



Polypoidal Choroidal Vasculopathy

Consensus Nomenclature and Non-Indocyanine Green Angiograph Diagnostic Criteria from the Asia-Pacific Ocular Imaging Society PCV Workgroup

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Purpose: To develop consensus terminology in the setting of polypoidal choroidal vasculopathy (PCV) and to develop and validate a set of diagnostic criteria not requiring indocyanine green angiography (ICGA) for differentiating PCV from typical neovascular age-related macular degeneration (nAMD) based on a combination of OCT and color fundus photography findings.

Design: Evaluation of diagnostic test results.

Participants: Panel of retina specialists.

Methods: As part of the Asia-Pacific Ocular Imaging Society, an international group of experts surveyed and discussed the published literature regarding the current nomenclature and lesion components for PCV, and proposed an updated consensus nomenclature that reflects our latest understanding based on imaging and histologic reports. The workgroup evaluated a set of diagnostic features based on OCT images and color fundus photographs for PCV that may distinguish it from typical nAMD and assessed the performance of individual and combinations of these non-ICGA features, aiming to propose a new set of diagnostic criteria that does not require the use of ICGA. The final recommendation was validated in 80 eyes from 2 additional cohorts.

Main Outcome Measures: Consensus nomenclature system for PCV lesion components and non-ICGA-based criteria to differentiate PCV from typical nAMD.

Results: The workgroup recommended the terms *polypoidal lesion* and *branching neovascular network* for the 2 key lesion components in PCV. For the diagnosis of PCV, the combination of 3 OCT-based major criteria (sub-retinal pigment epithelium [RPE] ring-like lesion, en face OCT complex RPE elevation, and sharp-peaked PED) achieved an area under the receiver operating characteristic curve of 0.90. Validation of this new scheme in a separate subset 80 eyes achieved an accuracy of 82%.

Conclusions: We propose updated terminology for PCV lesion components that better reflects the nature of these lesions and is based on international consensus. A set of practical diagnostic criteria applied easily to spectral-domain OCT results can be used for diagnosing PCV with high accuracy in clinical settings in which ICGA is not performed routinely. *Ophthalmology* 2020;■:1–10 © 2020 by the American Academy of Ophthalmology. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Polypoidal choroidal vasculopathy (PCV) is a subtype of neovascular age-related macular degeneration (nAMD) characterized by nodular dilations arising from neovascular networks that ramify mainly in the subretinal pigment epithelial space and which are seen best on indocyanine green angiography (ICGA).^{1–5} It has been estimated that up to 50% of nAMD cases in Asia are of the PCV subtype, whereas this proportion is estimated to range between 10% and 20% in White populations.^{6,7} It is possible that the prevalence of PCV

in White populations has been underestimated, because ICGA is not performed routinely, or, if performed, is undertaken with flash systems that capture single frames and are less sensitive to ICGA. When White populations with ICGA have been studied using the Heidelberg SLO (Heidelberg Engineering, Heidelberg, Germany), the prevalence of PCV was reported to range between 20% and 24.5% in populations of predominantly European ancestry and almost 31% in a White population in Hawaii.^{8–10}

Anti-vascular endothelial growth factor (VEGF) therapy has been shown to be effective in controlling disease activity associated with PCV.^{4,11–15} However, its effect on closing polypoidal lesions has been variable, leaving clinicians uncertain as to the long-term outcomes of PCV treatment with anti-VEGF monotherapy.^{13–15} Furthermore, in clinical series describing the outcomes of treatment of nAMD, eyes that were observed to be poor responders to anti-VEGF monotherapy subsequently were found to have the PCV variant.^{16,17} For these reasons, distinguishing PCV from typical nAMD is desirable and clinically important. However, the current gold standard for diagnosing PCV requires ICGA, an invasive and time-consuming procedure that is not performed routinely and may not be available widely.^{4,18,19} In contrast, spectral-domain OCT provides high-resolution images, is quick and noninvasive, and is the mainstay imaging method for diagnosis and monitoring of nAMD activity and guiding retreatment. Reimbursement is now possible for anti-VEGF therapy for nAMD after diagnosis based solely on OCT results without the use of fluorescein angiography, affirming the use of OCT not only as a monitoring tool, but also as a diagnostic method. Several OCT-based features have been described as commonly associated with PCV.^{20–23} The association of PCV with a thick choroid and dilated Haller's vessels with attenuation of the inner choroid has been described.^{24–27} More recently, it has been proposed that a combination of non-ICGA-based features may yield high sensitivity and specificity for differentiating PCV from typical nAMD.^{28–30}

The Asia-Pacific Ocular Imaging Society (APOIS) PCV Workgroup was formed as an associate member society of the Asia-Pacific Academy of Ophthalmology to promote the application of ocular imaging in the understanding and management of PCV worldwide. We report on the findings of the APOIS PCV Workgroup focusing on (1) an updated nomenclature, diagnostic guidelines, and definition of PCV and (2) on the use of diagnostic criteria that do not require the use of ICGA.

