9.03.08	Photodynamic Therapy for Choroidal Neovascularization		
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Section:	2.0 Medicine	**Page:**	Page 1 of 32

Policy Statement

I. Verteporfin photodynamic therapy as monotherapy may be considered **medically necessary** as a treatment of choroidal neovascularization associated with age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis, chronic central serous chorioretinopathy, or choroidal hemangioma.

II. Verteporfin photodynamic therapy is considered **investigational** as monotherapy for other ophthalmologic disorders.

III. Verteporfin photodynamic therapy is considered **investigational** when used in combination with one or more of the antivascular endothelial growth factor therapies: pegaptanib (Macugen®), ranibizumab (Lucentis®), bevacizumab (Avastin®), or aflibercept (Eylea™) as a treatment of choroidal neovascularization associated with age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis, central serous chorioretinopathy, choroidal hemangioma, or for other ophthalmologic disorders.

NOTE: Refer to Appendix A to see the policy statement changes (if any) from the previous version.

Policy Guidelines

U.S. Food and Drug Administration (FDA) labeling for verteporfin indicates that the provider should reevaluate the individual every 3 months and, if choroidal neovascularization leakage is detected on fluorescein angiography, therapy should be repeated. However, total number of treatments is not addressed by FDA. Evidence defining when treatment should stop is not available, but experts have suggested stopping "when the situation is judged to be 'futile'." FDA labeling states that the "safety and efficacy of Visudyne beyond 2 years have not been demonstrated."

Acute central serous chorioretinopathy refers to self-limiting disease that resolves spontaneously over a few months without any treatment. Chronic central serous chorioretinopathy has been defined as a serous macular elevation, visible biomicroscopically or detected by optical coherence tomography, that is associated with retinal pigment epithelial atrophic areas and subtle leaks or ill-defined staining by fluorescein angiography; it does not resolve spontaneously within a few months.

Coding

See the Codes table for details.

Description

Verteporfin photodynamic therapy is a treatment modality designed to selectively occlude ocular choroidal neovascular tissue. The therapy is a 2-step process, consisting of an injection of the photosensitizer verteporfin, followed 15 minutes later by laser treatment to the targeted sites of retinal neovascularization. The laser treatment selectively damages the vascular endothelium, thereby occluding choroidal neovascularization tissue. Individuals may be retreated if leakage from choroidal neovascularization persists.

Related Policies

- Intraocular Radiotherapy for Age-Related Macular Degeneration

Benefit Application

Benefit determinations should be based in all cases on the applicable contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

Some state or federal mandates (e.g., Federal Employee Program [FEP]) prohibits plans from denying Food and Drug Administration (FDA)-approved technologies as investigational. In these instances, plans may have to consider the coverage eligibility of FDA-approved technologies on the basis of medical necessity alone.

Regulatory Status

In 2000, verteporfin (Visudyne®; Novartis), an intravenous photodynamic therapy agent, was approved by the FDA for the treatment of age-related macular degeneration in individuals with predominantly classic subfoveal choroidal neovascularization. Subsequently, in 2001, the indication was expanded to include presumed ocular histoplasmosis and pathologic myopia.

Rationale

Background

Vision Loss

Severe vision loss can occur with ocular neovascularization, the growth of abnormal blood vessels in the retina or choroid. Neovascularization occurs in a number of ocular diseases, including age-related macular degeneration.

Age-Related Macular Degeneration

Age-related macular degeneration is a degenerative disease of the retina that results in loss of central vision. Two distinctive forms, known as dry and wet degeneration, may be observed. The dry form (also known atrophic or areolar) is more common and is often a precursor of the wet form (also known as exudative neovascular or disciform). The wet form is more devastating and characterized by serous or hemorrhagic detachment of the retinal pigment epithelium and development of choroidal neovascularization, which greatly increases the risk of developing severe irreversible loss of vision. Choroidal neovascularization is categorized as classic or occult. Classic choroidal neovascularization appears as an initial lacy pattern of hyperfluorescence followed by more irregular patterns as the dye leaks into the subretinal space. Occult choroidal neovascularization lacks the characteristic angiographic pattern. Classic choroidal neovascularization carries a worse prognosis for vision than occult choroidal neovascularization, suggesting that the proliferative response that obscures new vessels may also favorably alter the clinical course of age-related macular degeneration.

Pathologic Myopia

Pathologic myopia refers to an abnormal elongation of the eye associated with severe near-sightedness. It generally occurs among people older than 30 years of age and can result in a progressive, severe loss of vision, frequently related to the development of choroidal neovascularization. Verteporfin photodynamic therapy has also been investigated in patients with choroidal neovascularization related to pathologic myopia. Antivascular endothelial growth factor

therapy is now considered a first-line intervention in patients with myopic choroidal neovascularization.

Presumed Ocular Histoplasmosis

Presumed ocular histoplasmosis may be the second most common cause of blindness in patients younger than 50 years of age in certain endemic areas (Ohio and Mississippi River Valleys in the United States). This condition is characterized by a positive skin test for histoplasmosis, miliary opacities of the lungs, tiny choroidal scars, peripapillary disruption of the choriocapillaris, and exudation or hemorrhage from choroidal lesions in or near the macula. The condition is asymptomatic and benign, unless the choroidal neovascularization lesions, which may develop many years after chorioretinal scarring has taken place, affect the macula.

Central Serous Chorioretinopathy

Central serous chorioretinopathy refers to an idiopathic disease in which there is a serous detachment of the macula due to leakage of fluid from the choriocapillaris through the retinal pigment epithelium. This condition is avascular; however, neovascularization can occur as a secondary complication. In most cases, central serous chorioretinopathy resolves spontaneously in 3 to 4 months. However, in a few cases, chronic progression or recurrence can lead to the progressive decline of visual acuity. Central serous chorioretinopathy has been treated with medication and laser photocoagulation, but these treatments have limited efficacy. Multiple definitions have been used in the literature to classify central serous chorioretinopathy as acute or chronic based cutoff time points (e.g., persistent fluid for <3, 4 or 6 months) or less frequently based on the timing of treatment. For example, acute central serous chorioretinopathy defined as the first attempted treatment to improve visual acuity, and chronic central serous chorioretinopathy is defined as being refractory to treatment. Further, multiple verteporfin photodynamic therapy strategies that use either reduced-dose or half-fluency have been evaluated for the treatment of central serous chorioretinopathy because full-dose verteporfin photodynamic therapy used in age-related macular degeneration has shown a potentially higher risk of developing choroidal ischemia and retinal atrophic changes.

Polypoidal Choroidal Vasculopathy

Polypoidal choroidal vasculopathy arises primarily from abnormal choroidal circulation, resulting in characteristic lesions comprising well-defined vascular networks of vessels ending in polyp-like structures. A less common subtype is polypoidal choroidal neovascularization, and it may be considered a subtype of age-related macular degeneration. Eyes that develop a cluster of grape-like polypoidal dilations are at high risk for severe vision loss.

Choroidal Hemangioma

Choroidal hemangioma is an uncommon, benign vascular tumor, manifesting as an orange-red mass in the posterior pole of the eye. Visual loss may be progressive and irreversible because of chronic foveal detachment.

Angioid Streaks

Angioid streaks result from crack-like breaks in the Bruch membrane (the innermost layer of the choroid) and occur in individuals spontaneously or due to blunt trauma or associated with some systemic diseases such as pseudoxanthoma elasticum, Paget disease of bone, or sickle hemoglobinopathy. Vision loss in eyes with angioid streaks occurs most frequently as a result of choroidal neovascularization.

Treatment

Available therapeutic options for choroidal neovascularization include antivascular endothelial growth factor inhibitors, verteporfin photodynamic therapy, antioxidants, thermal laser photocoagulation, and corticosteroids. The safety and efficacy of each treatment depends on the form and location of the neovascularization.

Verteporfin photodynamic therapy is a treatment modality designed to selectively occlude ocular choroidal neovascular tissue. The therapy is a 2-step process, consisting of an injection of the photosensitizer verteporfin, followed 15 minutes later by laser treatment to the targeted sites of retinal neovascularization. The laser treatment selectively damages the vascular endothelium and occludes the neovascularized tissue. Patients may be retreated if leakage from choroidal neovascularization persists.

Monotherapy with vascular endothelial growth factor inhibitors is now standard treatment of choroidal neovascularization due to age-related macular degeneration and pathologic myopia. Combining verteporfin photodynamic therapy with antivascular endothelial growth factor inhibitors, concurrently or sequentially, has a biologic basis and has been investigated in multiple trials particularly in the treatment of choroidal neovascularization due to age-related macular degeneration and pathologic myopia.

