POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

Original Issue Date (Created):	**3/1/2012**
Most Recent Review Date (Revised):	**7/15/2020**
Effective Date:	**10/1/2020**

POLICY
RATIONALE
DISCLAIMER
POLICY HISTORY
PRODUCT VARIATIONS
DEFINITIONS
CODING INFORMATION
DESCRIPTION/BACKGROUND
BENEFIT VARIATIONS
REFERENCES

I. POLICY

Scanning computerized ophthalmic (e.g., optical coherence tomography) imaging of the anterior eye segment is considered **investigational**. There is insufficient evidence to support a conclusion concerning the health outcomes or benefits associated with this procedure.

Cross-references:

MP-2.028 Eye Care
MP-2.056 Ophthalmologic Techniques That Evaluate the Posterior Eye Segment for Glaucoma
MP-2.086 Retinal Telescreening for Diabetic Retinopathy

II. PRODUCT VARIATIONS Top

This policy is only applicable to certain programs and products administered by Capital BlueCross please see additional information below, and subject to benefit variations as discussed in Section VI below.

FEP PPO - Refer to FEP Medical Policy Manual MP-9.03.18 Optical Coherence Tomography (OCT) of the Anterior Eye Segment. The FEP Medical Policy manual can be found at: https://www.fepblue.org/benefit-plans/medical-policies-and-utilization-management-guidelines/medical-policies.

III. DESCRIPTION/BACKGROUND Top

Optical coherence tomography (OCT) is a noninvasive, high-resolution imaging method that can be used to visualize ocular structures. OCT of the anterior segment (AS) is being evaluated as a noninvasive diagnostic and screening tool for detecting angle-closure glaucoma, for presurgical evaluation, surgical guidance, and for assessing complications following surgical procedures. It is

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

also being studied as a tool to evaluate the pathologic processes of dry eye syndrome, tumors, uveitis, and infections.

OCT is a noninvasive method that creates an image of light reflected from the ocular structures. In this technique, a reflected light beam interacts with a reference light beam. The coherent (positive) interference between the 2 beams (reflected and reference) is measured by an interferometer, allowing construction of an image of the ocular structures. This method allows cross-sectional imaging at a resolution of 6 to 25 μm.

The Stratus OCT, which uses a 0.8-μm wavelength light source, was designed to evaluate the optic nerve head, retinal nerve fiber layer, and retinal thickness (see evidence review 9.03.06). The Zeiss Visante OCT and AC Cornea OCT use a 1.3-μm wavelength light source designed specifically for imaging the anterior eye segment. Light of this wavelength penetrates the sclera, allowing high-resolution cross-sectional imaging of the AC angle and ciliary body. The light is, however, typically blocked by pigment, preventing exploration behind the iris. Ultrahigh resolution OCT can achieve a spatial resolution of 1.3 μm, allowing imaging and measurement of corneal layers.

An early application of optical coherence tomography technology was the evaluation of the cornea before and after refractive surgery. Because this noninvasive procedure can be conducted by a technician, it has been proposed that this device may provide a rapid diagnostic and screening tool for detecting angle-closure glaucoma.

Other Diagnostic Tools

OCT of the anterior eye segment is being evaluated as a noninvasive diagnostic and screening tool with a number of potential applications. One proposed use of anterior segment OCT is to determine whether there is a narrowing of the AC angle, which could lead to angle-closure glaucoma. Another general area of potential use is as a pre- and postsurgical evaluation tool for of AC procedures. This could include assessment of corneal thickness and opacity, calculation of intraocular lens power, guiding surgery, imaging intracorneal ring segments, and assessing complications following surgical procedures such as blockage of glaucoma tubes or detachment of Descemet membrane following endothelial keratoplasty (see evidence review 9.03.22). A third general category of use is to image pathologic processes such as dry eye syndrome, tumors, noninfectious uveitis, and infections. It is proposed that AS OCT provides better images than slit-lamp biomicroscopy/gonioscopy and ultrasound biomicroscopy due to higher resolution; in addition, AS OCT does not require probe placement under topical anesthesia.

