Subject: Optical Coherence Tomography (Anterior Segment)

Overview: Optical coherence tomography (OCT) is a procedure that is used to produce high resolution cross sectional imaging of the eye. OCT is commonly used to evaluate the posterior segment of the eye and has also been proposed to evaluate the anterior segment.

Policy and Coverage Criteria:
Harvard Pilgrim Health Care (HPHC) considers Optical Coherence Tomography (Anterior Segment) as medically necessary when ANY of the following indications are met:

1. Anterior segment disorders of the eye, comprising ANY of the following:
   - Narrow-angle, mixed narrow-angle, suspected narrow angle, and open-angle glaucoma,
   - Corneal edema, ulcer, neoplasm, pterygium, or opacity precluding visualization of the anterior chamber,
   - Need for cataract extraction or lens power calculation with history of prior refractive surgery,
   - Iris tumor or pigmentary degeneration, or
   - Treatment is planned for a disease affecting the cornea, iris, lens, or other anterior segment structure;

Note: Refer to the medical policy titled SCODI for compete criteria

Exclusions: Optical Coherence Tomography (Anterior Segment) will be considered experimental/investigational for all other indications.

Supporting Information:
1. Technology Assessment: OCT measures structures of the eye using near-infrared light waves. A beam of light is reflected onto the eye and the echo time delay of light is recorded and compared to a reference value. A series of axial scans are combined to form two-dimensional images of the ocular structures. Cross-sectional images are then generated by scanning the incident optical beam. The resolution of OCT of the anterior segment (AS-OCT) is based on wavelength and bandwidth. A longer and faster wavelength is used in AS-OCT compared to OCT of the posterior segment. Due to limitations in light absorption of the iris, AS-OCT cannot produce a complete image beyond the pigmented epithelium. OCT devices available include the Visante OCT and the Cirrus HD-OCT (Carl Zeiss Meditec, Dublin, CA), the Stratus OCT, and the Orbscan II.

2. Literature Review: The gold standard for the evaluation of the anterior segment of the eye is gonioscopy. OCT is commonly used to evaluate the posterior segment of the eye, but has not been proven to be effective in evaluating the anterior segment of the eye.
   A 2013 report by the American Academy of Ophthalmology Ophthalmic Technology Assessment Committee Glaucoma Panel assessed the published literature pertaining to the association between AS imaging and gonioscopy to determine whether the imaging modalities aid in the diagnosis of primary angle closure. The panel concluded that although there is evidence suggesting that anterior imaging provides useful information in the evaluation of primary angle closure, none of these imaging methods provide sufficient information to be considered a substitute for gonioscopy. Longitudinal studies are needed to validate the diagnostic significance of the parameters measured by these instruments.
   Neri et al (2015) conducted an evaluation of the accommodation process in 14 normal eyes using AS-OCT. There was a significant decrease in the ACD during accommodation, a significant increase in lens thickness, and a significant movement forward of the lens central point. There was no change in the central corneal
thickness and anterior chamber width measurements. The authors concluded that high-resolution real-time imaging and biometry of the accommodating anterior segment can be effectively performed using AS-OCT. Mishima et al (2013) evaluated the prevalence and range of iridotrabecular contact (ITC) in 43 eyes with a shallow peripheral anterior chamber using AS-OCT and compared the results with ultrasound biomicroscopy and gonioscopy. At least one ITC was found in 93% and 97.7% of the 43 eyes under light and dark conditions with AS-OCT. With UBM, at least one ITC was found in 51.1% and 83.7% of the 43 eyes under light and dark conditions. The prevalence of ITC in eyes with AS-OCT was significantly higher than with UBM under light conditions, but not dark conditions. The authors concluded that AS-OCT detected all peripheral anterior synechia and the prevalence of ITC detected by AS-OCT in narrow angle eyes was higher than previously thought.

Qui et al (2011) conducted a prospective, randomized, case-control study to determine the age-related variations in the human tear meniscus using Fourier-domain AS_OCT and evaluate its application in dry eye screening and diagnosis. The study included 146 patients with dry eye and 160 healthy controls. The participants were divided into groups by age: group A (0-19 years), group B (20-39 years), group C (40-59 years), and group D (>60 years). Results showed that tear meniscus values were significantly correlated with clinical examination results and dry eye syndrome. Mean tear meniscus height, tear meniscus depth, and TMA values of patients with dry eye were significantly lower than those of the controls. Accuracy of dry eye diagnosis was approximately 70% by AS-OCT and decreased with increasing age. The authors concluded that Fourier domain AS-OCT provides blur-free imaging and precise measurement of the tear meniscus.