Methods

An international panel of retina experts in age-related macular degeneration was assembled as a part of the APOIS Workgroup. The study consisted of 2 phases. Initially, consensus meetings were held to discuss the nomenclature, terminology, and diagnostic criteria for PCV, and based on these discussions, consensus was achieved for an updated nomenclature reflecting the latest understanding based on advances in imaging technologies and histologic reports. Second, we proposed a set of non-ICGA features that can be applied to make a diagnosis of PCV. We assessed the performance of individual and combinations of spectral-domain (SD) OCT and fundus photography-based features to form a new set of diagnostic criteria. After assessment of the performance of individual and combinations of selected features compared with the gold standard ICGA grading, a final set of non-ICGA-based criteria was recommended.

The study adhered to the tenets of the Declaration of Helsinki, and all images and clinical data used in this study were obtained from the Phenotyping Asian Age-Related Macular Degeneration study, which was approved by the institutional ethics board of SingHealth.³¹ This study recruited consecutive patients demonstrating treatment-naïve typical nAMD and PCV. All

participants gave written informed consent. Participants underwent clinical examination and multimodal imaging according to a standardized protocol. The diagnosis of typical nAMD and PCV was based on results of clinical examination and multimodal imaging, which included color fundus photography, fluorescein angiography, ICGA, and OCT performed during the same session.

Consensus Meetings

The planning committee for the APOIS PCV workgroup consisted of 3 retinal specialists (W.K.L., T.Y.Y.L., C.M.G.C.) who developed the format for the consensus proceedings, summarized recent literature, and prepared case examples for discussion. The consensus panel members were selected from Asia, Europe, and North America on the basis of previous notable scientific contributions to the field of retinal imaging in nAMD and PCV. The workgroup met on 2 occasions (February 2019 and March 2019), during which the panel reviewed recent publications on imaging in PCV. The panel voted on recommendations for a preferred lexicon for PCV and PCV-related lesion components based on recent advances in imaging and histologic reports. An initial list comprising 11 features (9 based on OCT and 2 based on color fundus photography or fundus examination results) proposed by the planning committee was discussed by the panel while reviewing clinical examples with and without PCV. A revised list of 9 criteria were selected and evaluated during the second meeting.

Assessment of Performance of Proposed Non-Indocyanine Green Angiography Polypoidal Choroidal Vasculopathy Features

Fifteen panel members (all retina specialists) independently graded the presence or absence of each of the 9 short-listed criteria in a test set comprising multimodal images (excluding ICGA images) of eyes with and without PCV. To aid standardization of image interpretation, detailed description of each feature and reference image was provided before the grading exercise (Table 1; Fig 1). For each eye, retinal specialists were supplied with color fundus photographs, macular volume scan in enhanced depth imaging mode (comprising 25 line scans covering a 6 × 6-mm area centered on the fovea (Spectralis; Heidelberg Engineering), and en face OCT fly-through video spanning the internal limiting membrane to the choroid (Triton; Topcon, Tokyo, Japan). The en face scan was corrected and flattened to the Bruch's membrane using inbuilt software (IMAGEnet version 6; Topcon).

Statistical Analysis

For each feature, we determined sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and predictive accuracy (area under the receiver operating characteristic curve [AUC], and 95% confidence intervals). The gold standard diagnosis (5 PCV, 5 nAMD, all treatment naïve) was determined based on ICGA by the Singapore National Eye Centre Ocular Reading Center. Any individual feature with an AUC of more than 0.75 was selected as a major criterion, and any feature with an AUC of more than 0.60 and of 0.75 or less was selected as a minor criterion. Combinations of major criteria, minor criteria, or both also were assembled for computation of the AUC. Finally, to evaluate the transferability of the new scheme, 6 readers from Singapore and Milan (3 specialists and 3 trainees [J.J., and F.C.]) masked to the ICGA grading applied the recommendation to an independent test set of 80 eyes from Asian patients (n = 50) and from White patients (n = 30). The agreement with the ICGA gold standard diagnosis was compared.