The use of verteporfin photodynamic therapy in choroidal neovascularization has decreased substantially with the availability of antivascular endothelial growth factor therapy. Subsequent to U.S. Food and Drug Administration (FDA) approval of verteporfin photodynamic therapy in 2000, the FDA approved pegaptanib in 2004 and ranibizumab in 2006 for treatment of age-related macular degeneration related choroidal neovascularization. The approval of pegaptanib was based on a sham-controlled RCT[1,2,] while ranibizumab was approved based on a head-to-head comparison with verteporfin photodynamic therapy in the Anti-VEGF Antibody for the Treatment of Predominantly Classic Choroidal Neovascularization in Age-Related Macular Degeneration (ANCHOR) trial.[3,] Intravitreal injections of antivascular endothelial growth factor drugs such as ranibizumab and bevacizumab have shown superior efficacy compared with verteporfin photodynamic therapy in multiple head-to-head trials. Currently, verteporfin photodynamic therapy is used for patients in whom vascular endothelial growth factor inhibitors are contraindicated or for those who fail to benefit from vascular endothelial growth factor inhibitors.

Literature Review

Evidence reviews assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function¾including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions, the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice. The following is a summary of the key literature to date.

Promotion of greater diversity and inclusion in clinical research of historically marginalized groups (e.g., People of Color [African-American, Asian, Black, Latino and Native American]; LGBTQIA (Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual); Women; and People with Disabilities [Physical and Invisible]) allows policy populations to be more reflective of and findings more applicable to our diverse members. While we also strive to use inclusive language related to these

groups in our policies, use of gender-specific nouns (e.g., women, men, sisters, etc.) will continue when reflective of language used in publications describing study populations.

Age-Related Macular Degeneration - Verteporfin Photodynamic Therapy vs Placebo

Choroidal neovascularization is categorized as classic or occult. Classic choroidal neovascularization appears as an initial lacy pattern of hyperfluorescence followed by more irregular patterns as the dye leaks into the subretinal space. Occult choroidal neovascularization lacks the characteristic angiographic pattern. Classic choroidal neovascularization carries a worse prognosis for vision than occult choroidal neovascularization, suggesting that the proliferative response that obscures new vessels may also favorably alter the clinical course of age-related macular degeneration.

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with classic choroidal neovascularization due to age-related macular degeneration.

The following PICO was used to select literature to inform this review.

Population

Individuals with classic choroidal neovascularization due to age-related macular degeneration.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparator

Observation only.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Verteporfin Photodynamic Therapy vs Placebo

A TEC Assessment (2000) concluded that fewer patients treated using verteporfin photodynamic therapy compared with placebo experienced a clinically significant loss of visual acuity (38.8% vs 53.6%, respectively; p<.001).[4,] These conclusions were based on the 1-year follow-up results of 609 patients enrolled in 2 similar, multicenter, double-masked, randomized placebo-controlled trials called Treatment of Age-Related Macular Degeneration with Photodynamic Therapy (TAP), published in 1999.[5,] Subgroup analysis showed that efficacy was limited to patients in whom the area of classic choroidal neovascularization occupied 50% or more of the area of the lesion. Subsequently, in 2001, 2-year results of the TAP trials showed that beneficial outcomes for visual acuity and contrast sensitivity observed after 1-year of follow-up were sustained through 24 months.[6,] At 2 years, 53% of the verteporfin photodynamic therapy arm compared with 38% of the placebo arm lost fewer than 15 letters. Further, an average number of verteporfin photodynamic therapy treatments required was

lower in the second year (2.2) compared with the first year (3.4). Subgroup analysis confirmed the earlier findings that efficacy was limited to patients in whom the area of classic choroidal neovascularization occupied 50% or more of the area of the lesion.

Since 2001, several additional reports from the TAP trials have been published.[7,8,9,] They demonstrated positive outcomes with the use of verteporfin photodynamic therapy for subfoveal choroidal neovascularization, and further supported the findings of the earlier TAP trial reports. Kaiser (2006) reported on results of a 3-year open-label extension of the TAP trials.[10,] Of 402 verteporfin photodynamic therapy treated patients who completed the 24-month randomized study, 320 (80%) enrolled in the extension protocol. Of the 320 enrolled, 193 (60%) completed the 60-month examination, 122 (38%) discontinued prematurely, and 3 (1%) were noncompliant. Yearly treatment rates declined from 3.5 treatments in the first year to 0.1 in the fifth year; patients who remained in the study lost an additional 2.3 lines of letters over the 3-year extension.

The Verteporfin in Photodynamic Therapy (VIP) trial (2001) randomized 339 patients to verteporfin photodynamic therapy or placebo.[11,] Most (76%) patients had occult disease while the remainder had early classic choroidal neovascularization with good visual acuity. The primary outcome was the proportion of eyes with fewer than 15 letters of visual acuity loss. While there was no significant difference between the treatment and placebo groups at 12 months, by 24 months a significantly lower percentage of those with occult choroidal neovascularization who were treated with verteporfin photodynamic therapy (55%) had lost vision compared with those who received placebo (68%; p=.032). These results contrast with those of the TAP trials, although the patient populations differed. The TAP trials required all patients to have some percentage of classic choroidal neovascularization, while the VIP trial recruited patients with occult disease without evidence of classic choroidal neovascularization. In addition, the VIP trial required patients with occult disease to have experienced recent deterioration in vision. Results for the subgroup of patients with classic choroidal neovascularization but good visual acuity were not reported separately.

Multiple systematic reviews and meta-analysis have included TAP and VIP trials and corroborated the treatment benefit of verteporfin photodynamic therapy in preventing vision loss. A Cochrane review (2003) concluded that verteporfin photodynamic therapy was effective at preventing vision loss in classic and occult choroidal neovascularization due to age-related macular degeneration.[12,]In a meta-analysis of the safety of verteporfin photodynamic therapy, Azab et al (2004) analyzed data from the 24-month TAP A and B and VIP trials (total N=948 patients with age-related macular degeneration).[13,] Reviewers concluded that the safety profile of verteporfin photodynamic therapy did not differ statistically from placebo. An updated Cochrane review (2007) evaluated results from the 3 RCTs (total N=1022 patients), which included the TAP and VIP trials.[14,] Meta-analysis showed a 24-month risk ratio of losing 6 or more lines of visual acuity of 0.62 compared with the control group. Reviewers concluded that verteporfin photodynamic therapy was probably effective for treating choroidal neovascularization due to age-related macular degeneration, although the effect size was uncertain.

The result of a multicenter RCT (2008) that compared 2 intensities of initial verteporfin photodynamic therapy-every 2 or 3 months for first 6 months in 203 patients with choroidal neovascularization caused by age-related macular degeneration-showed no differences in overall outcomes for visual acuity or anatomic lesion features.[15,]

Section Summary: Age-Related Macular Degeneration - Verteporfin Photodynamic Therapy vs Placebo

The evidence for the efficacy of verteporfin photodynamic therapy includes multiple RCTs that have established its superiority over placebo. However, the efficacy is limited to a subgroup of patients with classic choroidal neovascularization. The use of verteporfin photodynamic therapy has now been largely replaced by antivascular endothelial growth factor therapies.

Age-Related Macular Degeneration - Verteporfin Photodynamic Therapy Plus Anti-Vascular Endothelial Growth Factor Therapy

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to age-related macular degeneration. The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to age-related macular degeneration.

Intervention

Treatment with verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy.

Comparator

Treatment with antivascular endothelial growth factor therapy alone.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Because verteporfin photodynamic therapy and ranibizumab target different disease components of age-related macular degeneration, it has been hypothesized that combining them might lead to a synergistic effect, with a decreased need for monthly vascular endothelial growth factor injection and increased the durability of response while maintaining visual acuity.

