Medical Coverage Policy | Optical Coherence Tomography of the Anterior Eye Segment

EFFECTIVE DATE: 01|01|2017
POLICY LAST UPDATED: 06|11|2022

OVERVIEW
This policy relates only to the anterior eye segment and not the posterior segment, which is a covered service.

Optical coherence tomography (OCT) is a non-invasive, high-resolution imaging method that can be used to visualize ocular structures. OCT of the anterior segment is being evaluated as a non-invasive diagnostic and screening tool for detecting angle-closure glaucoma, for presurgical evaluation, surgical guidance, and for assessing complications following surgical procedures. It is also being studied as a tool to evaluate the pathologic processes of dry eye syndrome, tumors, uveitis, and infections.

This policy is applicable to Commercial Products only. For Medicare Advantage Plans, see Related Policie section.

MEDICAL CRITERIA
Not applicable

PRIOR AUTHORIZATION
Not applicable

POLICY STATEMENT
Commercial Products
Scanning computerized ophthalmic (e.g., OCT) imaging of the anterior eye segment is not medically necessary as the evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

COVERAGE
Benefits may vary between groups and contracts. Please refer to the appropriate Benefit Booklet, Evidence of Coverage or Subscriber Agreement for applicable not medically necessary benefits/coverage.

BACKGROUND
Optical Coherence Tomography
Optical coherence tomography (OCT) is a noninvasive, high-resolution imaging method that can be used to visualize ocular structures. OCT 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 in the posterior segment. 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, permitting high-resolution cross-sectional imaging of the anterior chamber (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 OCT 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. Slitlamp 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 highfrequency mechanical pulses (10-20 MHz) to build a 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 anterior segment anatomy, particularly that of the anterior chamber 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 anterior chamber. 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 optical coherence tomography, 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.

For individuals who are being evaluated for angle-closure glaucoma who receive AS OCT, 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 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 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 (eg, 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.

CODING

Commercial Products

The following code is considered not medically necessary:

92132 Scanning computerized ophthalmic diagnostic imaging, anterior segment, with interpretation and report, unilateral or bilateral

RELATED POLICIES

Medicare Advantage Plans National and Local Coverage Determinations
Ophthalmologic Techniques for Evaluating Glaucoma

PUBLISHED

Provider Update, August 2022
Provider Update, April 2021
Provider Update, April 2020
Provider Update, July 2019
Provider Update, November/December 2018

REFERENCES

1. Wolffsohn JS, Peterson RC. Anterior ophthalmic imaging. Clin Exp Optom. Jul 2006; 89(4): 205-14. PMID 16776728
2. Baskaran M, Iyer JV, Narayanaswamy AK, et al. Anterior Segment Imaging Predicts Incident Gonioscopic Angle Closure. Ophthalmology. Dec 2015; 122(12): 2380-4. PMID 26359189
3. Desmond T, Tran V, Maharaj M, et al. Diagnostic accuracy of AS-OCT vs gonioscopy for detecting angle closure: a systematic review and meta-analysis. Graefes Arch Clin Exp Ophthalmol. Jan 2022; 260(1): 1-23. PMID 34223989
4. 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): 33-9. PMID 17070597
5. 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): 1321-7. PMID 20938002
6. 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): 389-98. PMID 19634744
7. 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): 233-9. PMID 19444291
8. Jiang C, Li Y, Huang D, et al. Study of anterior chamber aqueous tube shunt by fourier-domain optical coherence tomography. J Ophthalmol. 2012; 2012: 189580. PMID 22778909

9. 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): 1369-75. PMID 21993458
10. 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
11. Nguyen P, Chopra V. Applications of optical coherence tomography in cataract surgery. Curr Opin Ophthalmol. Jan 2013; 24(1): 47-52. PMID 23197267
12. 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): 1297-302. PMID 21377736
13. 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.e3. PMID 19054493
14. Garcia JP, Rosen RB. Anterior segment imaging: optical coherence tomography versus ultrasound biomicroscopy. Ophthalmic Surg Lasers Imaging. Nov-Dec 2008; 39(6): 476-84. PMID 19065978
15. Medina CA, Plesec T, Singh AD. Optical coherence tomography imaging of ocular and periocular tumours. Br J Ophthalmol. Jul 2014; 98 Suppl 2: ii40-6. PMID 24599420
16. 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
17. American Academy of Ophthalmology. Preferred Practice Pattern: Primary angle closure disease. 2020; https://www.aao.org/preferred-practice-pattern/primary-angle-closure-disease-ppp. Accessed January 23, 2022.