In the first multicenter study on the topic to my knowledge, Lahham et al report the accuracy of ocular point-of-care ultrasonography (POCUS) performed by emergency physicians (EPs) for the emergent diagnosis of retinal detachment (RD), as well as the less serious diagnoses of vitreous hemorrhage (VH) and vitreous detachment (VD). This prospective observational study was conducted at 4 diverse emergency departments (EDs), where 70 resident and attending EPs and 5 emergency advanced practice physicians with variable training performed ocular POCUS on 225 adult patients with clinical presentations suggestive of RD. Diagnoses based on ocular POCUS results were compared with a criterion standard of diagnoses from ophthalmologists, which included dilated ophthalmoscopy and more detailed procedures not available in the ED. Overall prevalence of disease was 36%. For RD, the reported sensitivity was 96.9% (95% CI, 80.6%-99.6%) and the reported specificity was 88.1% (95% CI, 81.8%-92.4%). For VH, the reported sensitivity was 81.9% (95% CI, 63.0%-92.4%) and the reported specificity was 82.3% (95% CI, 75.4%-87.5%). For VD, the reported sensitivity was 42.5% (95% CI, 24.7%-62.4%) and the reported specificity was 96.0% (95% CI, 91.2%-98.2%).

As with all POCUS applications, EPs need to be both proficient in this relatively straightforward bedside procedure and able to recall the disease-specific test characteristics for appropriate medical decision making. As a superficial, fluid-filled structure, the globe naturally lends itself to POCUS for a variety of medical and even traumatic conditions, as described in the emergency medicine literature since 2000 and in ophthalmology literature for decades before. Point-of-care ultrasonography training requirements have been clearly delineated in the American College of Emergency Physicians guidelines since 2001 and most recently updated in 2016. A comprehensive POCUS curriculum, including at least 150 examinations, 25 of which are proctored examinations in a specific application, and ongoing education and quality assurance programs, is necessary to achieve and maintain competency in POCUS.

Examining the test characteristics reported by Lahham et al, ocular POCUS is likely to be most useful to the properly trained practicing EP for ruling out RD, which typically requires an emergent ophthalmology consultation, and for ruling in the less serious VD as a possible alternative diagnosis. For most EPs, the lower sensitivity and specificity make ocular POCUS results less helpful for diagnosing VH, the least serious of the potential diagnoses. Depending on the health care system, ruling out RD may prevent the need for emergent ophthalmology consultation. Reassuringly, ocular POCUS results may sufficiently rule in VD as a likely cause of the patient’s symptoms, a diagnosis that still requires urgent ophthalmology follow-up, because VD and VH increase the risk of RD. Lahham et al conclude by correctly stating that ocular POCUS is a diagnostic adjunct for EPs, not a replacement for an ophthalmologist’s more detailed examination. For all ED applications, POCUS represents an additional helpful bedside diagnostic, monitoring, and procedural technology, not necessarily a replacement for other diagnostic testing or specialty consultation.

In contrast to the results from Lahham et al, Kim et al published a single-site study in 2019 in which 115 patients were evaluated by 30 EPs. That study reported a prevalence of disease of only 14%. For RD, ocular POCUS sensitivity was only 75% (95% CI, 48%-93%) and specificity was 94% (95% CI, 87%-98%) compared with a more rigorous criterion standard of retina specialist examination. Accuracy for RD was much higher in the trainees and the EPs who enrolled 3 or more
patients, possibly reflecting a higher level of training. In 2019, Gottlieb et al.6 published the largest systematic review and meta-analysis to date, to my knowledge, examining ocular POCUS for RD, including the study by Kim et al.5 and 10 other studies, with 844 total patients. In the 5 ED studies, ocular POCUS had a pooled sensitivity of 92% (95% CI, 67%-99%) and specificity of 91% (95% CI, 85%-95%).6 However, only 30 minutes to 2 hours of ocular POCUS education was provided to EPs with variable prior training.

However, likelihood ratios are less affected by prevalence than predictive values, which may vary by patient population and may be more relevant to native EP Bayesian clinical decision making than sensitivity and specificity.7,8 Kim et al.5 reported a positive likelihood ratio for RD of 12 (95% CI, 5.4-28.3) and a negative likelihood ratio of 0.27 (95% CI, 0.11-0.62). Although sensitivity and specificity for RD differed in the study by Lahham et al.1 likelihood ratios were similar to those found by Kim et al.5 with a positive likelihood ratio of 8.6 (95% CI, 5.7-13) and a negative likelihood ratio of 0.02 (95% CI, 0.0-0.17), and Gottlieb et al.6 reported a positive likelihood ratio of 25.2 (95% CI, 8.1-78.0) and a negative likelihood ratio of 0.06 (95% CI, 0.01-0.25).

Future multicenter studies need to address the accuracy of EPs who have achieved the training standards established by the landmark American College of Emergency Physicians ultrasound guidelines.3 To improve the feasibility of POCUS trials by more rapidly achieving sample sizes needed for statistical power, investigators may include EPs who may have not yet achieved these basic training standards. The inclusion of results from inadequately trained EPs could reduce reported accuracy and threaten external validity for the majority of graduating EPs, most of whom have already achieved these training standards. Multicenter studies supported by increasingly used Health Insurance Portability and Accountability Act–compliant online research and quality assurance systems will facilitate such investigations. Additionally, future multicenter studies need to address other clinical and patient-centered outcomes, such as the reduction in ED length of stay and cost of care when emergent specialty consultation is avoided through ocular POCUS and the risk of further vision loss from missed or delayed diagnoses. In the meantime, the well-done investigation by Lahham et al.1 provides additional high-quality, multicenter evidence for the accuracy of ocular POCUS performed by EPs for the diagnosis of RD and VD in the ED.

ARTICLE INFORMATION
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