Alternative methods of evaluating the AC are slit-lamp biomicroscopy or ultrasound biomicroscopy. Slit-lamp biomicroscopy is typically used to evaluate the AC; however, the chamber angle can only be examined with specialized lenses, the most common being the gonioscopic mirror. In this procedure, a gonio lens is applied to the surface of the cornea, which may result in distortion of the globe. Ultrasonography may also be used for imaging the anterior eye segment.[1] Ultrasonography uses high-frequency mechanical pulses (10-20 MHz) to build a

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

picture of the front of the eye. An ultrasound scan along the optical axis assesses corneal thickness, AC depth, lens thickness, and axial length. Ultrasound scanning across the eye creates a 2-dimensional image of the ocular structures. It has a resolution of 100 μm but only moderately high intraobserver and low interobserver reproducibility. Ultrasound biomicroscopy (≈50 MHz) has a resolution of 30 to 50 μm. As with slit-lamp biomicroscopy with a gonioscopic mirror, this technique requires placement of a probe under topical anesthesia.

Classification and Assessment of Glaucoma

Glaucoma is characterized by degeneration of the optic nerve.

The classification of glaucoma as open angle or angle closure relies on assessment of the AS anatomy, particularly that of the AC angle. Angle-closure glaucoma is characterized by obstruction of aqueous fluid drainage through the trabecular meshwork (the primary fluid egress site) from the eye's AC. The width of the angle is a factor affecting the drainage of aqueous humor. A wide unobstructed iridocorneal angle permits sufficient drainage of aqueous humor, whereas a narrow angle may impede the drainage system and leave the patient susceptible to an increase in intraocular pressure and angle-closure glaucoma.

A comprehensive ophthalmologic examination for glaucoma includes assessment of the optic nerve and retinal nerve fiber layer (see evidence review 9.03.06 on imaging of the optic nerve with posterior segment OCT), evaluation of visual fields, and measurement of ocular pressure. The presence of characteristic changes in the optic nerve or abnormalities in visual field, together with increased intraocular pressure, is sufficient for a definitive diagnosis of glaucoma.

Regulatory Status

Multiple optical coherence tomography systems have been cleared for marketing by the U.S. Food and Drug Administration (FDA) through the 510(k) process. Examples of approved systems are the Visante™ OCT (Carl Zeiss Meditec; FDA product code: HLI); the RTVue® (Optovue; FDA product code: OBO) and the Slitlamp optical coherence tomography (SL-OCT; Heidelberg Engineering;FDA product code: MXK).

The microscope-integrated optical coherence tomography devices for intraoperative use include the ReScan 700 (Zeiss; FDA product code: OBO) and the iOCT® system (Haag-Streit).

Portable devices for intraoperative use include the Bioptigen Envisu™ (Bioptigen; FDA product code: HLI) and the Optovue iVue® (Optovue; FDA product code: OBO). Ultrahigh-resolution optical coherence tomography devices include the SOCT Copernicus HR (Optopol Technologies; FDA product code OBO).

Commercially available laser systems, such as the LenSx® (Alcon), Catalys® (OptiMedica), and VICTUS® (Technolas Perfect Vision), include optical coherence tomography to provide image guidance for laser cataract surgery. FDA product code: OOE.

Custom-built devices, which do not require FDA approval, are also used.

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

The anterior chamber Cornea optical coherence tomography (Ophthalmic Technologies) is not cleared for marketing in the United States.

IV. RATIONALE

Top

Summary of Evidence

For individuals who are being evaluated for angle-closure glaucoma who receive AS OCT, the evidence includes case series and cohort studies. Relevant outcomes are test accuracy, symptoms, change in disease status, and morbid events. Current literature consists primarily of assessments of qualitative and quantitative imaging and detection capabilities. Ideally, a diagnostic test should be evaluated based on its diagnostic accuracy and clinical utility. Studies have shown that AS OCT detects more eyes with narrow or closed angles than gonioscopy, suggesting that the sensitivity of OCT is higher than that of gonioscopy. However, because of clinical follow-up and validation studies, it is not clear to what degree these additional cases are true positives or false positives and, therefore, the specificity and predictive values cannot be determined. The evaluation of diagnostic performance depends, therefore, on evidence that the additional eyes identified with narrow angle by AS OCT are at higher risk for primary angle-closure glaucoma. Results from a study with mid-term follow-up have shown that some patients identified with angle closure on AS OCT will develop angle closure on gonioscopy after several years, but that there may also be a large number of false-positive results. Longer term studies are needed to determine whether eyes classified as closed angle by AS OCT are at higher risk of developing primary angle-closure glaucoma. It is also not known whether early detection of angle closure will improve outcomes in individuals who do not have symptoms of angle closure. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who are being evaluated for anterior eye surgery or postsurgical complications who receive AS OCT, the evidence includes case series. Relevant outcomes are test accuracy, symptoms, change in disease status, and morbid events. Use of AS OCT has been reported for presurgical evaluation, surgical guidance, and monitoring for postsurgical complications. There is some evidence that the high-resolution images provided by AS OCT are superior to results from slit-lamp examination or gonioscopy for some indications. However, current literature is very limited. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have anterior eye segment disease or pathology who receive AS OCT, the evidence includes case series. Relevant outcomes are test accuracy, symptoms, change in disease status, and morbid events. The evidence related to the use of AS OCT for AS disease or pathology (e.g., dry eye syndrome, tumors, uveitis, infections) is limited, and does not support improvements in imaging compared with alternative diagnostic techniques. The evidence is insufficient to determine the effects of the technology on health outcomes.

