KAISER PERMANENTE®

Kaiser Foundation Health Plan of Washington

Clinical Review Criteria
Microinvasive Glaucoma Surgery (MIGS)

- Cypass (no longer available)
- iStent Device and Hydrus
- XEN Gel Implant (XEN® Gel stent) for Glaucoma

Criteria

For Medicare Members

Source	Policy
CMS Coverage Manuals	None
National Coverage Determinations (NCD)	None
Local Coverage Determinations (LCD)	Micro-Invasive Glaucoma Surgery (MIGS) (L38301)
Local Coverage Article	Billing and Coding: Micro-Invasive Glaucoma Surgery (MIGS) (A57864)

For Non-Medicare Members

iStent Device and Hydrus – 66989, 66991	iStent Device and Hydrus will be considered medically necessary when **ALL of the following** are met: 1. Only used in conjunction with Cataract Surgery when the individual is currently being treated with an ocular hypotensive medication **AND/OR** had prior laser trabeculoplasty 2. Used to reduce intraocular pressure (IOP) of greater than 21, except when clinical circumstances would support a lower IOP (this rationale should be documented in the note) 3. 18 years old or over **AND** 4. Mild to Moderate primary open-angle glaucoma defined as how much vision loss via visual field testing 5. Eyes do **NOT** have the following* a. Prior significant trauma b. In eyes with abnormal anterior segment c. In eyes with chronic inflammation d. In glaucoma associated with vascular disorders e. In pseudophakic patients with glaucoma f. In uveitic glaucoma g. In eyes with prior incisional glaucoma surgery or cilioablative procedures h. In eyes with prior laser trabeculoplasty (LT) with selective LT within 90 days prior to screening or prior argon laser trabeculoplasty (ALT) at any time i. In patients with unmedicated IOP greater than 36 mmHg after "washout" of medications j. Plan for implantation of more than two stents

Back to Top

	k. After complications during cataract surgery, including but not limited to, severe corneal burn, vitreous removal/vitrectomy required, corneal injuries, or complications requiring the placement of an anterior chamber IOL l. When implantation has been without concomitant cataract surgery with IOL implantation for visually significant cataract Contraindicated in the following patients: • In eyes with angle-closure glaucoma. • In eyes with traumatic, malignant, uveitic, or neovascular glaucoma or discernible congenital anomalies of the anterior chamber (AC) angle. • In patients with retrobulbar tumor, thyroid eye disease, Sturge-Weber Syndrome or any other type of condition that may cause elevated episcleral venous pressure *Exclusions include clinical circumstances that were not tested in the initial FDA approval.

Xen Gel Implant – 0449T, 66183	The use of Xen Gel Implant will be considered medically necessary when **ONE of the following** are met: 1. Refractory glaucoma, defined as prior failure of filtering/cilioablative procedure and/or uncontrolled IOP (progressive damage and mean diurnal medicated IOP ≥20 mm Hg) on maximally tolerated medical therapy (i.e., ≥4 classes of topical IOP-lowering medications, or fewer in the case of tolerability or efficacy issues) **OR** 2. Previous surgical treatment has failed (angle-based procedures, laser trabeculoplasty) **OR** 3. Primary open-angle glaucoma **OR** 4. Pseudo-exfoliative or pigmentary glaucoma with open angles that are unresponsive to maximum tolerated medical therapy Should **NOT** be used if any of the following are met: a. Angle-closure glaucoma where the drainage angle of the eye has not been surgically open b. Glaucoma drainage device previously implanted c. Presence of conjunctival scarring, prior conjunctival surgery or other conjunctival pathologies (e.g., pterygium) in the target quadrant d. Pathologies of the conjunctiva (clear membrane covering the white outer layer of the eye) in the area needed for this implant Active iris neovascularization or neovascularization of the iris within six months of the surgical date (abnormal formation of new blood vessels on the iris) e. Eye inflammation (e.g., conjunctivitis, keratitis, uveitis) f. Artificial lens implanted in the anterior chamber (intraocular lens) g. Presence of intraocular silicone oil h. Vitreous present in the anterior chamber

Criteria adopted based on FDA premarket approval and input from KP Ophthalmology leadership.

Cypass device – 0474T
The Cypass device was taken off the market on 8/29/2018 by the manufacturer due to safety concerns. This device will no longer be covered for Kaiser Permanente members.

