Xen gel stent for glaucoma

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Policy contains: Glaucoma, sub-conjunctival filtration, trabeculectomy, XEN gel stent

This policy is a Sandhills Center Clinical Coverage Policy adopted from AmeriHealth Caritas of North Carolina. These clinical policies are used to assist with making coverage determinations. Sandhills Center's clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of "medically necessary," and the specific facts of the particular situation are considered by Sandhills Center when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. Sandhills Center clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. Sandhills Center's clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, Sandhills Center will update its clinical policies as necessary. Sandhills Center clinical policies are not guarantees of payment.

Coverage policy

XEN gel stent is clinically proven and, therefore, medically necessary in cases of glaucoma with prior failure of filtering/cilioablative procedure and/or uncontrolled intraocular pressure (progressive damage and mean diurnal medicated intraocular pressure ≥ 20 mm Hg) on maximally tolerated medical therapy, i.e., ≥ 4 classes of topical intraocular pressure-lowering medications or fewer in the case of tolerability or efficacy issues (Buffault, 2019; Fea, 2020; Gabbay, 2021; Gillmann, 2020; Lavia, 2017; Lim, 2021; Nicolau, 2021; Reitsamer, 2022; U.S. Food and Drug Administration, 2016).

XEN45 insertion is medically necessary only when performed by an ophthalmologist experienced with trabeculectomy and bleb management (U.S. Food and Drug Administration, 2016).

Limitations

Only one XEN45 device per eye is medically necessary.

Alternative covered services

Trabeculoplasty.

Trabeculectomy.

Background

Glaucoma is a painless, symptomless condition that can cause blindness. With one exception, narrow-angle glaucoma, it is associated with increased intraocular pressure within the eye. Inside the eye, fluid is constantly being manufactured and has to drain from inside the eye. High eye pressure is always related to some increased resistance or obstruction of the normal outflow of the intraocular fluid. The chronic sustained high eye pressure leads to degenerative optic neuropathy, loss of retinal ganglion cells and axons, and ultimately to blindness if not treated.

A meta-analysis of 50 studies (n = 198,259) estimated the worldwide prevalence of primary open-angle glaucoma to be 2.4%, or over 68 million persons. Rates are 28% higher among males ($P < .01$), with the highest prevalence in Africa (Zhang, 2021). About half of worldwide glaucoma cases are undetected (Soh, 2021).

Glaucoma is an incurable disease, and all humans are at risk. Open-angle glaucoma, its most common form, has no symptoms, increasing the importance of early detection. An estimated three million Americans have the disease, but only half are aware of it. About 120,000 Americans are blind from glaucoma. African Americans are 15 times more likely to be visually impaired, and six to eight times more likely to be blind from glaucoma than American whites (Glaucoma Research Foundation, 2017). A family history of glaucoma increases risk of the disorder by four to nine times (Glaucoma Research Foundation, 2019).

First-line treatments for glaucoma are typically topical ophthalmic drops to reduce intra-ocular pressure, along with various medications. In cases refractory to these treatment, surgery can be considered, including laser surgery (often trabeculoplasty), traditional surgery (often trabulectomy, the gold standard for surgery for glaucoma), or other procedures such as shunts or canaloplasty (Glaucoma Foundation, 2020).

Trabeculectomy and traditional glaucoma surgeries are not always effective, and often result in complications (Chaudhary, 2018). Researchers have developed minimally invasive surgery techniques for lowering intra-ocular pressure; these surgeries increased by about 400% in the most recent eight years, including 203,146 eyes in the United States in the period 2013-2018 (Birnbaum, 2021; Yang, 2021).

One type of minimally invasive surgery is sub-conjunctival filtration, or XEN Gel Stent, manufactured by Allergan. XEN is implanted through an ab interno approach without conjunctival dissection. The U.S. Food and Drug Administration gave 510(k) Premarket Notification approval to the XEN Glaucoma Treatment System on November 21, 2016. The system consists of an injector, a single piece tube of porcine collagen/gelatin inserted permanently. An outflow pathway is created from the anterior chamber to the sub-conjunctival space through which aqueous humor can flow (U.S. Food and Drug Administration, 2016).

Findings

The American Academy of Ophthalmology practice guideline stated that trabeculectomy is the preferred treatment for open angle glaucoma cases not controlled by medicine. It also notes micro-invasive glaucoma surgeries are less effective in lowering intra-ocular pressure than trabeculectomy, but may have fewer short-term complications. The Academy's summary benchmarks for managing open angle glaucoma did not refer to any type of microinvasive surgery (American Academy of Ophthalmology, 2020a; 2020b).

A Local Coverage Determination concludes that a XEN gel stent is indicated for glaucoma cases refractory to medical treatment and with uncontrolled intraocular pressure. In addition, the procedure is indicated when

performed by an ophthalmologist experienced with trabeculectomy and bleb management (Centers for Medicare & Medicaid Services, 2021).