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

V. DEFINITIONS

Top

ANTERIOR SEGMENT is the front third of the eye that includes the structures in front of the vitreous humour: the cornea, iris, ciliary body, and lens. Within the anterior segment are two fluid-filled spaces: the anterior chamber between the posterior surface of the cornea (i.e. the corneal endothelium) and the iris and the posterior chamber between the iris and the front face of the vitreous. Aqueous humor fills these spaces within the anterior segment and provides nutrients to the surrounding structures

CUP/DISC RATIO in ophthalmology is the mathematic relationship between the horizontal or vertical diameter of the physiologic cup and the diameter of the optic disc.

DIABETIC RETINOPATHY is a disorder of retinal blood vessels characterized by capillary microaneurysms, hemorrhage, exudates, and the formation of new vessels and connective tissue.

INTRAOCULAR PRESSURE refers to the internal pressure of the eye regulated by resistance to the flow of aqueous humor through the fine sieve of the trabecular meshwork.

VI. BENEFIT VARIATIONS

Top

The existence of this medical policy does not mean that this service is a covered benefit under the member's health benefit plan. Benefit determinations should be based in all cases on the applicable health benefit plan language. Medical policies do not constitute a description of benefits. A member's health benefit plan governs which services are covered, which are excluded, which are subject to benefit limits and which require preauthorization. There are different benefit plan designs in each product administered by Capital BlueCross. Members and providers should consult the member's health benefit plan for information or contact Capital BlueCross for benefit information.

VII. DISCLAIMER

Top

Capital BlueCross's medical policies are developed to assist in administering a member's benefits, do not constitute medical advice and are subject to change. Treating providers are solely responsible for medical advice and treatment of members. Members should discuss any medical policy related to their coverage or condition with their provider and consult their benefit information to determine if the service is covered. If there is a discrepancy between this medical policy and a member's benefit information, the benefit information will govern. If a provider or a member has a question concerning the application of this medical policy to a specific member's plan of benefits, please contact Capital BlueCross' Provider Services or Member Services. Capital BlueCross considers the information contained in this medical policy to be proprietary and it may only be disseminated as permitted by law.

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

VIII. CODING INFORMATION

TOP

Note: This list of codes may not be all-inclusive, and codes are subject to change at any time. The identification of a code in this section does not denote coverage as coverage is determined by the terms of member benefit information. In addition, not all covered services are eligible for separate reimbursement.

Investigational and therefore not covered:

CPT Codes®								
0604T	0605T	0606T	92132					

IX. REFERENCES

Top

1. *Wolffsohn JS, Peterson RC. Anterior ophthalmic imaging. Clin Exp Optom. Jul 2006;89(4):205-214. PMID 16776728*
2. *Baskaran M, Iyer JV, Narayanaswamy AK, et al. Anterior segment imaging predicts incident gonioscopic angle closure. Ophthalmology. Dec 2015;122(12):2380-2384. PMID 26359189*
3. *Nolan WP, See JL, Chew PT, et al. Detection of primary angle closure using anterior segment optical coherence tomography in Asian eyes. Ophthalmology. Jan 2007;114(1):33-39. PMID 17070597*
4. *Narayanaswamy A, Sakata LM, He MG, et al. Diagnostic performance of anterior chamber angle measurements for detecting eyes with narrow angles: an anterior segment OCT study. Arch Ophthalmol. Oct 2010;128(10):1321-1327. PMID 20938002*
5. *Pekmezci M, Porco TC, Lin SC. Anterior segment optical coherence tomography as a screening tool for the assessment of the anterior segment angle. Ophthalmic Surg Lasers Imaging. Jul-Aug 2009;40(4):389-398. PMID 19634744*
6. *Mansouri K, Sommerhalder J, Shaarawy T. Prospective comparison of ultrasound biomicroscopy and anterior segment optical coherence tomography for evaluation of anterior chamber dimensions in European eyes with primary angle closure. Eye (Lond). Feb 2010;24(2):233-239. PMID 19444291*
7. *Jiang C, Li Y, Huang D, et al. Study of anterior chamber aqueous tube shunt by fourier-domain optical coherence tomography. J Ophthalmol. Jul 2012;2012:189580. PMID 22778909*
8. *Moutsouris K, Dapena I, Ham L, et al. Optical coherence tomography, scheimpflug imaging, and slit-lamp biomicroscopy in the early detection of graft detachment after descemet membrane endothelial keratoplasty. Cornea. Dec 2011;30(12):1369-1375. PMID 21993458*
9. *Venincasa MJ, Osigian CJ, Cavuoto KM, et al. Combination of anterior segment optical coherence tomography modalities to improve accuracy of rectus muscle insertion location. J AAPOS. Jun 2017;21(3):243-246. PMID 28526283*