If requesting these services, please send the following documentation to support medical necessity:
- Last 6 months of clinical notes from requesting provider &/or specialist

Back to Top

The following information was used in the development of this document and is provided as background only. It is provided for historical purposes and does not necessarily reflect the most current published literature. When significant new articles are published that impact treatment option, Kaiser Permanente will review as needed. This information is not to be used as coverage criteria. Please only refer to the criteria listed above for coverage determinations.

Background

The term micro-invasive or minimally invasive glaucoma surgery (MIGS) refers to a group of newer surgical procedures that are performed by using an ab interno (from inside the eye) approach via gonioscopic guidance and involve minimal trauma to ocular tissues. In contrast to external filtration surgeries such as trabeculectomy and aqueous tube shunt, these procedures are categorized as internal filtration surgeries. Compared with traditional filtration surgery, MIGS holds the promise of faster recovery time and less severe complications.

It is this potentially improved safety profile that opened up the indications for MIGS to include patients with early-stage glaucoma to reduce the burden of medications and problems with compliance (due to eye drop application difficulty, cost, cosmetic effects, and frequency). Another area of investigation is patients with glaucoma who require cataract surgery. An advantage of ab interno shunts is that they may be inserted into the same incision and at the same time as cataract surgery. In addition, most devices do not preclude subsequent trabeculectomy if needed. Therefore, health outcomes of interest are the IOP achieved, reduction in medication use, ability to convert to trabeculectomy, complications, and device durability.

There are three FDA approved/cleared micro-invasive surgical stents, the iStent Trabecular Micro-Bypass Stent (2011), the CyPass Micro-Stent System (July 2016), and the XEN Glaucoma Treatment System (Nov 2016). The iStent is a small (1 mm x 0.5 mm) L-shaped titanium device that is inserted into Schlemm's canal to augment the natural outflow system. CyPass is a 6.35 mm long fenestrated microstent made of biocompatible polyimide inserted into the supraciliary space, thus using an alternative outflow system. The XEN45 is a 6 mm long porcine-derived gelatin stent inserted into the subconjunctival space, bypassing the natural outflow system.

Both iStent and CyPass were FDA approved for use in combination with cataract surgery to reduce IOP in adults with mild or moderate OAG and a cataract that are currently being treated with medication to reduce IOP. XEN45 was granted FDA clearance for the management of refractory glaucoma, including cases where previous surgical treatment has failed, cases of primary open angle glaucoma, and pseudoexfoliative or pigmentary glaucoma with open angles that are unresponsive to maximum tolerated medical therapy.

07/08/2019: MTAC REVIEW

XEN Gel Implant (XEN® Gel stent) for Glaucoma

BACKGROUND

Glaucoma is one of the leading causes of blindness affecting almost 65 million people worldwide. It is a progressive eye disease that causes an irreversible, but potentially preventable damage to the optic nerve leading to visual field and acuity loss. Glaucoma is a heterogeneous group of optic neuropathies, the most common etiology of which is primary open angle glaucoma (POAG) caused by either elevated intraocular pressure IOP-related) or an alternative mechanism (non-IOP-related) (Lavia 2017, Agrawal 2018, Buffault 2019).

Currently, the only proven treatment for IOP-related glaucoma is lowering the intraocular pressure with the aim of preventing additional damage to the ganglionic cells and the optic nerve. Treatment is typically initiated with topical ocular hypotensive medications. Surgery is performed for the treatment of patients with moderate to advanced glaucoma inadequately controlled by the maximally tolerated medical therapy. Currently trabeculectomy is considered the gold standard and most common surgical procedure used for uncontrolled glaucoma. It is an incisional (ab-externo) filtering surgery that lowers the IOP by creating a pathway for release of aqueous humor from the anterior chamber (AC) of the eye into a subconjunctival space known as the filtration bleb (FB). Trabeculectomy is highly effective at lowering the IOP but, is an invasive procedure that requires intense postoperative care and may be associated with complications including hemorrhage, hypotony, scarring, aqueous leak, inflammation of the bleb, and endophthalmitis (Kerr 2017, Hengerer 2017, Agrawal 2018, Yook 2018, Buffault 2019, Heidinger 2019).

