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The Ophthalmology Surgical Competency Assessment Rubric for Panretinal Photocoagulation

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Purpose: To develop an internationally valid skill-based rubric that can be used as a global standardized platform for teaching, training, and evaluation of panretinal photocoagulation (PRP) in training programs.

Design: A panel of educators and experts in retinal lasers was assembled to develop a standardized objective skill-based rubric.

Participants: Sixteen international educators and retina specialists.

Methods: The steps to performing slit-lamp delivery of PRP was described in detail. A group of 6 authors reviewed and agreed on the steps and assigned descriptors to expectation levels of novice, beginner, advanced beginner, and expert according to a modified Dreyfuss model. The tool then was vetted by an international panel of 10 retina specialists who are involved in training ophthalmologists in other countries.

Main Outcome Measures: Final version of the tool agreed on by the international review panel.

Results: The consecutive steps to performing PRP were outlined and broken down into preparation, procedure, and postoperative care. Descriptive words explaining what to expect from a novice, beginner, advanced beginner, and expert were listed for each step of PRP. Expert comments were incorporated, establishing face and content validity.

Conclusions: This group of authors clearly defined expectations of a trainee at 4 levels of training according to the modified Dreyfus model, and an international panel of retina specialists agreed to its accuracy. This tool, the International Council of Ophthalmology's Ophthalmology Surgical Competency Assessment Rubric for Panretinal Photocoagulation, has face and content validity. It can be used globally in training programs both to teach and assess this important comprehensive skill in ophthalmic training. *Ophthalmology Retina 2017;■:1–6 © 2017 by the American Academy of Ophthalmology*

In 1997, the Accreditation Council for Graduate Medical Education announced the Outcomes Project to ensure that resident physician graduates were competent in the 6 core competencies described by the Accreditation Council for Graduate Medical Education. The American Board of Ophthalmology suggested surgery as a seventh core competency. Emphasis was placed on transitioning medical education from the traditional "know how" to the "show how" to the "do."[1] Subsequently, much has been published about these core competencies offering tools for the residency program director's toolbox to teach these competencies and methods for assessing residents both formative and summative.[2–7] Sixteen years later, in 2013, as part of the Outcomes Project, the Accreditation Council for Graduate Medical Education launched the Milestone Project as a method for United States training programs to measure a trainee's actual performance and to provide guidelines to reach competency, while providing accountability to the public.[8] The milestones are expected behaviors and attitudes within the core competencies that are to be demonstrated by residents by a particular point in their residency. This guideline helps programs assess whether a trainee is on the trajectory for competency in that specific competency or skill, and a map can be created to plot trainee progression or regression.

Despite a clearly written and published Ophthalmology Milestone,[9,10] ophthalmic residency programs still need supplemental tools to demonstrate attainment of surgical competence in certain surgical procedures. Panretinal photocoagulation (PRP) was acknowledged as a specific procedure in the ophthalmology milestone appendix PC-6,[10] but it does not go into detail about the competency stages needed to assess this laser skill properly, and in fact it is grouped with other ophthalmic lasers such as iridotomy and trabeculoplasty. Our objective was to develop a standardized, internationally valid tool both to guide the development and to assess the progression of an ophthalmologist's competence in performing slit-lamp delivery of PRP. The present article describes our methods of designing and validating this assessment tool for PRP, including a skill-based rubric.

Methods

A review of the literature for international or United States standards for teaching or assessing learners in the skill of PRP was

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performed. The authors, representing China, India, Saudi Arabia, and the United States, worked together online as content experts and developed the 16-step rubric for PRP. A rubric was defined as an explicit set of criteria used for assessing a procedural skill. Each step of the procedure was specified with behavioral narrative anchors for different learning stages using a modified Dreyfus model for skill acquisition (novice, beginner, advanced beginner, and competent).[11] An expert category was omitted because the level of expert is not achieved during training. Additionally, rating categories were assigned a numerical value so that an average numerical rating or total score for the tool could be calculated and monitored for improvement. Descriptors were detailed in such a way that could eliminate the bias in learner assessment, could remove any conjectures of a learner's completion of steps, and could reduce interpretative error of the criteria.

