



CIGNA HEALTHCARE COVERAGE POSITION

Revised Date	3/15/2008
Original Effective Date	5/15/2004
Next Review Date.....	3/15/2010
Coverage Position Number	0047

Subject Corneal Pachymetry

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Computer-Assisted Corneal Topography
 Corneal Remodeling
 Corneal Transplant

INSTRUCTIONS FOR USE

Coverage Positions are intended to supplement certain **standard** CIGNA HealthCare benefit plans. Please note, the terms of a participant's particular benefit plan document [Group Service Agreement (GSA), Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Positions are based. For example, a participant's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Position. In the event of a conflict, a participant's benefit plan document **always supercedes** the information in the Coverage Positions. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable group benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Positions and; 4) the specific facts of the particular situation. Coverage Positions relate exclusively to the administration of health benefit plans. Coverage Positions are not recommendations for treatment and should never be used as treatment guidelines. Proprietary information of CIGNA. Copyright ©2008 CIGNA

Coverage Position

CIGNA HealthCare covers corneal pachymetry as medically necessary for ANY of the following indications:

- bullous keratopathy
- corneal edema
- corneal dystrophy affecting the endothelium
- Fuch's corneal dystrophy
- corneal transplant (i.e., penetrating keratoplasty), pre- and post-surgical evaluation
- corneal transplant (i.e., penetrating keratoplasty), rejection
- compromised endothelial function in persons who are in need of cataract surgery
- diagnosed or suspected glaucoma, when pachymetry has not been previously performed

CIGNA HealthCare does not cover corneal pachymetry for routine glaucoma screening because it is considered not medically necessary.

Many CIGNA HealthCare benefit plans specifically exclude coverage for refractive surgery. Corneal pachymetry would be excluded from coverage under these plans for the following indications:

- pre- or post-surgical evaluation of corneal thickness associated with refractive surgeries (e.g., LASIK, radial keratotomy)

General Background

Corneal pachymetry is the measurement of corneal thickness. Both ultrasonic and optical pachymetry are methods of measuring corneal thickness. Ultrasonic pachymetry is more reproducible, but optical pachymetry is especially helpful in measuring the depth of corneal pathology. The ultrasound pachymeter is designed for measuring the axial length of the eye and the thickness of the cornea. Ultrasound energy is emitted from the probe tip acting as both the transmitter and receiver. Some of the energy is reflected back toward the probe in the form of an echo. Measurement data can be calculated based on both the time it takes the echo to travel back to the probe from the eye and the preset converted velocity. Corneal thickness can also be measured by specular microscope.

Pachymetry is not a new technology; it has been used in routine ophthalmological exams when corneal pathology has been suspected. It is a valid and established test for many ophthalmological conditions, such as corneal edema, Fuch's endothelial dystrophy, and bullous keratopathy. Pachymetry can assist in evaluating current medical treatment and is often an accurate means of assessing the progression of disease. Corneal thickness is an important criterion for assessing the risk of postoperative corneal decompression and for determining the appropriate surgical approach. Sequential corneal pachymetry is used to document the resolution of corneal disease or surgery affecting corneal thickness. Although ultrasonic pachymetry may be useful to confirm corneal thinning in patients with suspected keratoconus, videokeratography is currently the most sensitive and sophisticated method for confirming the presence of keratoconus. Pachymetry alone should not be used as a diagnostic tool for keratoconus because of the large range of pachymetry readings in the normal population (American Academy of Ophthalmology [AAO], 2003).

Corneal thickness measurement has recently been appreciated as an important element in the management of patients diagnosed with glaucoma, as well as those at high risk for developing glaucoma (i.e., glaucoma suspect). Particularly, central corneal thickness (CCT) has been found to influence the measurement of intraocular pressure (IOP). IOP is the only factor known to be amenable to treatment in glaucoma and glaucoma suspects. Goldman applanation tonometry is the gold standard for clinical measurement of IOP. This type of tonometry utilizes a special probe to flatten part of the cornea. IOP is determined by the amount of weight needed to flatten the cornea. The mean central corneal thickness in healthy human eyes is about 545 μm (micrometers). A thin central cornea (e.g., 490 μm) may explain loss of visual field in an eye despite normal applanation measurements of IOP, because the measurements do not reflect a higher true IOP. Conversely, a thick central cornea (e.g., 610 μm) may explain high measured IOP associated with longstanding normal visual field and optic disc due to a lower true IOP. At present, there is no single formula that recalculates IOP, as the relationship between CCT and IOP is not linear, and there is no accepted, universal algorithm (AAO, 2005).

Dueker et al. (2007) performed a technology assessment of the published literature to assess whether CCT is a risk factor for the presence, development, or progression of glaucomatous optic nerve damage related to primary open-angle glaucoma (POAG). Studies (n=37) were selected for methodological review based on relevance to the assessment questions and quality of study design. The reviewers found clear consistent evidence in the form of well-designed RCTs and case-control studies and nonrandomized clinical trials that CCT, as measured by ultrasound pachymetry, is a reliable indicator of risk for progression of ocular hypertension to glaucoma. Mixed evidence was found in terms of the association of CCT with the presence of glaucoma, therefore the value of CCT measurement as a screening tool for glaucoma appears to be negligible. The bulk of the studies reviewed did not show that CCT is useful in predicting the progression of glaucomatous damage. It was noted that although the evidence supporting the need for the measurement of CCT as a risk factor for glaucoma progression is not as strong, IOP is the only modifiable risk factor in the treatment of glaucoma, and CCT has the potential to significantly impact IOP measurement by applanation tonometry in all patients (Dueker, et al., 2007).