Over the last several years, several new devices and less invasive procedures have been developed with the intention of achieving lower IOP with shorter surgical time, less risk, and faster recovery. These are collectively termed "minimally invasive glaucoma surgery (MIGS)" and include trabecular drainage devices (e.g. iStent, iStent inject, and Hydrus microstent), suprachondral drainage devices (such as Cypass and iStent supra), and

 Back to Top

subconjunctival drainage devices including Express shunt, InnFocus micro shunt, and XEN Gel implant. However, some investigators debate whether XEN Gel should be considered as a MIGS (Kerr 2017, Widder 2018).

The XEN®45 Gel implant or stent (Allergan plc, Dublin), the focus of the current review, is intended to decrease IOP by creating a permanent outflow pathway from the anterior chamber to the subconjunctival space through a scleral channel. It is a 6mm long, 45µm wide, soft hydrophilic tube made of a porcine gelatin cross-linked with glutaraldehyde. The implant is stiff when dehydrated but becomes soft and flexible within 1-2 minutes of contact with the aqueous humor, allowing it to conform to the ocular tissue, thus theoretically minimizing migration, erosion, and endothelial damage (Pillunat 2017, Gregorio 2018, Karimi 2018).

The XEN® Gel implant procedure can be performed under local or topical anesthesia. The device is inserted from the anterior chamber (ab-interno) using a pre-loaded disposable injector and implanted into the subconjunctival space opposite the incision with minimal conjunctival tissue disruption. The tube creates a conduit that is intended to maintain outflow of the aqueous humor at 2-2.5µL/min as calculated by Hagen-Poiseuille equation (where the diameter and length of the tube defines the amount of outflow). The channel created leads to the formation of a bleb that assists in the drainage of the aqueous fluid. The bleb is a significant risk factor for scar formation and thus an antimetabolite such as mitomycin C (MMC) at a concentration of 0.1-0.2 mg/ml is generally injected in the subconjunctiva approximately 20 minutes before the procedure to reduce the risk of scar formation. XEN Gel uses the same pathway as trabeculectomy, but with the difference of leaving a foreign body in the tissue. The implant is frequently used in combination with phacoemulsification and lens implantation. In that case, the implantation of the stent is performed after placement of the posterior chamber intraocular lens (IOL) (Pillunat 2017, Ker 2017, Gregorio 2017, Karimi 2018, Bufault 2019).

There are three generations of XEN Gel implants (diameter sizes 45, 63, and 140 µm), but XEN®45 Gel is the one currently recommended and available.

XEN® Gel Stent and XEN Injector received US Food and Drug Administration (FDA) approval in November 2016 for use in patients with refractory glaucoma who failed previous surgical treatment or in patients with primary open angle glaucoma, pseudo exfoliative or pigmentary glaucoma with open angle that are unresponsive to maximum tolerated medical therapy.

The use of XEN Gel stent is contraindicated in certain conditions including angle closure glaucoma; previous glaucoma shunt/valve in the target quadrant; presence of conjunctival scarring; prior conjunctival surgery; other eye pathologies e.g. pterygium in the target quadrant; active eye inflammation; active iris neovascularization; AC IOL; presence of intraocular silicone oil; vitreous present in the AC; impaired episcleral venous drainage; suspected or known allergy to any of the device components or the drugs used with the procedure; and /or a history of dermatological keloid formation (Gregorio 2018).

Reported adverse events associated with XEN Gel implant include hypotony, hyphema, choroidal effusion, choroidal detachment, leaking bleb, bleb inflammation, subconjunctival hemorrhage, conjunctival erosion, conjunctival perforation, stent obstruction, implant migration, extrusion, brakeage, and implant exposure, and the need for secondary interventions and/or intraocular surgeries. Serious complications such as endophthalmitis, and visual acuity loss due to retinal detachment have also been reported (Kerr 2018, Lapira 2018, Lim 2018, Arnold 2019).

Conclusion:

- There is no published high-quality evidence from randomized controlled trials (to date) to determine the comparative effectiveness and safety of XEN Gel implantation versus trabeculectomy or other minimally invasive procedure used to lower IOP in patients with open angle glaucoma uncontrolled with optimal local medications.

- Low quality evidence from several prospective and retrospective observational studies suggest that XEN Gel implant lowers the IOP and reduces the number of IOP- lowering medication used in selected patients with open angle glaucoma uncontrolled with optimal local medications. The results, however, must be interpreted with caution due to the non-randomized design, potential confounding, and other inherent limitations of observational studies.

- The success rates varied between studies from 37-68% depending on definition of success based on the level of IOP reached, duration of follow up, use of topical medications, and need for revision surgeries.