Systematic Reviews

A systematic review (2015) of antivascular endothelial growth factor injections for treating wet age-related macular degeneration compared antivascular endothelial growth factor monotherapy with antivascular endothelial growth factor combination therapy plus verteporfin photodynamic therapy.[16,] Results showed a significant difference in best-corrected visual acuity of 2.74 letters (95% CI, 0.26 to 5.21 letters; p=.03) in favor of the monotherapy group (note that the conclusions of this systematic review indicated that the difference favored the combination group, which is incorrect). There were no differences between groups on the central retinal thickness or lesion size. Reviewers did not report a combined analysis of the number of antivascular endothelial growth factor injections performed in each group. Similar results were reported in a meta-analysis published in 2016.[17,]

Key Clinical Trials

The open-label, phase 2 study (2006) demonstrated that same-day administration of ranibizumab and verteporfin photodynamic therapy was well tolerated and vision was maintained.[18,] Results of the phase 1/2 FOCUS (Intravitreal Injections of rhuFab V2 in Combination With Visudyne in Subjects With Age Related Macular Degeneration) trial further supported the idea that combination

treatment might be more effective than monotherapy.[18,19,] In this trial, 162 patients with classic choroidal neovascularization secondary to age-related macular degeneration were randomized to verteporfin photodynamic therapy plus ranibizumab (n=106) or verteporfin photodynamic therapy plus sham (n=56). Verteporfin photodynamic therapy was repeated only if fluorescein angiography revealed persistent or recurrent leakage from choroidal neovascularization at evaluation visits (3-month intervals). Intention-to-treat analysis showed an average improvement in acuity of 5 letters at both 12 and 24 months (85% retention) with ranibizumab compared with a decrease of 8 letters in the verteporfin photodynamic therapy alone group. Visual acuity improved by 15 or more letters in 25% of patients treated with ranibizumab (plus verteporfin photodynamic therapy as needed) compared with 7% of patients treated with verteporfin photodynamic therapy alone. However, the FOCUS trial did not include a ranibizumab monotherapy arm.

Subsequently, the 2 larger phase 3 confirmatory trials - DENALI and MONT BLANC - failed to show the superiority of ranibizumab plus verteporfin photodynamic therapy over ranibizumab alone. DENALI (Efficacy/Safety of Verteporfin Photodynamic Therapy and Ranibizumab Compared With Ranibizumab in Patients With Subfoveal Choroidal Neovascularization) was a multicenter, double-masked, randomized phase 3b trial (2012) that tested the noninferiority of ranibizumab plus verteporfin photodynamic therapy vs verteporfin photodynamic therapy alone. In this trial, patients were randomized to ranibizumab plus standard fluence verteporfin photodynamic therapy (n=104) or reduced-fluence (n=105) or ranibizumab plus sham verteporfin photodynamic therapy (n=112).[20,] Patients received 3 consecutive monthly injections of ranibizumab followed by as-needed retreatments. The 2 main outcome measures were change in best-corrected visual acuity from baseline and the proportion of patients in the combination therapy groups with a treatment-free interval of 3 months or more. An improvement in mean best-corrected visual acuity score was observed in all treatment groups, with the largest mean change from baseline in the ranibizumab monotherapy group. The mean change in best-corrected visual acuity at 12 months was +5.3, +4.4, and +8.1 for ranibizumab plus standard fluence verteporfin photodynamic therapy, ranibizumab plus reduced-fluence verteporfin photodynamic therapy, and ranibizumab plus sham verteporfin photodynamic therapy, respectively. Noninferiority for visual acuity was not demonstrated. Trials failed to demonstrate the superiority of combination treatment to reduce treatment-free interval period. The proportion of patients with a treatment-free interval of 3 months or more was 92.6% (95% confidence interval [CI], 85.4% to 97.0%) in the ranibizumab plus standard fluence verteporfin photodynamic therapy and 83.5% (95% CI, 74.6% to 90.3%) in the reduced-fluence arm. Percentages for ranibizumab monotherapy were not reported.

MONT BLANC (Verteporfin Photodynamic Therapy Administered in Conjunction With Ranibizumab in Patients With Subfoveal Choroidal Neovascularization Secondary to Age-related Macular Degeneration) was similar to DENALI regarding design and outcome measures, except that the former did not include a reduced-fluence verteporfin photodynamic therapy arm.[21,] In this trial, 255 patients were randomized to ranibizumab plus standard fluence verteporfin photodynamic therapy (n=122) or ranibizumab plus sham verteporfin photodynamic therapy (n=133). Patients received 3 consecutive monthly injections of ranibizumab followed by as-needed retreatments. A difference in mean best-corrected visual acuity within 7 letters was designated as noninferiority margin. The mean change in best-corrected visual acuity at 12 months was +2.5 letters in ranibizumab plus standard fluence verteporfin photodynamic therapy group and +4.4 letters in the ranibizumab plus sham verteporfin photodynamic therapy group, yielding a mean difference (MD) of 1.88. Because this difference was within the noninferiority margin, authors concluded that ranibizumab plus verteporfin photodynamic therapy was noninferior to verteporfin photodynamic therapy alone. At 12 months, the proportion of patients with a treatment-free interval of 3 months or more was similar in the 2 groups (96% combination therapy vs 92% monotherapy). With the sample size of 125 in each arm, the trial as designed had 80% power to identify treatment difference of 20% or more in the proportion of patients with 3 or more months of treatment-free interval in the combination arm vs monotherapy arm. After 12 months, the proportion of patients with 3 or more months of treatment-free interval was 96% and 92% in the combination and monotherapy arm, respectively (difference in proportion,

0.04; 95% CI, -0.02 to 0.09). Thus, the trial failed to show the superiority of ranibizumab plus verteporfin photodynamic therapy over verteporfin photodynamic therapy alone in increasing the treatment-free interval.

Additional Randomized Controlled Trials

In addition to the above trials, several smaller randomized trials have been published. Semeraro et al (2015) published an RCT evaluating 75 patients with treatment-naive exudative choroidal neovascularization due to age-related macular degeneration.[22,] Patients were randomized into 3 groups: ranibizumab monotherapy, ranibizumab plus reduced-fluence verteporfin photodynamic therapy, and ranibizumab plus ketorolac eye drops. At the 12-month follow-up, best-corrected visual acuity was superior in the ranibizumab plus ketorolac group (-0.25 logarithm of the minimum angle of resolution) compared with ranibizumab monotherapy (-0.14 logarithm of the minimum angle of resolution) or ranibizumab combined with verteporfin photodynamic therapy (-0.10 logarithm of the minimum angle of resolution). In a multicenter, unmasked trial, Williams et al (2012) randomized 60 patients to ranibizumab with half-fluence verteporfin photodynamic therapy or ranibizumab alone.[23,] Best-corrected visual acuity improved by 9.9 letters in the ranibizumab group and by 2.6 letters in the combined treatment group. The proportion of patients who gained 15 or more letters was 33% in the monotherapy arm and 31% in the combination arm. A small RCT by Lim et al (2012) assessed 31 patients with age-related macular degeneration and 10 patients with polypoidal choroidal vasculopathy who were randomized to bevacizumab monotherapy or bevacizumab plus verteporfin photodynamic therapy.[24,] At 12 months, the monotherapy and combined treatment groups showed similar improvements in best-corrected visual acuity and central foveal thickness, and the total number of bevacizumab injections was not reduced when verteporfin photodynamic therapy was given. A randomized, open-label assessor-blinded trial (2007) from Croatia with short-term (3-month) follow-up evaluated combination treatment with bevacizumab plus verteporfin photodynamic therapy (N=165 eyes).[25,] At 3-month follow-up, 22 (42%) of 52 patients improved by more than 0.2 logarithm of the minimum angle of resolution following combined treatment compared with 1 (2%) patient treated with bevacizumab alone and none treated with verteporfin photodynamic therapy alone.

Nonrandomized Studies

Data from a retrospective study for adjunctive verteporfin photodynamic therapy in patients refractory to antivascular endothelial growth factor monotherapy has suggested a favorable effect on visual acuity and anatomic outcomes. Lee and Lee (2016) reported on data from a retrospective analysis of 28 eyes of 28 patients who showed persistent subretinal and/or intraretinal fluid after at least 4 antivascular endothelial growth factor injections in the 6 months before adjunctive verteporfin photodynamic therapy and subsequently received additional verteporfin photodynamic therapy and antivascular endothelial growth factor therapies.[26,] Patient charts were reviewed until 12 months after the initial verteporfin photodynamic therapy. During a 1-year follow-up, 17 (60.7%) eyes did not demonstrate recurrent fluid accumulation. Among the 11 eyes requiring retreatment, 7 eyes initially showed complete fluid absorption after the initial photodynamic therapy. At 12 months, best-corrected visual acuity had improved by 0.3 logarithm of the minimum angle of resolution or more or was maintained compared with baseline in 27 (96.4%) eyes.