Table 1. Nine Non-Indocyanine Green Angiography Features Evaluated for Predictive Value of Polypoidal Choroidal Vasculopathy Diagnosis

Features	Detailed Description
OCT features	
Sharp peaked PED (Fig 1A)	<ul style="list-style-type: none"> • Narrow-peaked PED, with inverted “V” configuration. Also described as “thumb-like protrusion” • Sharp vertical incline $>70^\circ$ on at least 1 side • Height: base-to-width ratio >1
Sub-RPE ring-like lesion (Fig 1B)	<ul style="list-style-type: none"> • Round structure seen under PED • May have hyporeflective center and hyperreflective outline • Reflectivity of center may vary in intensity
Complex or multilobular PED (Fig 1C)	<ul style="list-style-type: none"> • Notch in PED, resembling an “M” • Multilobular PED
Double-layer sign (Fig 1D)	<ul style="list-style-type: none"> • Undulating RPE line that is separated from BM line underneath
Thick choroid with dilated Haller’s layer vessels (Fig 1E)	<ul style="list-style-type: none"> • Thick choroid for age and axial length or refractive error • Any eye with subfoveal choroid thickness $\geq 300 \mu\text{m}$ • Dilated Haller’s layer vessels that occupy the full thickness of the choroid with attenuation of overlying choriocapillaris
Fluid compartment (Fig 1F)	<ul style="list-style-type: none"> • Predominant SRF with or without mild IRF
En face OCT complex RPE elevation (Fig 1G)	<ul style="list-style-type: none"> • Hyperreflective branching vascular network connecting multiple PEDs
Fundus CFP features	
Extensive subretinal hemorrhage (Fig 1H)	<ul style="list-style-type: none"> • Subretinal or sub-RPE hemorrhage ≥ 4 DD
Orange nodule (Fig 1I)	<ul style="list-style-type: none"> • One or more orange subretinal round elevation

CFP = color fundus photography; DD = disc diameter; IRF = intraretinal fluid; PED = pigment epithelial detachment; RPE = retinal pigment epithelium; SRF = subretinal fluid.

Results

Consensus Nomenclature

The workgroup reviewed clinical and imaging observations related to the 2 key components recognized in a PCV complex, which often have been referred to as *polyp* and *branching vascular network* in publications. These terms are descriptive in nature and relate historically to the observations based on ICGA results. With additional information gained from advances in OCT and histology analysis,^{32–38} the panel’s consensus is that PCV is a variant of type 1 neovascularization within the age-related macular degeneration spectrum. The panel recommended the terms *polypoidal lesion* and *branching neovascular network* to describe the 2 lesion components within the PCV complex (Table 2). We recommend that the term *polyp* be avoided because strong evidence based on OCT and histologic analysis suggests these lesions are not fleshy, solid lesions.³ Pulsation of the polypoidal lesion is visible with dynamic ICGA and is reported to be associated with subretinal hemorrhage, suggesting an arterial origin in a proportion of cases.^{39–40} Although some researchers have proposed the term *aneurysmal lesion* for the polypoidal lesion, the panel observed that a hyporeflective round sub-retinal pigment epithelium (RPE) structure suggestive of a dilated vascular or aneurysmal structure may not be discernible in all cases. In addition, internal structures may be seen within some larger polypoidal structures (Fig 2). Thus, although both terms—*polypoidal* and *aneurysmal*—have limitations, the panel recommended the term *polypoidal lesion* until a better understanding of the internal structure of these lesions is formulated.

The panel recommended the term *branching neovascular network* to better reflect the neovascular nature of the vascular network within a PCV complex. This is based on observations from OCT and histologic analysis that this network is located above the Bruch’s membrane and is not intrachoroidal.^{23,41–46} However, the term *branching vascular network* may carry additional prognostic implications in a subset of eyes in which the vessels are less responsive to anti-VEGF therapy.^{47–54} The panel also recognized that branching vascular network and type 1 choroidal neovascularization (CNV) associated with thick choroid (sometimes referred to as *pachychoroid neovascularopathy* [PNV]) may represent a continuum.^{26–27} However, the panel decided the term *pachychoroid neovascularopathy* should be reserved for etiologic consideration, rather than to describe the morphologic features of the lesion.