A systematic review/meta-analysis of eight studies showed the XEN45 Gel Stent alone or with phacoemulsification produced a statistically significant difference in intraocular pressure reduction and medication reduction one day, one week, and six months after the procedure (Lim, 2021).

A meta-analysis of 19 studies (n = 2,215) included glaucoma patients who underwent XEN surgery with and without cataract extraction. Reductions in intraocular pressure and medications were significant after two years. Four of the 19 studies compared improvements between the groups, which were not significant (Poelman, 2021).

A review of 77 studies evaluated performance of 10 types of minimally invasive glaucoma surgery, including XEN (five studies). XEN had the second highest weighted reduction of intraocular pressure at 38.5%, 12 to 24 months post-operative; the only type of surgery with a superior improvement included just one study. XEN also had an average 59.9% reduction in medications, superior to most other approaches (Gillmann, 2020).

A comprehensive review of 14 studies (n = 1,575) of XEN procedures for refractory glaucoma analyzed improvements, most after 12 months follow up. Intraocular pressure declines ranged from 27% to 54%, while medication reductions ranged from 38% to 96%, of which nine were over 69% (Fea, 2020).

A systematic review of 87 studies of minimally invasive glaucoma surgery found 74% had no control group. Of the 11 studies of XEN, all were prospective, and none were randomized; these also had the lowest “quality score” calculated by authors, of 13 types of surgery (Rosdahl, 2020).

A systematic review/meta-analysis of 12 studies (n = 1,602 eyes) compared XEN Gel with trabeculectomy (five studies) and with XEN plus phacoemulsification (eight studies). XEN added to trabeculectomy groups failed to lower intraocular pressure, but reduced the number of drugs. XEN alone significantly lowered intraocular pressure reduced medications after three months (Wang, 2020).

A systematic review of eight studies (n = 777 patients, 958 eyes), showed the decrease in mean intraocular pressure at 12 months after surgery with XEN Gel Stents ranged from 25% to 56%. Glaucoma medications declined in each study. The most common complication was transient hypotony within one month (3%), and only five cases of severe complications occurred. Needling was been required in 32% of cases, and eyes (5.7%) required repeat filtering surgery or cyclodestructive procedure (Buffault, 2019).

A Cochrane review could find no randomized trials of subconjunctival draining minimally-invasive devices to prevent glaucoma progression, including the XEN gelatin implant and InnFocus stent (King, 2018).

A systematic review of 30 studies (n = 2,928 eyes), nine randomized, evaluated minimally invasive glaucoma surgeries, including XEN Gel Stent. Results found these procedures appeared to be safe, and effective in reducing both intraocular pressure and glaucoma drug use, based on limited evidence. Authors recommend more randomized trials to better understand outcomes versus other treatments (Lavia, 2017).

Until recently, most journal articles on efficacy and safety of the XEN gel stent had relatively small sample sizes.

The number of large studies (not systematic reviews) has increased after 2020.

One study with a relatively large number of patients (n = 186 procedures, 143 patients) found the Xen procedure resulted in a significant and lasting improvement in intraocular pressure (18.1 mmHg preoperative ($P < .0001$), 13.2 after six months, 13.7 after 12 months ($P < .05$), and 12.6 after 24 months ($P < .05$) (Nicolaou, 2021).

An analysis (n = 212 eyes) found improvements from baseline after three years in mean intraocular pressure (20.7 to 13.9 mmHg) and medication (2.5 to 1.1) after XEN surgery. Results were consistent after XEN alone or with phacoemulsification. Authors noted 7.1% eyes had intraoperative complications, 14.6% had postoperative adverse events of special interests, and 12.3% required secondary surgical intervention (Reitsamer, 2022).

A study (n = 205) of glaucoma patients who had XEN surgery with or without phacoemulsification found declines in mean intraocular pressure (22.6 to 14.0) and mean number of medications (2.6 to 0.6) at 36 months (both $P < .001$). The failure rate at 36 months was 25%, and needling was required in 36.6%. The failure rate in non-Caucasians (74%) compared to Caucasians (21%) showed patient selection is important (Gabbay, 2021).

A review (n = 179 eyes) found reductions in intraocular pressure of glaucoma patients after six months for XEN (17.8 to 13.5, or 24%, P < .0001) and trabeculectomy (20.4 to 10.8, or 47%, $P < .0001$). The number of medications was reduced in the XEN group (2.9 to 1.1, $P < .0001$) and trabeculectomy group (3.1 to 0.8, $P < .0001$). The needling rate was higher in the XEN group (30% versus 7.9%, $P < .0001$) (Sharpe, 2020).

References

On January 12, 2022, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were “glaucoma,” “sub-conjunctival filtration’” “trabeculectomy,” and “XEN gel stent,”. We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

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Policy updates

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