Section Summary: Age-Related Macular Degeneration - Verteporfin Photodynamic Therapy Plus Anti-Vascular Endothelial Growth Factor Therapy

The evidence for the efficacy verteporfin photodynamic therapy plus antivascular endothelial growth factor therapies compared with antivascular endothelial growth factor therapies alone includes 2 confirmatory RCTs (and their multiple analyses), multiple smaller RCTs, and a meta-analysis. This evidence does not demonstrate improvements in best-corrected visual acuity with combination therapy compared with antivascular endothelial growth factor monotherapy. Combination therapy may reduce the number of intravitreal injections needed, but this result has not been consistently reported across studies.

Age-Related Macular Degeneration - Verteporfin Photodynamic Therapy Plus Corticosteroids and/or Vascular Endothelial Growth Factor Inhibitors

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy plus corticosteroids and/or antivascular endothelial growth factor therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to age-related macular degeneration.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to age-related macular degeneration who are treated with verteporfin photodynamic therapy plus corticosteroids and/or antivascular endothelial growth factor therapy.

Intervention

Treatment with verteporfin photodynamic therapy plus corticosteroids and/or antivascular endothelial growth factor therapy.

Comparator

Treatment with corticosteroids and/or antivascular endothelial growth factor therapy.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Three RCTs have evaluated the combination of verteporfin photodynamic therapy with corticosteroids¾1 trial from Italy,[27,] 1 trial from Canada (Canadian Retinal Trials Group),[28,] and 1 trial from Iran.[29,] The Italian RCT (2008) assigned 84 treatment-naive patients with exudative age-related macular degeneration to verteporfin photodynamic therapy alone (n=41) or combination intravitreal triamcinolone acetonide plus verteporfin photodynamic therapy (n=43).[27,] Mean visual acuity increased at 1 month of follow-up but decreased progressively by the 24-month point in both groups. In the Canadian Retinal Trials Group study (2009), 100 patients with choroidal neovascularization due to age-related macular degeneration were randomized to verteporfin photodynamic therapy alone or verteporfin photodynamic therapy plus intravitreal triamcinolone.[28,] Combination treatment did not result in a significant difference in the primary outcome of visual acuity at 1 year compared with verteporfin photodynamic therapy alone. The Iranian trial (2014) randomized 84 treatment-naive patients who had choroidal neovascularization due to age-related macular degeneration to verteporfin photodynamic therapy plus bevacizumab with and without intravitreal triamcinolone.[29,] There were no significant differences in the best-corrected visual acuity at week 12 and other time points.

Section Summary: Age-Related Macular Degeneration - Verteporfin Photodynamic Therapy Plus Corticosteroids and/or Vascular Endothelial Growth Factor Inhibitors

The evidence for the efficacy of triple therapy verteporfin photodynamic therapy plus corticosteroid and antivascular endothelial growth factor includes 3 small RCTs. This evidence does not demonstrate improvements in best-corrected visual acuity with this therapy compared with antivascular endothelial growth factor monotherapy. Comparative trials are needed to evaluate the efficacy of this triple therapy.

Pathologic Myopia - Verteporfin Photodynamic Therapy vs Placebo

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to pathologic myopia.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to pathologic myopia.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparator

Observation only.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

The initial evidence on pathologic myopia was based primarily on retrospective studies and clinician experience. RADIANCE (Efficacy and Safety of Ranibizumab in Patients With Visual Impairment Due to Choroidal Neovascularization Secondary to Pathologic Myopia), a multicenter RCT (2014) compared intravitreal ranibizumab with verteporfin photodynamic therapy in the treatment of myopic choroidal neovascularization and reported improved visual acuity at 12 months in the ranibizumab treatment arm.[30,] Zhu et al (2016) published a Cochrane review that found treatment with antivascular endothelial growth factor therapies was more likely to restore visual acuity than verteporfin photodynamic therapy.[31,]

Verteporfin Photodynamic Therapy vs Placebo

A second arm of the VIP trial focused on 120 patients with pathologic myopia and choroidal neovascularization, either classic, occult, or mixed (although 90% of patients had classic choroidal neovascularization), who were randomized 2:1 to verteporfin photodynamic therapy or placebo.[32,] Patients received an average of 3.4 verteporfin photodynamic therapy treatments over 12

months. The primary outcome was the proportion of eyes with fewer than 8 letters of visual acuity loss at 12 months by intention-to-treat analysis. At month 12, 58 (72%) of patients who received verteporfin photodynamic therapy lost fewer than 8 letters on a standard eye chart and 17 (44%) receiving placebo. Improvement of at least 5 letters was observed in 26 (32%) verteporfin photodynamic therapy-treated eyes compared with 6 (15%) placebo-treated eyes. Fluorescein angiography showed the progression of classic choroidal neovascularization in 36% of verteporfin photodynamic therapy-treated eyes compared with 54% of the placebo group. Trialists concluded that verteporfin photodynamic therapy increased the chance of stabilizing or improving vision compared with placebo for at least 1 year. However, the results at 2 years of follow-up were not statistically significant in favor of verteporfin photodynamic therapy.[33,]

Section Summary: Pathologic Myopia - Verteporfin Photodynamic Therapy vs Placebo

The evidence for the efficacy of verteporfin photodynamic therapy compared with placebo includes a subgroup analysis from a large RCT. This analysis showed verteporfin photodynamic therapy to be more effective than placebo in preventing vision loss, and these findings have been corroborated in nonrandomized studies. However, the long-term efficacy of verteporfin photodynamic therapy is uncertain. Moreover, use of verteporfin photodynamic therapy for myopic choroidal neovascularization has now been largely replaced by antivascular endothelial growth factor therapies.

Pathologic Myopia - Verteporfin Photodynamic Therapy Plus Anti-Vascular Endothelial Growth Factor Therapy

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to pathologic myopia.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to pathologic myopia who are treated with verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy.

Intervention

Treatment with verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy.

Comparator

Treatment with antivascular endothelial growth factor therapy alone.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Rinaldi et al (2017) randomized 60 patients to verteporfin photodynamic therapy (standard- and reduced-fluence, n=20 each) plus ranibizumab or to ranibizumab monotherapy (n=20).[34,] The primary outcomes were mean change in best-corrected visual acuity and mean change in retinal thickening from baseline to week 48. The trial was likely underpowered to detect a clinical meaningful difference in best corrected visual acuity for between-group comparisons. Mean best-corrected visual acuity change at 48 weeks was +0.2 and +15 letters with standard- and reduced-fluence verteporfin photodynamic therapy plus ranibizumab, respectively, compared with +16.8 letters with ranibizumab monotherapy. At 48 weeks, mean central foveal thickness decreased from baseline was 58 µm, 91.4 µm, and 85 µm for the 3 groups, respectively.

Chen et al (2011) compared bevacizumab monotherapy (n=17) with bevacizumab plus verteporfin photodynamic therapy (n=6) in a retrospective analysis of patients with choroidal neovascularization secondary to causes other than age-related macular degeneration; approximately half of the patients had myopic choroidal neovascularization.[35,] Most observed differences between groups were not statistically significant, likely due to the small sample size. For example, mean change in visual acuity at 12-month follow-up was 1.7 lines in the monotherapy group and 2.8 lines in the combination therapy group, and 36% of the monotherapy group gained 3 lines or more compared with 60% in the combination therapy group. The combination group received fewer reinjections (average injections, 2.6 vs 4.8), but this difference was not statistically significant (p=.11). Subgroup analysis for cases of myopic choroidal neovascularization showed no significant difference between groups in mean acuity gains (2.0 lines in the monotherapy group vs 2.3 lines in the combination therapy group), with fewer reinjections (2 vs 7.2, p<.05) needed in the combination group during the 12-month follow-up. No serious ocular complications were observed. Prospective comparison with a larger number of patients is needed.

Section Summary: Pathologic Myopia - Verteporfin Photodynamic Therapy Plus Anti-Vascular Endothelial Growth Factor Therapy

The evidence for the efficacy of verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy includes a small RCT and a retrospective study. This evidence does not demonstrate improvements in best-corrected visual acuity. Comparative trials are needed to evaluate the efficacy of this combination therapy vs relevant comparators.

