Osteopathic Family Physician (2019) 38 - 41

CLINICAL IMAGE

Ocular Surface Growth in 41-Year-Old Male

Leonid Skorin, Jr., DO, OD, MS, FAAO, FAOCO[1]; Emmalee A. Toldo, OD, MEd VFL[2]

[1] Mayo Clinic Health System, Albert Lea, MN
[2] Minnesota Eye Consultants, Minneapolis, MN

A 41-year-old male presents to the eye clinic for a long-standing growth on the nasal aspect of his left eye. He has noticed an increase in the size of the growth in the last six months. The patient reports that his left eye has some discomfort that began six months ago as well. When the eye gets uncomfortable, he uses artificial tears but notes minimal improvement in symptoms. He has no vision changes and his other eye is unaffected.

The patient had photorefractive keratectomy (PRK) refractive surgery for his nearsightedness in both eyes approximately 15 years ago. He experienced a good outcome from his PRK surgery and was asymptomatic. His current work as a landscaper includes exposure to dirt, dust, and dryness. He spends a lot of time outdoors and does not wear sunglasses. The patient also has a long-standing history of exposure to intense ultraviolet light while serving with the military in the desert in the Middle East. The patient has no other significant ocular or medical history.

On physical examination, the patient has an elevated, flesh-colored growth at the 9-o'clock perilimbal position of his left eye. It is wedge-shaped and extends from the conjunctiva approximately 1.5mm onto the cornea. There is no inflammation of the surrounding conjunctiva or sclera. No feeder vessels are present and there is no adjacent corneal thinning *(Figure 1 and Figure 2)*. The area is not painful to palpation and there is no pain on eye movement. His uncorrected visual acuity was 20/25 in each eye. Keratometry, which measures the anterior corneal curvature, indicates minimal corneal astigmatism. The remainder of the ocular health examination is unremarkable.

QUESTIONS

1. What is the patient's most likely diagnosis?

A. Limbal dermoid
B. Nodular episcleritis
C. Ocular surface squamous neoplasia
D. Pinguecula
E. Pterygium

2. What is the most likely cause of this condition?

A. Dust exposure
B. Environmental irritant exposure
C. Ultraviolet light exposure
D. Wind exposure
E. All of the above

3. What is the recommended treatment option?

A. Minimize exposure to dust, wind, and dryness
B. More frequent use of artificial tears
C. Surgical excision
D. Wear sunglasses when outdoors
E. All of the above

FIGURE 1:

Left eye growth, patient looking straight ahead

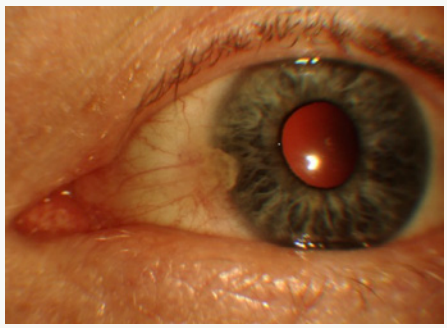
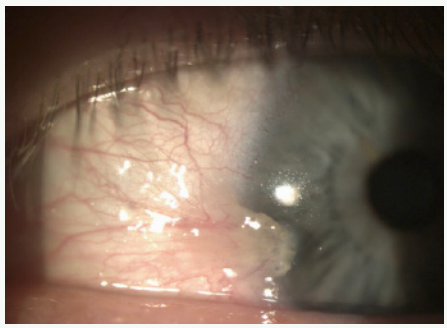


FIGURE 2:

Magnified view of left eye growth, patient looking temporally



CORRESPONDENCE:
Leonid Skorin, Jr., DO, OD, MS, FAAO, FAOCO |
skorin.leonid@mayo.edu

 Print ISSN: 1877-573X

ANSWERS:

1. What is the patient's most likely diagnosis?

Correct Answer: E) Pterygium

Pterygia are a triangular or wing-shaped growth of elevated fibrovascular tissue that originates from the interpalpebral conjunctiva and grows onto the cornea.[1, 2] Pinguecula are yellow-white, flat or mildly elevated interpalpebral conjunctival lesions. They may have a similar appearance to pterygia, but they do not encroach onto the cornea and are normally asymptomatic.[1, 3] Ocular surface squamous neoplasia (OSSN) usually arises over a preexisting pinguecula. Like pterygia, ultraviolet light exposure is a known risk factor. Older age, smoking, and human papilloma virus or human immunodeficiency virus infection are other risk factors.[4] OSSN appears as a gelatinous epithelial thickening which may extend into the peripheral cornea with accompanying injection and prominent feeder vessels.[4] Nodular episcleritis, which is associated with collagen vascular disease, typically affects young adult females and has an acute presentation with more pain, redness, and an inflamed nodule overlying the sclera.[1, 3] Limbal dermoid is a congenital rounded whitish-yellow lesion. It is typically located at the inferotemporal limbus and there is no abnormal vascularization.[1, 3]

2. What is the most likely cause of this condition?

Correct Answer: E) All of the above

Prolonged exposure to any combination of the aforementioned environmental factors may lead to the development of a pterygium. Sunlight exposure and chronic irritation are classic contributors to pterygium formation.[3]

3. What is the recommended treatment option?

Correct Answer: E) All of the above

Choices A through C are the medical therapies that should initially be attempted. If they do not relieve symptoms, or if the lesion is threatening the visual zone, then surgical excision is recommended.[5] It is important to note that a pterygium will not resolve with the use of medical therapies and might even recur after surgical intervention.[5, 6]

DISCUSSION

A pterygium is an ocular surface disease that can cause varied problems for patients. It is described as a proliferative disorder resulting from an aberrant conjunctival wound healing response.[2, 7, 8] It is characterized by a wing-shaped growth of fibrovascular tissue onto the cornea.[2] It is caused by an altered limbal squamous epithelium with goblet cell hyperplasia.[2, 8] An advancing row of fibroblasts penetrates the cornea between Bowman's layer and the basement membrane of the overlying epithelium.[3] There is accompanying destruction of Bowman's layer of the cornea, affecting the cornea's clarity.[3] This has been shown to be mediated by ultraviolet light-induced matrix-metalloproteinases.[2] Pterygia are regarded as a benign lesion due to its slow growth, although they do tend to have local invasiveness and a high rate of recurrence if not properly removed during surgical intervention.[2]

Pterygia can be found worldwide. They are found more frequently in equatorial regions, at high altitude, and in highly reflective environments such as sand, snow, water, and concrete.[2, 3, 8] This is due to the increased levels of ultraviolet radiation encountered in these environments, which is a substantial risk factor for the development of pterygia.[2, 3, 8, 9] Exposure to hot, windy, dusty, or smoky environments is also a contributor.[10] There is a slight prevalence for older males which is likely related to a prolonged history of ultraviolet light exposure.[3, 11] Hereditary factors may also contribute to pterygium formation.[3, 10]

Pterygia are generally found on the nasal interpalpebral fissure, although simultaneous nasal and temporal involvement can occur.[9, 10] Temporal involvement alone is rare.[10] The affinity for the nasal limbus is thought to be due to reflection and refraction of sunlight in the nasal aspect of the cornea.[2, 10] Peripheral light focusing is a phenomenon where incidental light (commonly gathered at the temporal aspect of the eye) passes through the anterior chamber and focuses at the distal (nasal) limbus.[2] Damage to the limbal stem cells in this area are thought to be a main contributor to the aberrant wound-healing response and tissue changes in this ocular disorder.[2, 9]

Pterygia can cause several issues in affected patients. Changes in corneal topography and induced astigmatism can be seen as results of tissue proliferation.[2, 8] If the tissue encroaches into the visual zone then increased glare, decreased contrast sensitivity, obstruction of vision, corneal scarring, and subsequently reduced visual acuity can occur.[2,8] Chronic discomfort due to the inflammation and subsequent dry eye can cause problems for patients.[8,10] Photophobia, tearing, burning, red eye, and foreign body sensation are common patient complaints, as is the cosmetic concern.[8,10] Patients can also be asymptomatic. In very severe cases, ocular surface scarring can lead to more complications such as formation of symblepharon (cicatricial attachment of the conjunctiva of the eyelid to the conjunctiva of the eyeball), reduced ocular motility, and diplopia.[5, 8]