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

10. *Nguyen P, Chopra V. Applications of optical coherence tomography in cataract surgery. Curr Opin Ophthalmol. Jan 2013;24(1):47-52. PMID 23197267*
11. *Bianciotto C, Shields CL, Guzman JM, et al. Assessment of anterior segment tumors with ultrasound biomicroscopy versus anterior segment optical coherence tomography in 200 cases. Ophthalmology. Jul 2011;118(7):1297-1302. PMID 21377736*
12. *Agarwal A, Ashokkumar D, Jacob S, et al. High-speed optical coherence tomography for imaging anterior chamber inflammatory reaction in uveitis: clinical correlation and grading. Am J Ophthalmol. Mar 2009;147(3):413-416 e413. PMID 19054493*
13. *Garcia JP, Jr., Rosen RB. Anterior segment imaging: optical coherence tomography versus ultrasound biomicroscopy. Ophthalmic Surg Lasers Imaging. Nov-Dec 2008;39(6):476-484. PMID 19065978*
14. *Medina CA, Plesec T, Singh AD. Optical coherence tomography imaging of ocular and periocular tumours. Br J Ophthalmol. Jul 2014;98(Suppl 2):ii40-46. PMID 24599420*
15. *Thomas BJ, Galor A, Nanji AA, et al. Ultra high-resolution anterior segment optical coherence tomography in the diagnosis and management of ocular surface squamous neoplasia. Ocul Surf. Jan 2014;12(1):46-58. PMID 24439046*
16. *American Academy of Ophthalmology. Preferred Practice Pattern: Primary angle closure. 2015; http://www.aaojournal.org/article/S0161-6420(15)01271-3/pdf. Accessed July 8, 2020.*
17. Blu*e Cross Blue Shield Association Medical Policy Reference Manual. 9.03.18, Optical Coherence Tomography of the Anterior Eye Segment. April 2020.*

X. POLICY HISTORY

Top

MP 2.085	**CAC 10/25/11 -New policy**. Adopt BCBSA. This new policy addresses Optical Coherence Tomography (OCT) for evaluation of the anterior segment of the eye which is listed as investigational. OCT for the evaluation of the optic nerve (retinal nerve fiber layer) layer is addressed in MP 2.056.
	CAC 1/29/13 Consensus review. No change to policy statements. References updated. Changed policy title to Optical Coherence Tomography (OCT) of the Anterior Eye Segment (formerly Anterior Eye Segment Optical Imaging. This is consistent with change made by BCBSA. Codes reviewed 12/17/13
	CAC 1/28/14 Consensus review. No change to policy statements. References updated. Rationale added. FEP variation revised to reflect updated title. Codes reviewed.
	CAC 1/27/15 Consensus review. No change to policy statements. References and rationale updated. Codes reviewed.
	11/2/15 Administrative change. LCD number changed from L27529 to L35038 due to Novitas update to ICD-10.

POLICY TITLE	OPTICAL COHERENCE TOMOGRAPHY (OCT) OF THE ANTERIOR EYE SEGMENT
POLICY NUMBER	MP-2.085

	CAC 1/26/16 Consensus review. No change to the policy statement. References and rationale updated**.**
	CAC 11/29/16 Consensus. No change to policy statement. References and rationale updated. Coding reviewed. Variations updated.
	12/19/17 Consensus review. No changes to the policy statement. Rationale updated.
	11/11/18. Consensus. No change to policy statements. References updated. Rationale condensed.
	8/26/2019. Consensus review. Policy statement unchanged. References updated.
	5/20/2020 Administrative update. New codes 0604T, 0605T, and 0606T added to the policy. Product Variation, Benefit Variation, and Disclaimer updated.
	7/15/20: Consensus review. Background and references updated. No change to policy statement

TOP