Presumed Ocular Histoplasmosis

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to presumed ocular histoplasmosis.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to presumed ocular histoplasmosis.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparators

Treatment with photocoagulation or antivascular endothelial growth factor therapies.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

There are few published data on the use of verteporfin photodynamic therapy to treat patients with choroidal neovascularization related to ocular histoplasmosis. The US Food and Drug Administration (FDA) approval of verteporfin photodynamic therapy for ocular histoplasmosis in 2001 was based on a prospective single-arm study involving 26 patients with ocular histoplasmosis. Visual acuity improved by an average of more than 1 line (6.7 letters) on a standard eye chart at 12 months, with 28% of patients experiencing improvement of at least 3 lines (15 letters). Visual acuity decreased by fewer than 3 lines in 88% of patients during the same period from a historical control. Ramaiya et al (2013) reported on results from a small RCT that assigned 19 patients to ranibizumab or photodynamic therapy with rescue ranibizumab.[36,] The primary outcome measure was the change in visual acuity at 1 year. Data from 10 of the 19 randomized patients were excluded from analysis because of lack of follow-up data. The number of injections in the ranibizumab arm was 7.7 (range, 1 to 11). The mean number of photodynamic therapy treatments administered was 2.5 (range, 2 to 3). All patients in the verteporfin photodynamic therapy group required rescue ranibizumab therapy, with a mean of 2.5 (range, 2 to 3) injections. Mean change in the Early Treatment Diabetic Retinopathy Study visual acuity at 1-year follow-up was 19.6 letters in the ranibizumab group and 21 letters in the photodynamic therapy group. Four (80%) of 5 patients showed a greater than 15 letter gain at 1 year in the ranibizumab group, whereas 1 of 2 patients in the verteporfin photodynamic therapy group showed a greater than 15 letter gain. Because of 50% lost to follow-up, a small sample (<6 patients per arm), and incomplete reporting of the trial results, interpretation of data is difficult.

Section Summary: Presumed Ocular Histoplasmosis

The evidence for the efficacy of verteporfin photodynamic therapy includes a small prospective single-arm study and an RCT. Lack of a control arm in the single-arm study and 50% loss to follow-up in the RCT preclude a meaningful interpretation of the data on observed improvements in visual acuity. Comparative trials are needed to evaluate the efficacy of combination verteporfin photodynamic therapy plus antivascular endothelial growth factor therapy.

Central Serous Chorioretinopathy

Acute Central Serous Chorioretinopathy

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to acute central serous chorioretinopathy.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to acute central serous chorioretinopathy.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparators
Treatment with photocoagulation or antivascular endothelial growth factor therapies.

Outcomes
Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria
Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence
A Cochrane review with network meta-analysis (2015) evaluated various treatments for central serous chorioretinopathy that included both acute and chronic central serous chorioretinopathy.[37,] Only RCTs were included. Pairwise (direct) comparison for verteporfin photodynamic therapy included antivascular endothelial growth factor versus verteporfin photodynamic therapy, antivascular endothelial growth factor plus 50% verteporfin photodynamic therapy versus50% verteporfin photodynamic therapy alone, 50% verteporfin photodynamic therapy versusobservation or sham treatment, and 30% verteporfin photodynamic therapy versus 50% verteporfin photodynamic therapy or versus full strengthverteporfin photodynamic therapy. (Percentages refer to the dose of verteporfin used.) The primary outcome was visual acuity at 12 months. Low-quality evidence from a 2008 study (58 participants) suggested that half-dose verteporfin photodynamic therapy for acute central serous chorioretinopathy probably resulted in a small improvement in vision (MD = -0.10 logarithm of the minimum angle of resolution; 95% CI, -0.18 to -0.02) compared with sham treatment.[38,] Moderate-quality evidence from 2 studies suggested that 30% verteporfin photodynamic therapy results in a small improvement in vision compared with verteporfin photodynamic therapy (MD = -0.16 logarithm of the minimum angle of resolution; 95% CI, -0.22 to -0.10) and compared with 50% verteporfin photodynamic therapy (MD = -0.12 logarithm of the minimum angle of resolution; 95% CI, -0.15 to -0.08).[39,40,] Visual acuity scores at 12 months did not differ between antivascular endothelial growth and verteporfin photodynamic therapy[41,42,] or antivascular endothelial growth plus 50% verteporfin photodynamic therapy and 50% verteporfin photodynamic therapy alone,[43,] or 50% verteporfin photodynamic therapy and observation or sham treatment. [38,]

Chan et al (2008) conducted a double-masked, placebo-controlled trial of 63 patients who were randomized 2:1 to half-dose verteporfin photodynamic therapy or placebo.[38,]Thirty-nine patients in the verteporfin photodynamic therapy and 19 in the placebo arm completed the trial. The primary outcome measure (the proportion of eyes with the absence of subretinal fluid at the macula at 12 months) was observed in 37 (95%) eyes in the verteporfin photodynamic therapy arm and 11 (58%) eyes in the placebo arm. Mean increase of best-corrected visual acuity was 1.8 and 0.6 lines in the verteporfin photodynamic therapy and placebo arm, respectively. The treatment difference was 1.2 lines, which fell below the threshold of 3 lines considered clinically meaningful. A responder analysis was not reported.

Zhao et al (2015) reported on a double-masked, randomized, noninferiority trial with 131 patients that compared a 50% with a 30% dose of verteporfin photodynamic therapy for acute (<6 months) central serous chorioretinopathy.[40,] The 2 primary outcome measures were the proportion of eyes with complete absorption of subretinal fluid and the proportion of eyes with complete disappearance

of fluorescein leakage at 6 and 12 months. At 12 months, the proportion of eyes with complete absorption of retinal fluid was 75.4% in the 30%-dose group and 94.6% in the half-dose group (p=.004). Complete disappearance of fluorescein leakage at 12 months was observed in 68.9% of the 30%-dose group and 92.9% of the half-dose group (p=.001). Visual acuity (a secondary outcome measure) improved from 20/32 to 20/20 in both groups, with a mean between-group difference of 1.7 letters. In the 30%-dose group, 4 (6.6%) eyes lost 5 or more letters compared with 0 eyes in the half-dose group. This study did not provide sufficient evidence of a functional benefit that would outweigh the potential risk of treatment with verteporfin photodynamic therapy for acute central serous chorioretinopathy.

Salehi et al (2015), in their network meta-analysis which included a total of 25 studies (total N=1098 patients; 1098 eyes), judged these studies to be at low risk of bias in most domains with the exception of attrition bias (6% of the 30% verteporfin photodynamic therapy group vs 13% of the 50% verteporfin photodynamic therapy group) and selective outcomes reporting (primary and secondary outcomes were designated differently on the trial registry entry and the published report).[37,] The 30% dose did not achieve noninferiority.

Section Summary: Acute Central Serous Chorioretinopathy

The evidence for the efficacy of verteporfin photodynamic therapy for acute central serous chorioretinopathy includes 2 RCTs. This evidence, although demonstrating that full- and reduced-dose verteporfin photodynamic therapy results in small improvements in best-corrected visual acuity, did not meet the clinically meaningful threshold. Comparative and adequately powered trials are needed to evaluate the efficacy of verteporfin photodynamic therapy in acute central serous chorioretinopathy.

Chronic Central Serous Chorioretinopathy

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to chronic central serous chorioretinopathy.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to chronic central serous chorioretinopathy.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparators

Treatment with reduced-dose/-fluence verteporfin photodynamic therapy.

Outcomes

Symptoms, Change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.

- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Reductions in subretinal fluid and improvement in retinal anatomy, visual acuity,[44,45,46,47,48,49,] and retinal sensitivity[50,51,52,53,54,] have been observed in 70% to 100% of cases in multiple retrospective studies. Use of reduced-dose verteporfin photodynamic therapy for chronic central serous chorioretinopathy also has been reported. Uetani et al (2012) compared half-dose with one-third dose verteporfin photodynamic therapy in a small (N=16 eyes) prospective open-label trial.[55,] At 3 months, all 10 (100%) eyes in the half-dose verteporfin photodynamic therapy group and 2 (33%) eyes in the one-third-dose verteporfin photodynamic therapy group had complete resolution of subretinal fluid. Patients in the half-dose verteporfin photodynamic therapy group gained an average of 5.4 letters while patients in the one-third-dose group gained 1.7 letters (p=not significant [*NS*]). Chan et al (2008) also reported on reduced-dose verteporfin for the treatment of chronic central serous chorioretinopathy in a prospective series of 48 patients.[44,] Mean duration of central serous chorioretinopathy was 8.2 months (range, 3 to 40 months). At 12 months after verteporfin photodynamic therapy, mean best-corrected visual acuity improved from 0.31 to 0.15 logarithm of the minimum angle of resolution, an improvement of 1.6 lines.