There are several different types of pterygium. Type I is a small primary pterygium which presents with minimal or no symptoms. It can be fibrous (parallel to the limbus), pinguecular (raised, 2-3 mm of stromal infiltration possible but no invasion of the cornea), or classical (apex invades 1-2 mm onto the cornea).[3] Type II pterygium, the most common type, is an advanced primary or recurrent pterygium.[3] There is no optical zone involvement. The cornea is invaded 2-4 mm and there is irritation with a reduction in vision due to irregular astigmatism.[3] Type III is an advanced primary or "malignant" recurrent pterygium.[3] There is more than 4 mm of corneal invasion and the optical zone is involved.[3] The patient has obvious symptoms of discomfort and there is always a reduction in vision. The "malignant pterygium" label is reserved for the rapid postoperative recurrence that may appear.[3]

TREATMENT

Conservative management is used for prevention, to control symptoms, and to minimize factors that promote pterygium progression. These would include avoiding sunlight exposure by

wearing wide-brimmed hats and sunglasses that filter ultraviolet light. If patients work or live in areas with significant dryness, wind, dust, or dirt exposure, then they should be encouraged to use topical lubricants such as artificial tears, ointments, and gels.[12, 13] Ocular decongestants such as naphazoline or tetrahydrozoline can also be used occasionally to reduce conjunctival swelling. These should not be used continuously due to secondary effects such as rebound hyperemia.[13] Topical nonsteroidal anti-inflammatory agents such as ketorolac or topical steroids such as loteprednol may be indicated for brief periods to more rapidly reduce inflammation and swelling when symptoms flare but should also be prescribed with caution due to secondary effects.[14] There is no known effective medical treatment to diminish or remove an established pterygium.[12, 15]

The definitive treatment is surgical.[8,15] Decisions to perform surgery are often based on a patient's cosmetic concerns, discomfort, or obstruction of vision.[2] Morphological features of the lesion that are considered markers of severity, such as visibility of the underlying episcleral blood vessels, should also be considered.[2, 9, 16] Medical indications for pterygium surgery include visual acuity loss, increased astigmatism, and encroachment of the optical zone.[5, 9,17] Ocular discomfort is an additional indication for surgery, although findings of disagreement between symptoms and signs could be indicative of possible corneal nerve damage.[9] When a pterygium is removed, the changes in astigmatism and corneal topography are often reversed, which may improve visual acuity.[5]

Pterygia often recur after excision; therefore, surgical excision should not be based on cosmetic appearance alone.[3, 15] Studies have found several risk factors that are associated with pterygium recurrence, including younger age at the time of surgery and increased or untreated postoperative inflammation.[5] A non-translucent, fleshy, higher-grade pterygium is also associated with increased recurrence rates.[5] Pterygium also tends to recur rapidly after excision. A 50% chance of recurrence within four months after surgery and a 97% chance of recurrence 12 months after surgery have been documented.[6] Shorter intervals between subsequent recurrence after surgical removal have also been documented.[6] This demonstrates the importance of choosing an effective surgery which has the least risk of recurrence.

There are many surgical techniques available. Different approaches have been attempted to decrease recurrence after excision while providing a safe and cosmetically appealing surgical outcome.[5,15] No surgical gold standard for safety and efficacy has been established.[5] Amniotic membrane graft and conjunctival autograft with fibrin glue or sutures have emerged as successful surgeries with decreased recurrence rates compared to historical surgical techniques.[5, 11] The use of fibrin glue was reported to have a statistically significant decrease in recurrence compared to suture use, as well as reduction in operation time and decreased postoperative inflammation.[5, 8, 11]

Some studies suggest that pterygia might have a propensity to evolve into precursors of ocular surface neoplasms.[2] The relationship between the two is not well understood; however, it has been suggested that ultraviolet radiation-induced mutations in tumor-suppressor genes play a role in their formation and therefore chronic ultraviolet light exposure is a shared etiology in both conditions.[2] As such, annual follow-up is recommended at a minimum or more frequently if there are concerning signs such as visual impairment, restriction of eye movement, or encroachment of the pupil.[2, 13]

This patient was diagnosed with a Type I pterygium with classical appearance, as it invaded 1.5mm onto the cornea and did not induce any irregular astigmatism. We discussed treatment options with our patient. He declined surgical intervention at the time. He will continue to use artificial tears with increased use in dry or dusty working environments. He will begin to wear sunglasses with ultraviolet light protection when he is outdoors. He has been scheduled to follow up in one year. The patient was advised to return sooner if the conservative therapy does not bring him adequate relief from his ocular discomfort or if he decides to proceed with surgical intervention.