Mansouri et al (2010) conducted a cross-sectional study to compare the accuracy in measurement of the anterior chamber angle by AS-OCT and ultrasound biomicroscopy (UBM) in 55 eyes (33 patients) with suspected primary angle closure (PACS), primary angle closure (PAC), or primary angle-closure glaucoma (PACG). All eyes were examined by AS-OCT followed by UBM. The mean superior trabecular-iris angle showed a significantly different result in AS-OCT compared to UBM. There was no difference between the two techniques in inferior trabecular-iris angle and superior angle-opening distance. The authors concluded that the comparative study showed that AS-OCT measurements are significantly correlated with UBM measurements but show poor agreement with each other. The authors do not believe AS-OCT can replace UBM for the assessment of the AC angle.

Wong et al (2009) assessed the ability of high-definition OCT to image the anterior chamber angle in 45 patients with phakic eyes. The participants underwent gonioscopy and anterior chamber angle imaging with HD-OCT. Cross-sectional HD-OCT allowed in vivo visualization of the sclera spur in 71 of 90 quadrants and the termination of the Descemet membrane in 84 of 90 quadrants. Imaging of the trabecular meshwork was present in 56 quadrants. Angle closure was observed in 17 eyes with gonioscopy and 12 eyes with HD-OCT. The authors concluded that the two methods showed good agreement for angle closure diagnosis by quadrant.

Pavlin et al (2009) conducted a prospective observational case series to evaluate the utility of AS-OCT in the imaging of anterior segment tumors and compare the images to UBM in 18 eyes. The results showed that AS-OCT imaged small hypopigmented tumors with complete penetration, however, cysts, highly pigmented tumors, large tumors, and ciliary body tumors were incompletely penetrated. UBM penetrated all tumors completely. The authors concluded that UBM is preferable for clinical anterior tumor assessment because of its superior ability to penetrate large tumors, highly pigmented tumors, and ciliary body tumors.

Sakata et al (2008) conducted a cross-sectional observational study in 423 right eyes to compare the performance of gonioscopy and AS-OCT in detecting angle closure in the different quadrants of the anterior chamber angle. Participants underwent gonioscopy and AS-OCT imaging in the dark. In 59% of the eyes by AS-OCT a closed angle was observed in at least one quadrant and in 33% of the eyes by gonioscopy. AS-OCT tended to detect more closed ACA than gonioscopy in the superior and inferior quadrants.

Dada et al (2007) compared anterior segment parameters using quantitative imaging by AS-OCT and UBM in 63 eyes. Central corneal thickness, anterior chamber depth, and the peripheral iridocorneal angles were assessed and compared. The correlation between AS-OCT and UBM measurements were significant for the nasal angle, temporal angle, anterior chamber depth, and central corneal thickness. There was no difference between the mean anterior chamber depth, central corneal thickness, and angle parameters measured by AS-OCT or UBM. The authors concluded that AS-OCT and UBM can both be used for anterior segment measurements and yielded comparable results.
3. Professional/Governmental Organizations

American Academy of Ophthalmologists (AAO): The AAO recommends evaluation of the eye through gonioscopy when angle closure is suspected. ASOCT is less capable of defining specific etiologies for angle closure due to inability to image behind the iris.

http://www.aao.org/ppp

Codes:

Coding:
Codes are listed below for informational purposes only, and do not guarantee member coverage or provider reimbursement. The list may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible.

<table>
<thead>
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<th>CPT® Code</th>
<th>Description</th>
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<tr>
<td>92132</td>
<td>Scanning computerized ophthalmic diagnostic imaging, anterior segment, with interpretation and report, unilateral or bilateral</td>
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List of medically necessary ICD-10 code

References:
### Summary of Changes:

<table>
<thead>
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<th>Date</th>
<th>Change</th>
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<tbody>
<tr>
<td>4/18</td>
<td>Coverage changed from experimental/investigational to covered with criteria</td>
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<tr>
<td>7/16</td>
<td>Policy reviewed, no changes. Coverage remains experimental and investigational.</td>
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Approved by Medical Policy Review Committee: 4/10/2018  
Reviewed/revised: 7/16, 4/18  
Initiated: N/A