Section Summary: Chronic Central Serous Chorioretinopathy

The evidence for the efficacy of verteporfin photodynamic therapy for chronic central serous chorioretinopathy includes multiple retrospective studies. Although this relatively large body of studies has indicated that half-dose verteporfin photodynamic therapy yields positive functional and anatomic outcomes while, at the same time, reducing the potential adverse events associated with conventional verteporfin photodynamic therapy, no comparative data have shown the relative efficacy of multiple verteporfin photodynamic therapy strategies. Comparative trials are needed to evaluate the efficacy of verteporfin photodynamic therapy strategies in chronic central serous chorioretinopathy.

Polypoidal Choroidal Vasculopathy - Verteporfin Photodynamic Therapy Alone

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to polypoidal choroidal vasculopathy.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to polypoidal choroidal vasculopathy.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparators

Standard of care or antivascular endothelial growth factor therapies.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;

- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Verteporfin Photodynamic Therapy

A systematic review by Chan et al (2010) included 30 studies assessing verteporfin photodynamic therapy in patients with polypoidal choroidal vasculopathy.[56,] Reviewers found numerous case series reporting favorable anatomic outcomes and visual acuity for patients treated with verteporfin photodynamic therapy. Some of these studies are described below. Tang et al (2015) also published a systematic review and meta-analysis evaluating treatment for polypoidal choroidal vasculopathy.[57,] Two RCTs compared verteporfin photodynamic therapy with ranibizumab and reported a weighted mean difference in visual acuity of 0.06 logarithm of the minimum angle of resolution (95% CI, -0.01 to 0.12) in favor of ranibizumab, but this difference was not statistically significant. Subsequent to the meta-analysis by Tang et al (2015), Silva et al (2022) published a randomized controlled trial that compared the efficacy and safety of intravitreal aflibercept plus either verteporfin or sham photodynamic therapy in 50 individuals with polypoidal choroidal vasculopathy.[58,] Consistent with the previous RCTs, no statistically significant difference in visual acuity was found between verteporfin photodynamic therapy with antivascular endothelial growth therapies compared to antivascular endothelial growth therapies alone at week 52 (best corrected visual acuity change: 6.5 vs 5; p=.98).

Several nonrandomized studies from Asia have been reported. Hikichi et al (2011) reported on the largest prospective consecutive series of 220 eyes of 210 Japanese patients with polypoidal choroidal vasculopathy who were followed for 1 year after the primary verteporfin photodynamic therapy.[59,] A single physician, diagnosed, treated and followed all patients (not masked). Retreatment was considered every 3 months based on the examination findings, and there was an average of 1.37 treatments. Fluid, exudates, and hemorrhages had resolved in 205 (93%) eyes at 1-year follow-up. Average visual acuity improved by more than 0.3 logarithm of the minimum angle of resolution in 55 (25%) of eyes, remained stable in 143 (65%) of eyes, and decreased more than 0.3 logarithm of the minimum angle of resolution in 21 (10%) of eyes.

Akaza et al (2011) reported on 3-year follow-up of 43 eyes (43 patients) treated with verteporfin photodynamic therapy for polypoidal choroidal vasculopathy.[60,] Before the initial verteporfin photodynamic therapy, 40 (93%) eyes exhibited polypoidal choroidal vasculopathy in the narrow sense and 3 (7%) exhibited polypoidal choroidal neovascularization. Number of treatment sessions during follow-up ranged from 1 to 8. At 3-year follow-up, mean visual acuity decreased to below baseline. Polypoidal lesions recurred in 33 (77%) of the 43 eyes at 3 years, although the 3 eyes with polypoidal choroidal neovascularization showed little change except for enlargement and recurrence. Long-term visual outcomes following verteporfin photodynamic therapy showed a high frequency of recurrent polypoidal lesions as well as enlargement and neovascular changes of abnormal vascular networks. However, because polypoidal lesions recurred after verteporfin photodynamic therapy in some cases, further study is needed to confirm the long-term effectiveness of verteporfin photodynamic therapy for polypoidal choroidal vasculopathy.

Section Summary: Polypoidal Choroidal Vasculopathy - Verteporfin Photodynamic Therapy Alone

Available evidence on the efficacy of verteporfin photodynamic therapy for polypoidal choroidal vasculopathy consists of several retrospective studies, a meta-analysis that included 2 RCTs, and a subsequently published additional RCT. Retrospective studies have reported favorable anatomic outcomes and visual acuity for patients treated with verteporfin photodynamic therapy. RCTs comparing verteporfin photodynamic therapy with antivascular endothelial growth therapies have

reported no statistical differences in visual acuity. Controlled trials are needed to permit conclusions on the efficacy of verteporfin photodynamic therapy monotherapy in polypoidal choroidal vasculopathy.

Polypoidal Choroidal Vasculopathy - Verteporfin Photodynamic Therapy Plus Anti-Vascular Endothelial Growth Factor Therapy

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy plus anti-vascular endothelial growth factor therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to polypoidal choroidal vasculopathy. The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to polypoidal choroidal vasculopathy.

Intervention

Treatment with verteporfin photodynamic therapy plus anti-vascular endothelial growth factor therapy.

Comparators

Treatment with antivascular endothelial growth factor therapy alone.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Tang et al (2015) published a systematic review that evaluated treatment for polypoidal choroidal vasculopathy.[57,] A single RCT, which compared verteporfin photodynamic therapy alone with verteporfin photodynamic therapy plus ranibizumab, reported a nonsignificant weighted mean difference of -0.08 logarithm of the minimum angle of resolution (95% CI, -0.20 to 0.04) in favor of combination therapy.

Randomized Controlled Trials

Lim et al (2012) randomized 31 patients with age-related macular degeneration and 10 patients with polypoidal choroidal vasculopathy to bevacizumab alone or bevacizumab plus verteporfin photodynamic therapy.[24,] Bevacizumab was administered at 6-week intervals for the first 18 weeks, and then at 3-month intervals, as needed. At 12 months, the monotherapy and combined treatment groups showed similar improvements in best-corrected visual acuity and central foveal thickness. Patients with polypoidal choroidal vasculopathy did not show significant improvements in best-corrected visual acuity (p=.050) or central foveal thickness (p=.088) when analyzed alone; however, the trial was likely underpowered for this subgroup analysis.

EVEREST (Efficacy and Safety of Verteporfin Added to Ranibizumab in the Treatment of Symptomatic Macular Polypoidal Choroidal Vasculopathy, 2012) was a small, exploratory, multicenter, double-masked, randomized trial of verteporfin photodynamic therapy, ranibizumab, or verteporfin photodynamic therapy plus ranibizumab in 61 treatment-naive Asian patients with polypoidal choroidal vasculopathy.[61,] Patients in the verteporfin photodynamic therapy-only group (angio-occlusive) received sham ranibizumab, and patients in the ranibizumab monotherapy group (antiangiogenic and antipermeability) received sham verteporfin photodynamic therapy. The primary end point (the proportion of patients with complete regression of polyps at 6 months) showed verteporfin photodynamic therapy alone (71.4%) or in combination with ranibizumab (77.8%) to be superior to ranibizumab monotherapy (28.6%) in achieving complete polyp regression. Mean improvement in best-corrected visual acuity was generally similar for the 3 groups (7.5 letters for verteporfin photodynamic therapy, 10.9 letters for combined treatment, 9.2 letters for ranibizumab alone). The proportion of patients gaining at least 15 letters was 19% in the verteporfin photodynamic therapy group, 21% in the combination group, and 33% in the ranibizumab monotherapy group. Interpretation of the visual acuity results is limited because the trial was not powered to assess differences in best-corrected visual acuity. There were no new safety findings.

Nonrandomized Trials

Observational studies have also been published. Kang et al (2013) reported on 5-year retrospective follow-up for 42 eyes (36 patients) treated with verteporfin photodynamic therapy for polypoidal choroidal vasculopathy.[62,] Patients received a mean of 2.21 verteporfin photodynamic therapy treatments during the study, with additional intravitreal injections of antivascular endothelial growth agents if exudative changes were observed. During follow-up, recurrence was observed in 33 (78.6%) eyes, and the mean number of antivascular endothelial growth injections was 6.42 in eyes with recurrence. In the entire group, best-corrected visual acuity improved from 0.78 logarithm of the minimum angle of resolution at baseline (20/120 Snellen equivalent) to 0.67 logarithm of the minimum angle of resolution (20/93 Snellen equivalent) at 5 years. Using a change of at least 0.3 logarithm of the minimum angle of resolution as a threshold, best-corrected visual acuity improved in 14 (33.3%) eyes, remained stable in 23 (54.8%) eyes, and decreased in 5 (11.9%) eyes. Interpretation of this study is difficult because all patients received combination treatment with intravitreal vascular endothelial growth factor antagonists without comparison groups. Kim and Yu (2011) retrospectively reviewed 39 consecutive patients with polypoidal choroidal vasculopathy who received verteporfin photodynamic therapy (before April 2007) or combination verteporfin photodynamic therapy plus intravitreal bevacizumab (after April 2007).[63,] During 12 months of follow-up, patients in the monotherapy group (n=19) received a mean of 1.89 verteporfin photodynamic therapy applications, and patients in the combined therapy group (n=20) received a mean of 1.30 verteporfin photodynamic therapy applications and 2.90 bevacizumab injections. Best-corrected visual acuity improved by 3.0 lines in the combined therapy group compared with 1.6 lines in the verteporfin photodynamic therapy-only group. This level of improvement in best-corrected visual acuity was achieved in 55.0% in the combined therapy group and 36.8% in the monotherapy group.