 Back to Top

- XEN Gel implant is associated with intra-and post- operative adverse events (AEs). Many were reported to resolve spontaneously without the need for intervention. However, few were serious and /or required immediate and inevitable interventions.

- More than one third of the eyes require additional surgeries after XEN Gel implant.

Articles: The literature search did not identify any randomized controlled trials that compared the safety and efficacy of XEN45 Gel implant versus trabeculectomy or any other surgical procedure. The search revealed 3 systematic reviews with meta-analyses that pooled the results of the different of MIGS procedures, two studies (published in 3 articles on the earlier generations of the implant (XEN140 and XEN 63), around 10 observational studies with pre-post comparisons after XEN45 Gel implant with or without cataract surgery, and one retrospective observational study that compared the results the microstent implant to those of a trabeculectomy procedure.

The meta-analyses of studies on MIGS as well as the studies using the earlier generations of XEN Gel (60 and 140) were excluded. The observational study with a comparison group (Schlenker, 2017) was critically appraised (Evidence table 1) and the larger prospective and retrospective observational studies were summarized in a following table. See Evidence Table.

The use of Xen Gel Implant as a surgical treatment for glaucoma does not meet the *Kaiser Permanente Medical Technology Assessment Criteria.*

Applicable Codes

Xen Gel - Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

CPT® Codes	Description
0449T	Insertion of aqueous drainage device, without extraocular reservoir, internal approach, into the subconjunctival space; initial device
66183	Insertion of anterior segment aqueous drainage device, without extraocular reservoir, external approach

iStent and Hydrus - Considered Medically Necessary when criteria in the applicable policy statements listed above are met:

CPT® Codes	Description
66989	Extracapsular cataract removal with insertion of intraocular lens prosthesis (1-stage procedure), manual or mechanical technique (eg, irrigation and aspiration or phacoemulsification), complex, requiring devices or techniques not generally used in routine cataract surgery (eg, iris expansion device, suture support for intraocular lens, or primary posterior capsulorrhexis) or performed on patients in the amblyogenic developmental stage; with insertion of intraocular (eg, trabecular meshwork, supraciliary, suprachoroidal) anterior segment aqueous drainage device, without extraocular reservoir, internal approach, one or more
66991	Extracapsular cataract removal with insertion of intraocular lens prosthesis (1 stage procedure), manual or mechanical technique (eg, irrigation and aspiration or phacoemulsification); with insertion of intraocular (eg, trabecular meshwork, supraciliary, suprachoroidal) anterior segment aqueous drainage device, without extraocular reservoir, internal approach, one or more

Considered not medically necessary:

CPT® Codes	Description
0253T	Insertion of anterior segment aqueous drainage device, without extraocular reservoir, internal approach, into the suprachoroidal space
0671T	Insertion of anterior segment aqueous drainage device into the trabecular meshwork, without external reservoir, and without concomitant cataract removal, one or more

Back to Top

Cypass (no longer available) - Considered not medically necessary:

CPT® Codes	Description
0474T	Insertion of anterior segment aqueous drainage device, with creation of intraocular reservoir, internal approach, into the supraciliary space

***Note:** Codes may not be all-inclusive. Deleted codes and codes not in effect at the time of service may not be covered.

****To verify authorization requirements for a specific code by plan type, please use the **Pre-authorization Code Check**.

Date Created	Date Reviewed	Date Last Revised
02/06/2018	02/06/2018[MPC], 02/05/2019[MPC], 02/04/2020[MPC], 02/02/2021[MPC], 02/01/2022[MPC], 02/07/2023[MPC]	11/13/2023

[MPC] Medical Policy Committee

Revision History	Description
06/05/2018	MPC approved criteria for commercial members
10/08/2018	Non-coverage language for the Cypass device
11/14/2018	Language regarding iStent added
08/06/2019	MTAC review for Xen Gel was added
11/15/2019	Added all requests for Xen Gel must go to Medical Director for review
04/07/2020	MPC approved to adopt new coverage criteria for Xen Gel & iStent/Hydrus as surgical treatments for glaucoma, effective 08/01/2020.
08/12/2020	Removed Non-Medicare criteria prior to 08/01/2020
01/27/2022	Updated applicable coding (removed deleted codes 0191T, 0376T, added 66989, 66991, 0671T)
11/13/2023	Updated Medicare coverage article link (A57864).

Back to Top