Non-Indocyanine Green Angiography Diagnostic Criteria

Eleven features were proposed and discussed during the consensus meetings. The panel proposed consolidation of notched pigment epithelial detachment (PED), hemorrhagic PED, and multilobular PED into a single sign, termed *complex or multilobular PED*. The consolidated list of 9 signs (6 based on cross-sectional OCT, 2 based on color fundus photography or fundus examination, and 1 based on en face OCT) is summarized in Table 1, and examples are included in Figure 1. Definitions and reference images for each sign were supplied to all 15 retinal specialists.

The sensitivity, specificity, and AUC for each of the 9 individual features are summarized in Table 3. Three features

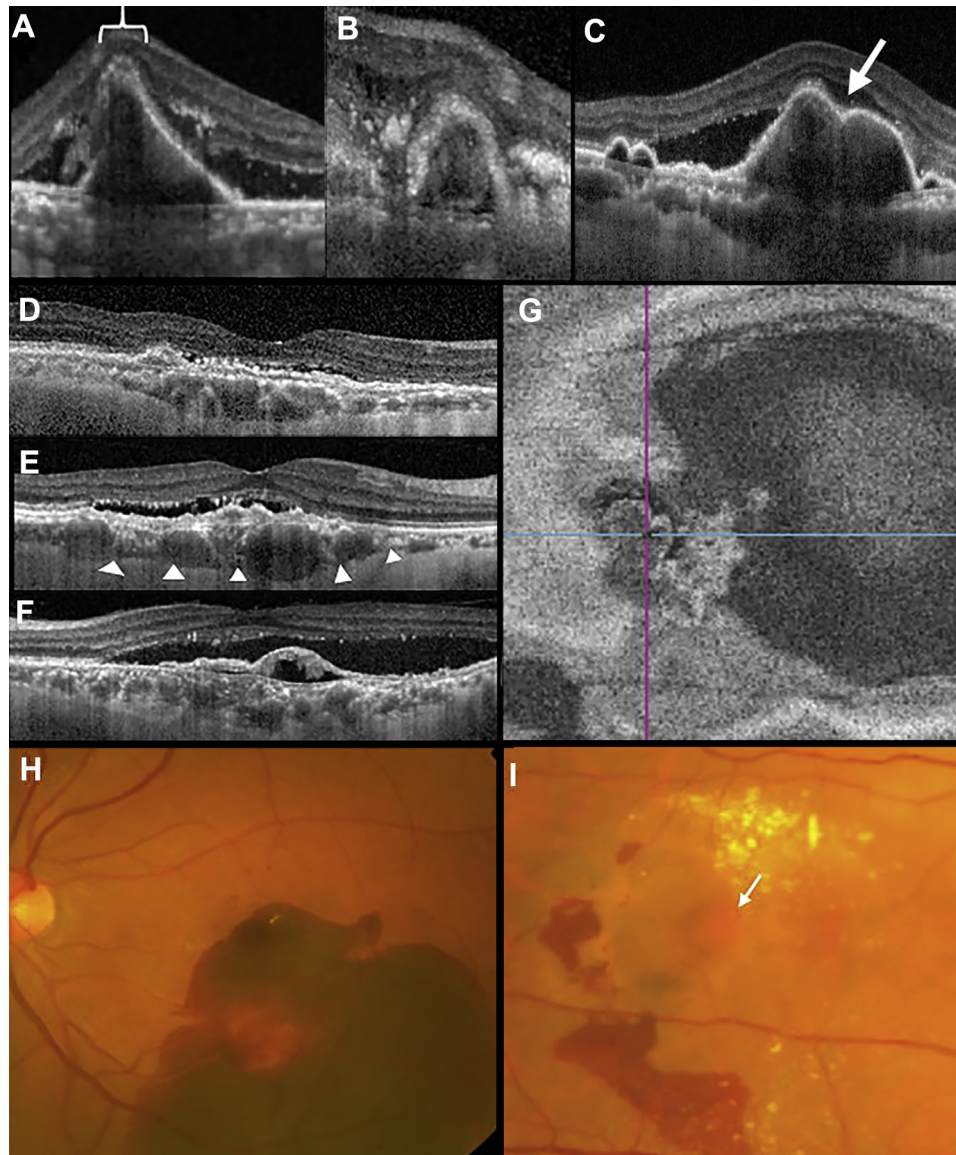


Figure 1. Reference images for the 9 selected non-OCT features evaluated for inclusion into the final set of diagnostic criteria. Detailed descriptions are shown in [Table 1](#): (A–F) 6 features based on cross-sectional OCT, (G) 1 feature based on en face OCT, and (H, I) 2 features based on fundus examination or color photography. A, Sharp-peaked pigment epithelial detachment (PED). B, Sub-retinal pigment detachment ring-like lesion. C, Complex or multilobular PED (arrow highlighting the notch within the outline of the PED). D, Double-layer sign or shallow, irregular retinal pigment epithelium (RPE) elevation. E, Thick choroid with dilated Haller’s layer vessels (scleral choroidal interface shown by arrowheads). F, Predominance of subretinal fluid. G, Complex RPE elevation observed with en face OCT. H, Extensive subretinal hemorrhage. I, Orange nodule (white arrow).

(sub-RPE ring-like lesion, en face OCT complex RPE elevation, and sharp-peaked PED) met the prespecified AUC requirement for major criteria, and 4 features (orange nodule, thick choroid with dilated Haller’s layer, complex or multilobular PED, and double-layer sign) met the prespecified AUC requirement for minor criteria. Massive hemorrhage and fluid compartment were not included for subsequent evaluation. Interrater agreement was moderate for the 3 major criteria ([Table 4](#)). We evaluated the sensitivity, specificity, PPV, NPV, and AUC of combinations of features comprising at least 1 major criterion with additional features ([Table 5](#)). Presence of all 3 major criteria achieved an AUC of 0.90, with sensitivity of 0.75, specificity of 0.91, PPV of 0.93, and NPV of 0.68. Finally, we validated this new scheme

in an independent dataset of patients with macular neovascularization (based on indocyanine green classification, this consisted of 40 eyes with PCV and 40 with typical nAMD) drawn from 2 countries (Singapore and Italy). Three retinal specialists and 3 trainees achieved an accuracy of 82% based on a combination of 3 major criteria.