Section Summary: Polypoidal Choroidal Vasculopathy - Verteporfin Photodynamic Therapy Plus Anti-Vascular Endothelial Growth Factor Therapy

Available evidence on the efficacy of verteporfin photodynamic therapy plus anti-vascular endothelial growth factor therapy for polypoidal choroidal vasculopathy consists of 2 small RCTs, a meta-analysis, and 2 retrospective studies. While results of 1 RCT reported no difference in visual acuity for patients treated with verteporfin photodynamic therapy plus antivascular endothelial growth therapy versus verteporfin photodynamic therapy alone, the other trial reported improvement in visual acuity, but the effect was not statistically significant. Adequately powered controlled trials are needed to permit conclusions on the efficacy of combination verteporfin photodynamic therapy plus antivascular endothelial growth therapy in polypoidal choroidal vasculopathy.

Choroidal Hemangioma

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to choroidal hemangioma.

The following PICO was used to select literature to inform this review.

Population
Individuals with choroidal neovascularization due to choroidal hemangioma.

Intervention
Treatment with verteporfin photodynamic therapy.

Comparators
Standard of care treatment.

Outcomes
Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

The systematic review by Chan (2010) included 11 case series on verteporfin photodynamic therapy in patients with choroidal hemangioma.[56,]Verteporfin photodynamic therapy has been reported to induce complete and irreversible occlusion of the microvasculature, although this may require more than 1 treatment. Several case series have demonstrated encouraging visual acuity and anatomic outcomes in 150 patients with circumscribed choroidal hemangioma treated with various verteporfin photodynamic therapy regimens.

Blasi et al (2010) reported on 5-year outcomes for a prospective series of 25 consecutive patients with symptomatic choroidal hemangioma.[64,] Twenty-two (88%) patients received a single verteporfin photodynamic therapy session and 3 eyes received a second verteporfin photodynamic therapy session. Follow-up examinations were performed 2 weeks, 1 month, 3 months, and every 6 months after treatment. All tumors were reduced in size, and there were no recurrences through 5 years of follow-up. At 1 year, best-corrected visual acuity improved by an average of 18.2 letters. Visual acuity improved by 2 or more lines in 20 (80%) eyes and by 3 or more lines in 12 (48%) eyes. No treated eyes lost visual acuity between the 1- and 5-year follow-ups. Foveal center thickness decreased from a mean of 386.20 µm to 179.2 µm at 5 years, and there was the resolution of macular exudation in all cases. No treatment-related adverse events were identified.

Section Summary: Choroidal Hemangioma

Available evidence on the efficacy of verteporfin photodynamic therapy for choroidal hemangioma consists of a systematic review of 11 case series and a prospective study. This body of evidence has suggested a favorable effect of verteporfin photodynamic therapy on various visual acuity and

anatomic outcomes in patients with a choroidal hemangioma. Controlled trials with a larger number of patients and longer follow-up are needed to permit conclusions regarding the efficacy of verteporfin photodynamic therapy for this indication.

Angioid Streaks

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to angioid streaks.

The following PICO was used to select literature to inform this review.

Population

Individuals with choroidal neovascularization due to angioid streaks.

Intervention

Treatment with verteporfin photodynamic therapy.

Comparators

Standard of care treatment.

Outcomes

Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

The systematic review by Chan (2010) included 8 case series on verteporfin photodynamic therapy assessing 148 patients with angioid streaks.[56,] Reviewers concluded that verteporfin photodynamic therapy might limit or slow vision loss compared with the expected natural course of choroidal neovascularization due to angioid streaks, but 1 study showed a decrease in visual acuity following verteporfin photodynamic therapy, and others showed that substantial proportions of patients continued to lose visual acuity. Thus, further studies are warranted to assess long-term safety and efficacy of verteporfin photodynamic therapy in these patients.

Section Summary: Angioid Streaks

Available evidence on the efficacy of verteporfin photodynamic therapy for angioid streaks consists of a systematic review of case series. The data from case series have reported conflicting results for visual acuity. Controlled trials with a larger number of patients and longer follow-up are needed to permit conclusions on the efficacy of verteporfin photodynamic therapy in angioid streaks, especially if it is effective in limiting the growth of choroidal neovascularization.

Inflammatory Chorioretinal Conditions

Clinical Context and Therapy Purpose

The purpose of verteporfin photodynamic therapy is to provide a treatment option that is an alternative to or an improvement on existing therapies for individuals with choroidal neovascularization due to inflammatory chorioretinal conditions.

The following PICO was used to select literature to inform this review.

Population
Individuals with choroidal neovascularization due to inflammatory chorioretinal conditions.

Intervention
Treatment with verteporfin photodynamic therapy.

Comparators
Standard of care treatment.

Outcomes
Symptoms, change in disease status, a change or improvement of functional status, and quality of life measurement(s). Average follow-up is 12 to 24 months.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess long-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

Choroidal neovascularization can occur as a complication of inflammatory conditions such as uveitis, multifocal choroiditis and panuveitis, and punctate inner choroidopathy. About one-third of patients develop choroidal neovascularization, which can result in severe vision loss if it is subfoveal.
The systematic review by Chan (2010) included 15 case reports evaluating verteporfin photodynamic therapy in 115 patients with inflammatory eye conditions.[56,] Encouraging visual acuity, and anatomic improvements have been reported with verteporfin photodynamic therapy for punctuate inner choroidopathy, choroiditis and toxoplasmic retinochoroiditis, and subfoveal choroidal neovascularization secondary to posterior uveitis. While promising, larger and comparative studies are needed to evaluate the effect of verteporfin photodynamic therapy on health outcomes for this indication.

Section Summary: Inflammatory Chorioretinal Conditions

Available evidence on the efficacy of verteporfin photodynamic therapy for inflammatory chorioretinal conditions consists of multiple case reports. Controlled trials are needed to permit conclusions on the efficacy of verteporfin photodynamic therapy in ocular inflammatory conditions.

Supplemental Information

The purpose of the following information is to provide reference material. Inclusion does not imply endorsement or alignment with the evidence review conclusions.

Clinical Input From Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

2012 Input

In response to requests, input was received from 2 physician specialty societies and 2 academic medical centers while this policy was under review in 2012. Input agreed that photodynamic therapy alone is medically necessary for age-related macular degeneration, pathological myopia, presumed ocular histoplasmosis, central serous chorioretinopathy, and choroidal hemangioma. Input was mixed on the use of photodynamic therapy for other ophthalmologic disorders. Input agreed that photodynamic therapy used in combination with vascular endothelial growth factor antagonists is investigational for all ophthalmologic disorders.

Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Academy of Ophthalmology

In 2019, the American Academy of Ophthalmology updated its 2015 preferred practice pattern guideline on age-related macular degeneration. The 2019 update states that verteporfin photodynamic therapy has approval by the U.S. Food and Drug Administration for the treatment of age-related macular degeneration-related, predominantly classic, subfoveal choroidal neovascularization. [65,]

The 2019 update stated that antivascular endothelial growth factor therapies have become first-line therapy for treating and stabilizing most cases of age-related macular degeneration and suggests that verteporfin photodynamic therapy is rarely needed. An update for this guideline is scheduled for 2024.