The Ocular Hypertension Treatment Study (OHTS) established corneal thickness as a risk factor for glaucoma. OHTS was a long-term, randomized, controlled multicenter clinical trial. The study aimed to determine whether medical reduction of intraocular pressure would prevent or delay the onset of glaucomatous visual field loss and/or optic disc damage in ocular hypertensive subjects and to gather data to assist in identifying patients at high risk for developing open-angle glaucoma and those most likely to benefit from early medical treatment. Ocular hypertensive subjects (n=1636) deemed to be at moderate

risk of developing POAG were randomly assigned to either close observation only or a stepped medical regimen. Patient selection criteria included IOP of 24–32 mm Hg in at least one eye and IOP of 21–32 mm Hg in the fellow eye. Medical treatment consisted of topical anti-glaucoma agents. In the opinion of Kass et al. (2002), the OHTS demonstrated that moderate IOP reductions could be achieved and maintained during a median follow-up period of 72 months.

In a cross-sectional study arm of the OHTS, Brandt et al. (2001) set out to determine if CCT is related to race. CCT was measured in 1301 patients with ocular hypertension. Ultrasonic pachymeters of the same make and model were used in all sites. The mean CCT in Caucasians was 573 μm , while the mean CCT for African-American subjects was 555.7 μm . The study demonstrated that African-American subjects have thinner corneas than white subjects. The effect of CCT may influence the accuracy of applanation tonometry in the diagnosis, screening and management of patients with glaucoma and ocular hypertension.

La Rosa et al. (2001) reported a comparative study of CCT of Caucasians and African-Americans in glaucomatous and nonglaucomatous populations. A statistically significant difference was found between the central corneal thickness of African-Americans (n=56) and Caucasians (n=32) who had suspected or confirmed glaucoma from control populations of African-Americans (n=56) and Caucasian (n=51) subjects who had no evidence of glaucoma, elevated intraocular pressure (IOP) or optic nerve damage. It is proposed that the finding that African-Americans have thinner corneas than Caucasians may lead to lower applanation, intraocular pressure readings, and potentially result in an underestimation of the actual level of intraocular pressure. This study raises the possibility that individual CCT may need to be taken into account to accurately assess the intraocular pressure for the diagnosis of glaucoma.

In a comparative study (n=100 eyes) conducted by Sallet et al. 2000, CCT measured by optical pachymetry was compared with corneal thickness measured by ultrasound. Optical pachymetry was performed using the noncontact specular microscope. Three measurements were averaged, followed by the instillation of a topical anesthetic. The next three measurements were taken using the ultrasound pachymeter. Sallet et al. concluded that optical and ultrasound pachymetry are comparable.

Professional Societies/Organizations

According to the AAO, the measurement of CCT aids in the interpretation of IOP measurement results and the stratification of patient risk for glaucoma. The AAO describes a glaucoma suspect as an individual with clinical findings and/or a group of risk factors that indicate an increased likelihood of developing POAG. Clinical findings include the following:

- appearance of the optic disc or retinal nerve fiber layer that is suspicious for glaucomatous damage
- a visual field suspicious for glaucomatous damage
- consistently elevated IOP associated with normal appearance of the optic disc and retinal nerve fiber layer and with normal visual field test results

Risk factors associated with glaucomatous optic neuropathy are elevated IOP measurement; older age; family history of glaucoma; African or Hispanic/Latino descent; and thinner CCT (AAO, 2005).

Summary

Well-established indications for corneal pachymetry include the management of corneal disorders such as Fuch's dystrophy and bullous keratopathy. The procedure may be useful for the preoperative evaluation of patients undergoing corneal transplant (i.e., penetrating keratoplasty), as well as for postoperative follow-up and evaluation of corneal transplant rejection. The overall body of evidence in the published peer-reviewed medical literature suggests that the use of pachymetry should be considered as an adjunct to standard glaucoma evaluation to assist in the interpretation of intraocular pressure (IOP) measurement. It has not been proven that repeat measurements of corneal thickness for glaucoma are necessary unless the patient has corneal diseases or surgery affecting corneal thickness.

Coding/Billing Information

Note: This list of codes may not be all-inclusive.

Covered when medically necessary:

CPT®* Codes	Description
76514	Ophthalmic ultrasound, diagnostic; corneal pachymetry, unilateral or bilateral (determination of corneal thickness)

HCPCS Codes	Description
	No specific codes

ICD-9-CM Diagnosis Codes	Description
365.00 – 365.9	Glaucoma
371.03	Central opacity of cornea
371.20	Unspecified corneal edema
371.23	Bullous keratopathy
371.57	Endothelial corneal dystrophy
996.51	Mechanical complications of other specified prosthetic device, implant and graft, due to corneal graft
	Multiple/varied

Experimental/Investigational/Unproven/Not Covered:

ICD-9-CM Diagnosis Codes	Description
V80.1	Screening for glaucoma

***Current Procedural Terminology (CPT®) © 2007 American Medical Association: Chicago, IL.**

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