Discussion

This report presents the APOIS PCV Workgroup updated nomenclature of PCV based on our current understanding of PCV using new clinical, imaging, and histopathologic data.

Table 2. Consensus Nomenclature for Polypoidal Choroidal Vasculopathy Lesion Components

Recommended Term Based on Multimodal Imaging	Indocyanine Green Angiography-Based Term	Alternatives Discussed But Not Recommended	Discussion
Polypoidal lesion	Polyp	Aneurysm; aneurysmal lesion	<ul style="list-style-type: none"> The lesion is not a fleshy solid lesion; hence, we recommend avoiding using the term <i>polyp</i>. In some cases, the appearance of a hyporeflective, round sub-RPE structure is suggestive of a dilated vessel or aneurysm. However, this is not seen in all patients. Internal structure may exist within some polypoidal lesions. These are not polyps but may not be aneurysms.
Branching neovascular network	Branching vascular network	Pachychoroid neovascularopathy	<ul style="list-style-type: none"> The network is observed to be in the same plane as a type 1 neovascularization (between RPE and Bruch's membrane); hence, BNN recognizes this as a neovascular lesion. Some reports have suggested BVN responds poorly to anti-VEGF therapy. This may relate to the maturity of the vessels. Significant overlap may be observed between BNN within the context of PCV and a type 1 neovascularization with thick choroid background (sometimes referred to as <i>pachychoroid neovascularopathy</i>). We recommend BNN or <i>type 1 neovascularization</i> be used for descriptive purpose, whereas PNV may be reserved for discussion specific to cause.

BNN = branching neovascular network; BVN = branching vascular network; PCV = polypoidal choroidal vasculopathy; PNV = pachychoroid neovascularopathy; RPE = retinal pigment epithelium; VEGF = vascular endothelial growth factor.

We recommend a set of diagnostic criteria for PCV without the need for ICGA that can achieve high sensitivity, specificity, and an AUC when compared with ICGA as the gold standard. The combination of the 3 major criteria (sub-RPE ring-like structure on cross-sectional OCT, complex RPE elevation on en face OCT, and sharp-peaked PED on cross-sectional OCT) achieved an AUC of 0.90. We believe this set of diagnostic criteria can serve the need for most clinical situations, allowing for a quick, practical, and noninvasive method for differentiating PCV from typical nAMD, especially in clinical settings and practices that do not have access to ICGA.