AUTHOR DISCLOSURE:
No relevant financial affiliations

REFERENCES:

1. Bagheri N, Wajda B. Pterygium/Pinguecula. The Wills Eye Manual: Office and Emergency Room Diagnosis and Treatment of Eye Disease. Seventh edition. Philadelphia: Wolters Kluwer. 2017;62-63.
2. Chui J, Coroneo MT, Tat LT, et al. Ophthalmic pterygium: A stem cell disorder with premalignant features. Am J Pathol. 2011;178(2), 817–827. doi:10.1016/j.ajpath.2010.10.037
3. Buratto L, Phillips RL, Carito G. Pterygium Surgery. Thorofare, NJ. SLACK Incorporated, 2000;3-47.
4. Sudesh S , Rapuano CJ, Cohen EJ, Eagle RC Jr, Laibson PR. Surgical management of ocular surface squamous neoplasms: The experience from a cornea center. Cornea. 2000;19(3)278–283.
5. Janson BJ, Sikder S. Surgical management of pterygium. Ocul Surf. 2014;12(2)112-119. doi:10.1016/j.jtos.2014.01.001
6. Hirst, LW, Sebban A, Chant D. Pterygium recurrence time. Ophthalmology. 1994;101(4)755-758. doi:10.1016/S0161-6420(94)31270-X
7. Di Girolamo N, Chui J, Coroneo MT, Wakefield D. Pathogenesis of pterygia: Role of cytokines, growth factors, and matrix metalloproteinases. Prog Retin Eye Res. 2004;23(2)195-228. doi:10.1016/j.preteyeres.2004.02.002
8. Fuest M, Mehta JS, Coroneo MT. New treatment options for pterygium. Expert Rev Ophthalmol. 2017;12(3)193-196. doi:10.1080/17469899.2017.1324297
9. Julio G, Lluch S, Pujol P, Merindano D. Ocular discomfort in pterygium patients. Optom Vis Sci. 2013;90(3)269–274. doi:10.1097/OPX.0b013e3182815b2a
10. Schwember J, Madrid L, Yori L. Rotatory conjunctival flap for pterygium removal: A simple and quick technique. Am J Cosmet Surg. 2017;34(4):183-186. doi:10.1177/0748806817705809

11. Todorovic D, Vulovic T, Sreckovic S, et al. Updates on the treatment of pterygium. Serb J Exper Clin Res. 2016;17(3), 257-262. doi:10.1515/sjecr-2016-0012
12. Hoffman RS, Power WJ. Current options in pterygium management. Int Ophthalmol Clin. 1999;39(1)15 -26.
13. Rapuano CJ. Color Atlas & Synopsis of Clinical Ophthalmology. Wills Eye Institute. Cornea. Second Edition. Philadelphia: Lippincott Williams & Wilkins. 2012;42-43.
14. Frucht-Pery J, Siganos CS, Solomon AT, et al. Topical indomethacin solution versus dexamethasone solution for treatment of inflamed pterygium and pinguecula: a prospective randomized clinical study. Am J Ophthalmol. 1999;127:148-152.
15. Farjo QA, Sugar A. Pterygium and conjunctival degenerations. In: Yanoff M, Duker JS (eds). Ophthalmology. Third edition. New York, NY: Mosby Elsevier. 2009;248-250.
16. Labbé A, Gheck L, Iordanidou V, et al. An in vivo confocal microscopy and impression cytology evaluation of pterygium activity. Cornea. 2010;29(4):392-399. doi:10.1097/ICO.0b013e3181bd44ce
17. Hirst L. Pterygium Surgery. In: Alberts DM, Lucarelli MJ (eds). Clinical Atlas of Procedures in Ophthalmic and Oculofacial Surgery. Second Edition. New York, NY: Oxford University Press. 2012;180-194.