical settings to fill the precarious void between the current dearth of fundus exams with DO and the prevalence of relevant ocular findings in patients with headaches and other neurological pathologies. In the interim, consider using the conventional and widely available fundus camera NMOF before acquiescing to an incomplete funduscopic exam in a patient with headache.

REFERENCES

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