The authors modified the rubric repeatedly until there was full consensus on the rubric demonstrating content validity, and it then was disseminated online to an international review panel of 10 experts representing 8 countries: France, South Africa, Lebanon, Australia, India, Egypt, Costa Rica, and the United States. This review panel was chosen for global representation and their expertise in teaching PRP in different countries to demonstrate face validity. Their comments were catalogued by the authors and incorporated into the final document called International Council of Ophthalmology's Ophthalmology Surgical Competency Assessment Rubric for Panretinal Photocoagulation.

Cognitive understanding of the indications, patient selection, counseling, and laser handling originally were included, but later were excluded by the authors because the rubric was meant to score only the physical performance of PRP. Although the authors recognize PRP laser competence entails medical knowledge, decision making, communication, and safety precautions, it was believed that a separate rubric or cognitive assessment should be developed for these.

Results

The steps for slit-lamp delivery of PRP were sorted into 3 groups: (1) laser safety and procedure preparation, (2) laser procedure, and (3) considerations after laser treatment. An additional global indices section was created to describe further the overall fluidity of movement of the laser and ability to make dynamic adjustments by the operator.

Within each subgroup, the authors identified distinct steps that were necessary to complete PRP. A total of 16 steps and 4 global indices measures were devised (Table 1). A maximum of 100 points can be achieved, yielding 100% score if competency was achieved for every step. The authors applied a modified Dreyfus model, stratifying certain aspects of the skill acquisition (i.e., familiarity of laser settings and burn response, amount of supervision or coaching required, ability to cope in complex situations, and ability to assess the overall situation while knowing the direction of the fovea at all times).

The expert review panel's comments were incorporated into the document. One recommendation from the review panel suggested developing an indirect PRP scoring rubric. To assess internationally the need for developing a subsequent tool for indirect PRP, a survey of the international review panel and authors representing a total of 10 countries revealed that indirect PRP laser is performed and taught less than 10% of the time in their institutions. Of the 15 specialists surveyed, 5 retina experts practice in the United States, 2 of whom were the only ones to identify indirect PRP as the primary method taught to their trainees. For these reasons, an indirect PRP scoring system was not included. Another recommendation suggested adding descriptive behaviors for a pattern-scanning laser. Because this type of laser is not widely available, the authors kept the description of expected behaviors generalizable to any laser machine.

Discussion

Panretinal photocoagulation is a common office-based procedure performed worldwide for retinal diseases, yet teaching methods and trainee experience vary greatly within the United States and worldwide. All respondents to a survey of United States residency program leadership identified PRP as a procedure that ophthalmology resident graduates should be competent to perform independently.[12] Eighty-nine percent of these programs indicated that their residents perform more than 20 PRP laser procedures before graduation, yet 11% of programs perform between 6 and 20. The United States programs are required to show in aggregate that residents have performed a minimum of 10 retinal laser procedures[13] (quantity) and have an "equivalent experience," but there are no standard requirements or measures to assess how well the resident performed (quality) or to assure that the resident is competent.

A review of the literature found no universal or standardized tools for teaching and assessing laser procedures for retinal diseases. Abràmoff et al[14] in 2008 published a matrix of how to incorporate teaching methods and assessment methods and potential portfolio contents for teaching and assessing laser competency using recommended potential good practices they found in literature. They also included a laser safety checklist, a summative feedback checklist for informed consent, and a photocoagulation feedback form with a Dreyfus model scoring rubric. However, their rubric primarily measures the cognitive domain of this skill: understanding laser settings, understanding instrument operation, and awareness of complications, with some evaluation of physical skill in using both hands and the foot pedal and using efficient motions. This is a good start, but the tool is not designed to give feedback from a step-by-step approach and tells neither the evaluator nor the trainee about complete skill acquisition. Although PRP laser competence entails knowledge, decision making, communication, and safety precautions, it was believed that a separate rubric or cognitive assessment should be developed for these.

Internationally, there has been demand for standardized tools for both teaching and assessment. The standardized rubric in the current study can be a global standardized platform for teaching, training, and evaluation of PRP. It was authored by both United States and international experts and then reviewed further by a separate panel from 8 countries, demonstrating both content and face validity. The International Council of Ophthalmology has been developing similar ophthalmology surgical competency assessment tools for teaching and assessing resident surgical skill, including common surgical procedures such as small-incision cataract surgery,[6] strabismus,[15] and lateral tarsal strip.[16]