National Institute for Health and Care Excellence

In 2018, the National Institute for Health and Care Excellence updated its 2003 guidance on the use of photodynamic therapy for age-related macular degeneration.[66,] The Institute made the following recommendations: it recommended against use of photodynamic therapy as monotherapy for late (wet) age-related macular degeneration and against use of photodynamic therapy as first-line adjunctive therapy to antivascular endothelial growth factor therapies for late (wet) age-related macular degeneration; it recommended for photodynamic therapy as second-line adjunctive therapy to antivascular endothelial growth factor therapies for late (wet) age-related macular degeneration in a trial setting.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

Since 2001, use of ocular photodynamic therapy has been covered by Medicare for the treatment predominantly classical subfoveal choroidal neovascularization (i.e., occupies ≥50% of the area of the entire lesion) associated with age-related macular degeneration only when used in conjunction with verteporfin. However, there was no national Medicare coverage policy for other indications. In 2004, Medicare found evidence to conclude that photodynamic therapy with verteporfin may be "reasonable and necessary" for patients with age-related macular degeneration with "subfoveal

occult or minimally classic choroidal neovascularization ... 4 disk areas or less in size ... [with] evidence of progression within the three months prior to initial treatment." [67,] Medicare also reiterated that use of ocular photodynamic therapy with verteporfin for indications such as "pathologic myopia or the presumed histoplasmosis syndrome" may be "eligible for coverage through individual contractor discretion."

Ongoing and Unpublished Clinical Trials

Some currently ongoing trials that might influence this review are listed in Table 1.

Table 1. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
Ongoing			
NCT03079141	Photodynamic Therapy Versus Eplerenone: Treatment Trial for Chronic Central Serous Chorioretinopathy (SPECT)	107	Aug 2021 (last update=Oct 2019; Status=Unknown)
Unpublished			
NCT02452840	Adjunctive Photodynamic Therapy for Persistent Disease Activity in Patients With Neovascular Age-Related Macular Degeneration	100	Aug 2019

NCT: national clinical trial; PDT: photodynamic therapy.
[a] Denotes industry-sponsored or cosponsored trial.

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Documentation for Clinical Review

Please provide the following documentation:

- History and physical and/or consultation notes including:
  - Reason for photodynamic therapy (diagnosis)
  - Type of therapy
  - Other agents being used or planned for use for the same diagnosis

Post Service (in addition to the above, please include the following):

- Procedure report(s)

Coding

This Policy relates only to the services or supplies described herein. Benefits may vary according to product design; therefore, contract language should be reviewed before applying the terms of the Policy.

The following codes are included below for informational purposes. Inclusion or exclusion of a code(s) does not constitute or imply member coverage or provider reimbursement policy. Policy Statements are intended to provide member coverage information and may include the use of some codes for clarity. The Policy Guidelines section may also provide additional information for how to interpret the Policy Statements and to provide coding guidance in some cases.

Type	Code	Description
CPT®	67221	Destruction of localized lesion of choroid (e.g., choroidal neovascularization); photodynamic therapy (includes intravenous infusion)
	67225	Destruction of localized lesion of choroid (e.g., choroidal neovascularization); photodynamic therapy, second eye, at single session (List separately in addition to code for primary eye treatment)
HCPCS	C9161	Injection, aflibercept hd, 1 mg
	C9257	Injection, bevacizumab, 0.25 mg
	J0177	Injection, aflibercept HD, 1 mg ***(Code effective 04/01/2024)***
	J0178	Injection, aflibercept, 1 mg
	J2503	Injection, pegaptanib sodium, 0.3 mg
	J2778	Injection, ranibizumab, 0.1 mg
	J3396	Injection, verteporfin, 0.1 mg
	J9035	Injection, bevacizumab, 10 mg

Policy History

This section provides a chronological history of the activities, updates and changes that have occurred with this Medical Policy.

Effective Date	Action
06/18/2000	BCBSA Medical Policy adoption
07/01/2001	Administrative Review; no changes
05/08/2002	Coding Update
11/01/2005	Coding modified/updated: delete J3395; Added J3396
10/01/2010	Policy title change from Photodynamic Therapy with Verteporfin for Age Related Macular Degeneration Policy revision with position change
06/28/2013	Policy revision with position change
05/29/2015	Coding update
02/01/2016	Policy title change from Photodynamic Therapy for Subfoveal Choroidal Neovascularization Policy revision without position change
05/01/2017	Policy revision without position change
05/01/2018	Policy revision without position change
05/01/2019	Policy revision without position change
06/01/2023	Policy reactivated. Previously archived from 05/01/2020 to 05/31/2023.
05/01/2024	Annual review. No change to policy statement. Policy guidelines and literature review updated. Coding update.

Definitions of Decision Determinations

Medically Necessary: Services that are Medically Necessary include only those which have been established as safe and effective, are furnished under generally accepted professional standards to treat illness, injury or medical condition, and which, as determined by Blue Shield, are: (a) consistent with Blue Shield medical policy; (b) consistent with the symptoms or diagnosis; (c) not furnished primarily for the convenience of the patient, the attending Physician or other provider; (d) furnished at the most appropriate level which can be provided safely and effectively to the patient; and (e) not more costly than an alternative service or sequence of services at least as likely to produce equivalent therapeutic or diagnostic results as to the diagnosis or treatment of the Member's illness, injury, or disease.

Investigational/Experimental: A treatment, procedure, or drug is investigational when it has not been recognized as safe and effective for use in treating the particular condition in accordance with generally accepted professional medical standards. This includes services where approval by the federal or state governmental is required prior to use, but has not yet been granted.

Split Evaluation: Blue Shield of California/Blue Shield of California Life & Health Insurance Company (Blue Shield) policy review can result in a split evaluation, where a treatment, procedure, or drug will be considered to be investigational for certain indications or conditions, but will be deemed safe and effective for other indications or conditions, and therefore potentially medically necessary in those instances.

Prior Authorization Requirements and Feedback (as applicable to your plan)

Within five days before the actual date of service, the provider must confirm with Blue Shield that the member's health plan coverage is still in effect. Blue Shield reserves the right to revoke an authorization prior to services being rendered based on cancellation of the member's eligibility. Final determination of benefits will be made after review of the claim for limitations or exclusions.

Questions regarding the applicability of this policy should be directed to the Prior Authorization Department at (800) 541-6652, or the Transplant Case Management Department at (800) 637-2066 ext. 3507708 or visit the provider portal at www.blueshieldca.com/provider.

We are interested in receiving feedback relative to developing, adopting, and reviewing criteria for medical policy. Any licensed practitioner who is contracted with Blue Shield of California or Blue Shield of California Promise Health Plan is welcome to provide comments, suggestions, or concerns. Our internal policy committees will receive and take your comments into consideration.

For utilization and medical policy feedback, please send comments to: MedPolicy@blueshieldca.com

Disclaimer: This medical policy is a guide in evaluating the medical necessity of a particular service or treatment. Blue Shield of California may consider published peer-reviewed scientific literature, national guidelines, and local standards of practice in developing its medical policy. Federal and state law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over medical policy and must be considered first in determining covered services. Member contracts may differ in their benefits. Blue Shield reserves the right to review and update policies as appropriate.

Appendix A

POLICY STATEMENT (No changes)	
BEFORE	**AFTER**
Photodynamic Therapy for Choroidal Neovascularization 9.03.08 **Policy Statement:** I. Verteporfin photodynamic therapy as monotherapy may be considered **medically necessary** as a treatment of choroidal neovascularization associated with age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis, chronic central serous chorioretinopathy, or choroidal hemangioma. II. Verteporfin photodynamic therapy is considered **investigational** as monotherapy for other ophthalmologic disorders. III. Verteporfin photodynamic therapy is considered **investigational** when used in combination with one or more of the antivascular endothelial growth factor therapies: pegaptanib (Macugen®), ranibizumab (Lucentis®), bevacizumab (Avastin®), or aflibercept (Eylea™) as a treatment of choroidal neovascularization associated with age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis, central serous chorioretinopathy, choroidal hemangioma, or for other ophthalmologic disorders.	**Photodynamic Therapy for Choroidal Neovascularization 9.03.08** **Policy Statement:** I. Verteporfin photodynamic therapy as monotherapy may be considered **medically necessary** as a treatment of choroidal neovascularization associated with age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis, chronic central serous chorioretinopathy, or choroidal hemangioma. II. Verteporfin photodynamic therapy is considered **investigational** as monotherapy for other ophthalmologic disorders. III. Verteporfin photodynamic therapy is considered **investigational** when used in combination with one or more of the antivascular endothelial growth factor therapies: pegaptanib (Macugen®), ranibizumab (Lucentis®), bevacizumab (Avastin®), or aflibercept (Eylea™) as a treatment of choroidal neovascularization associated with age-related macular degeneration, pathologic myopia, presumed ocular histoplasmosis, central serous chorioretinopathy, choroidal hemangioma, or for other ophthalmologic disorders.