Although the PPV when the set of diagnostic criteria was present was 0.93, the NPV was 0.68. Therefore, the absence of these criteria cannot be used to exclude the diagnosis PCV. Nonetheless, because in clinical practice the first-line treatment of both PCV and typical nAMD is anti-VEGF monotherapy, this set of diagnostic criteria serve as a useful starting point and also could highlight potential nonresponders or poor responders who may benefit from adjunct therapy. The ability to diagnose PCV based on easily applied OCT criteria will be helpful in patient management, such as when considering the use of combination therapy, selection of specific anti-VEGF agents, or when it is suspected that the patient may exhibit low compliance with regular attendance. It has been reported that persistent polypoidal lesions may pose a risk of massive submacular hemorrhage.⁵³

In clinic-based studies, several groups have used various combinations of OCT features and have reported high sensitivity and specificity for differentiating PCV from typical nAMD. Based on the presence of at least 3 of 4 OCT signs (multiple PEDs, sharp PED peak, PED notch, and rounded sub-RPE hyporeflective area), De Salvo et al²⁸ found the sensitivity and specificity to be more than 90%. Another study based on the presence of at least 2 of 3 OCT signs (PED, double-layer sign, and thumb-like polyps) reported sensitivity and specificity in excess of 85%.²⁹ In addition to OCT features, Chaikitmongkol et al³⁰ observed that the presence of at least 2 of 4 features (notched or hemorrhagic PED on fundus photography and sharply peaked PED, notched PED, and hyperreflective ring under PED on OCT) could diagnose PCV with sensitivity and specificity of more than 90%. The OCT-based features evaluated in previous series mostly related to PED characteristics. In the current study, complex or multilobular PED achieved an AUC of only 0.67 and therefore was not selected as a major criterion. In some eyes, one part of the PED may be dome-shaped, and another edge may show a sharply vertical edge, such as the appearance of an RPE tear. The present study not only builds on previous reports and includes a more comprehensive list of features being evaluated, but also used a process of training and validation to obtain robust estimates of diagnostic accuracy. En face OCT has been reported to be useful in visualizing the branching neovascular network and PEDs within which

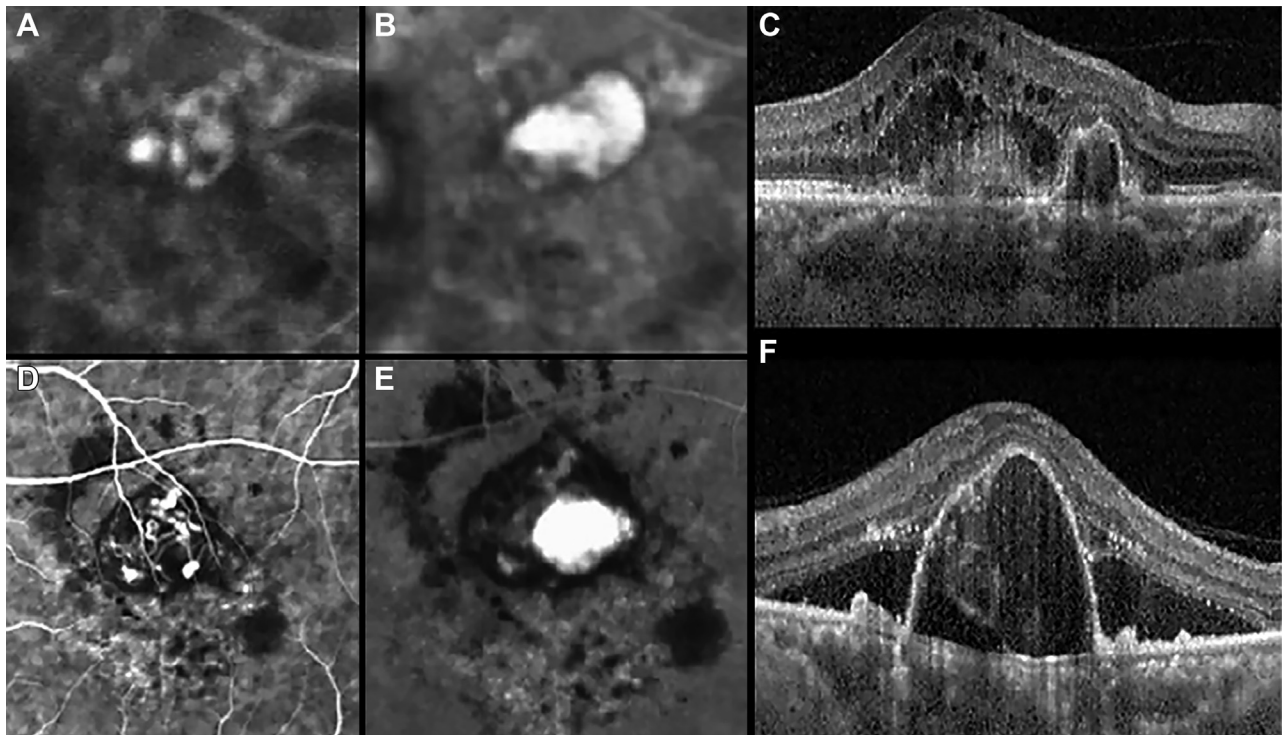


Figure 2. Images showing detailed analysis of indocyanine green angiography (ICGA) in 2 patients. **A–C**, Patient 1: **(A)** early phase ICGA (25 seconds) image showing that a combination of saccular and fusiform vascular dilatation was visible but these cannot be discerned individually in **(B)** the mid-phase image (5 minutes). **C**, Corresponding cross-sectional OCT image showing a sharp-peaked pigment epithelial detachment (PED) with sub-retinal pigment epithelium ring-like lesion and thick choroid with dilated Haller's layer. **D–F**, Patient 2: **(D)** early phase ICGA image showing complex vascular network with dilatation at the termini and **(E)** mid-phase ICGA image showing no discernible individual feature and the lesion appearing as a single large structure filled with dye. **F**, Cross-sectional OCT image in which the internal structure appears to be present within the large PED.

polypoidal lesions may be found.^{3,23,41,44–46} However to date, no studies have combined en face OCT with cross-sectional OCT or fundus photography.

We observed moderate intergrader agreement for all the major criteria, which is comparable with a κ value of 0.53 for intergrader agreement of PCV diagnosis based on ICGA our group reported previously.⁴ Although the initial set of diagnostic characteristics and assessments were performed

by retina specialists with special interest in imaging and PCV, we demonstrated that inclusion of ophthalmology residents yielded similar agreement and that they also were able to implement the recommended diagnostic criteria in Singapore and Italy.

Although the purpose of this study was to recommend a set of diagnostic criteria that can be used to screen for PCV in eyes with macular neovascularization resulting from

Table 3. Area under the Receiver Operating Characteristic Curve, Sensitivity, Specificity, Positive Predictive Value, and Negative Predictive Value for Each Individual Feature

Feature	Area under the Receiver Operating Characteristic Curve (95% Confidence Interval)	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
1. Sub-RPE ring-like lesion	0.83 (0.76–0.89)	0.81	0.87	0.88	0.79
2. En face OCT complex RPE elevation	0.82 (0.75–0.88)	0.80	0.84	0.85	0.79
3. Sharp-peaked PED	0.79 (0.71–0.85)	0.79	0.79	0.79	0.79
4. Orange nodule	0.74 (0.67–0.81)	0.69	0.84	0.88	0.61
5. Complex or multilobular PED	0.67 (0.59–0.75)	0.76	0.68	0.61	0.81
6. Thick choroid with dilated Haller's layer	0.71 (0.63–0.78)	0.63	0.74	0.81	0.54
7. Double-layer sign	0.65 (0.57–0.73)	0.78	0.60	0.42	0.88
8. Extensive subretinal hemorrhage	0.60 (0.57–0.72)	0.62	0.58	0.64	0.72
9. Fluid compartment	0.56 (0.48–0.64)	0.57	0.52	0.41	0.65

PED = pigment epithelial detachment; RPE = retinal pigment epithelium.

Table 4. Interrater Agreement for 7 Selected Signs

Feature	Overall (κ Value*)	P Value	Agreement
1. Sub-RPE ring-like lesion	0.543	<0.001	Moderate
2. En face OCT complex RPE elevation	0.459	<0.001	Moderate
3. Sharp-peaked PED	0.486	<0.001	Moderate
4. Orange nodule	0.218	<0.001	Fair
5. Complex or multilobular PED	0.268	<0.001	Fair
6. Thick choroid with dilated Haller's layer	0.241	<0.001	Fair
7. Double-layer sign	0.140	<0.001	Slight

PED = pigment epithelial detachment; RPE = retinal pigment epithelium;
*Fleiss multirater κ value.

AMD, ICGA remains the best validated method for confirmation of PCV and likely will remain the gold standard. Nonetheless, our validation exercise based on a moderately sized sample showed that the criteria selected by the international expert committee has the potential to be equivalent to ICGA in diagnostic accuracy. The accuracy of 82% when the criteria we developed were applied by both residents and specialists offers support to the view that ICGA can be dispensed with under most conditions. Although ICGA is the best validated method, previous studies have reported a substantial proportion of screen failure in participants referred by clinicians with considerable expertise in the diagnosis of PCV, which did not meet reading center diagnostic criteria,^{13,18} indicating that a significant level of variation exists in ICGA interpretation.

We recognize that the current set of criteria has been developed based on treatment-naïve eyes and that with treatment, some of the features may become altered. Our plan is to perform a similar study in previously treated eyes in the future. We did not include OCT angiography in this study because this imaging method is still not widely available and clinical experience remains limited. Further studies with larger samples that include OCT angiography among the index tests now are necessary for the

development of algorithms that can be applied to distinguish macular neovascularization types. The appearance of polypoidal lesions on OCTA is variable and has led to discord among specialists on the morphologic features of the polypoidal lesion. Challenges in accurately segmenting the lesion, as well as turbulent flow within the polypoidal lesion, have been suggested as reasons for the highly variable appearance of the flow maps.⁵⁵ Hyperflow signal has been reported to be colocalized within the sub-RPE ring-like structure in 57% of eyes with PCV.⁵⁶ However, others have described a glomeruli-like appearance in the polypoidal lesions and have suggested they may consist of neovascular tangles, rather than aneurysmal lesions.⁵⁷ Further improvement in the resolution of imaging tools in the future may clarify the nature of the polypoidal lesions. Nonetheless, based on our current understanding, although the panel recognized the potential benefit of the terms *aneurysmal* or *aneurysm*, until we have clearer and more universally accepted evidence, we recommend *polypoidal lesion* as the preferred term.

Other limitations of this study include the relatively small number of cases evaluated. Although we do not expect the specific OCT instrument to affect the results, the quality of OCT scans, which may depend on the amount of averaging, media opacity, density of the macular cube scan used, and

Table 5. Area under the Receiver Operating Characteristic Curve, Sensitivity, Specificity, Positive Predictive Value, and Negative Predictive Value for Combination of Features

	Area under the Receiver Operating Characteristic Curve (95% Confidence Interval)	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
Any 2 major criteria					
Sub-RPE ring-like lesion and en face OCT complex RPE elevation	0.89 (0.73–0.87)	0.74	0.91	0.93	0.68
Sub-RPE ring-like lesion and sharp-peaked PED	0.82 (0.75–0.88)	0.80	0.84	0.85	0.79
En face OCT complex RPE elevation and sharp-peaked PED	0.84 (0.79–0.85)	0.73	0.86	0.89	0.68
All 3 major criteria	0.90 (0.85–0.96)	0.75	0.91	0.93	0.68
3 Major criteria and any minor criterion	0.91 (0.86–0.95)	0.78	0.91	0.94	0.68

PED = pigment epithelial detachment; RPE = retinal pigment epithelium.

segmentation of en face images, may impact the performance of the diagnostic criteria for individual patients. The location of polypoidal lesions at the termini of large branching neovascular networks may be outside the area captured by an OCT macular volume scan centered over the fovea. In settings where en face OCT is not available, the combination of the remaining 2 spectral-domain OCT-based major criteria will achieve an AUC of 0.82 (Table 5).

In conclusion, the APOIS PCV Workgroup has proposed a set of practical, easily adopted non-ICGA diagnostic criteria based on OCT for diagnosing PCV. We recommend revising the terms *polyp* and *branching vascular network*, which are based on ICGA appearance, to *polypoidal lesion* and *branching neovascular network*, respectively, because these terms capture advances in the understanding of these 2 key lesion components of PCV based on multimodal imaging and histologic studies.

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Abbreviations and Acronyms:

APOIS = Asia-Pacific Ocular Imaging Society; **AUC** = area under the receiver operating characteristic curve; **ICGA** = indocyanine green angiography; **nAMD** = neovascular age-related macular degeneration; **NPV** = negative predictive value; **PCV** = polypoidal choroidal vasculopathy; **PED** = pigment epithelial detachment; **PPV** = positive predictive value; **RPE** = retinal pigment epithelium; **VEGF** = vascular endothelial growth factor.

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