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Advanced Double-headed Pterygium with Visual Axis Involvement: A Rare Clinical Presentation

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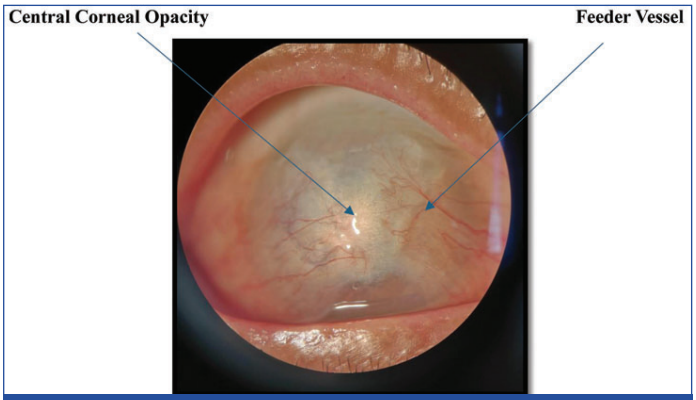
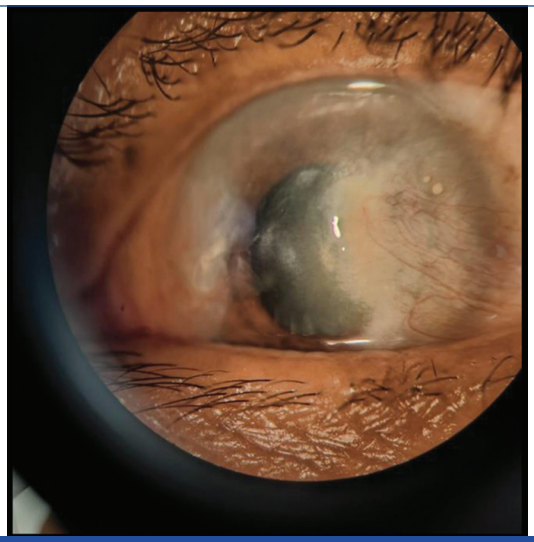
A 68-year-old female reported to the ophthalmology outpatient clinic with symptoms of a fleshy growth in both eyes, along with decrease in vision and foreign body sensation since six months. The patient had no history of diabetes mellitus, hypertension, immunosuppression, or any other systemic disease. There was no prior history of ocular trauma, surgery, or previous pterygium treatment. The patient was not on any long-term medications and reported no family history of similar ocular conditions. Occupational history revealed regular outdoor exposure with significant sunlight and dust exposure. Although the patient reported noticing the lesion and associated symptoms for approximately six months, the clinical appearance suggested that the lesion may have been present for a longer duration before becoming symptomatic.

On examination, the right eye revealed a diheaded Grade-IV pterygium that extended across and covered the pupillary visual axis, as well as conjunctivalisation of the cornea superiorly [Table/Fig-1] [1]. At 6 o'clock, a rather clean corneal zone was observed, through which iris tissue could be seen. The pterygium showed significant arborising superficial and deeper feeder arteries, indicating active fibrovascular growth. Visual acuity in the right eye was confined to hand movements close to the face, with perception of light and projection of rays accurately present. The corneal surface above the temporal lesion exhibited an irregular light reflex, indicating secondary stromal scarring and epithelial irregularity.



[Table/Fig-1]: Right eye having a diheaded Grade-IV pterygium invading on the pupillary visual axis, with superior corneal conjunctivalisation and conspicuous vascularity.

The left eye had vision of CF2M, not improving with pinhole or refraction. The anterior chamber has normal depth and is quiet, and the lens shows nuclear sclerosis grade 2 with posterior subcapsular cataract. Intraocular pressure measured by applanation tonometry was within normal limits. Posterior segment examination revealed a normal optic disc, macula, and peripheral retina. Refraction or keratometry was not possible due to a high degree of astigmatism. The left eye had a nasal Grade-III pterygium and a temporal Grade-IV pterygium, with the pupillary visual axis being partially spared. Deep feeder vessels were visible, while visual acuity was limited to counting fingers at one metre [Table/Fig-2]. Dense leucomatous corneal opacity was seen underneath the pterygium, with irregular stromal remodelling indicating a long-term disease course, potentially related with lipidation, subepithelial fibrosis, and superficial vascular pannus.



[Table/Fig-2]: Left eye, the nasal pterygium Grade-III and temporal pterygium Grade-IV with the pupillary visual axis being partially spared and deep vessels are appreciated.

The differential diagnosis that was considered was post-infectious corneal scar (bacterial or fungal keratitis), interstitial keratitis, lipid keratopathy, Salzmann nodular degeneration, ocular surface squamous neoplasia, traumatic corneal leukoma, and phlyctenular keratoconjunctivitis. Given the existence of Grade-IV pterygium, pupillary visual axis involvement, and severe vision impairment, particularly in the right eye, advanced (Grade-IV) pterygium with visual axis involvement causing significant vision loss was the final diagnosis. The patient's treatment strategy included surgical removal of the pterygium. Pterygium excision with conjunctival autografting was proposed as the preferred method for reducing recurrence risk and restoring ocular surface structure. Due to significant visual degradation, the right eye will be treated first, followed by phased operation on the left. Based on intraoperative results, adjunctive procedures such as rigorous fibrovascular tissue excision and anti-fibrotic medications may be used.

As no surgical treatment was performed, the patient will be managed conservatively with topical antibiotics, corticosteroids, and lubricants, along with close monitoring for healing, potential advancement, and visual rehabilitation. Although surgical excision is the definitive treatment for advanced Grade-IV pterygium with visual axis involvement, it was not performed in this case due to patient-related factors.

The patient was thoroughly counselled regarding the need for surgical intervention, including the benefits of visual rehabilitation

and prevention of further progression. However, the patient did not consent for immediate surgery due to personal and socio-economic constraints, and preference to defer surgical management at the time of presentation. The prognosis following surgical intervention in such advanced cases is guarded but potentially beneficial, depending on multiple factors; pterygium excision with conjunctival autografting would likely result in improvement in visual acuity, primarily by clearing the visual axis obstruction, reduction in induced astigmatism, although complete normalisation may not occur due to pre-existing corneal irregularity, and restoration of ocular surface anatomy, leading to symptomatic relief.

However, in this particular case, the prognosis is influenced by pre-existing dense stromal scarring and corneal opacity, which may limit visual recovery even after successful excision, long-standing conjunctivalisation, and possible limbal stem cell deficiency, affecting epithelial healing, risk of recurrence, which is higher in large, vascular, and double-headed pterygia despite the use of conjunctival autografting. Thus, while functional and symptomatic improvement is expected, complete visual recovery is unlikely, and the final visual outcome would depend on the extent of irreversible corneal changes. In such advanced cases, additional procedures such as optical keratoplasty may be required for optimal visual rehabilitation. The outcomes of the current conservative management are primarily supportive and symptomatic rather than curative. It is expected to provide relief of symptoms such as irritation, redness, and foreign body sensation, reduction in ocular surface inflammation, improvement in tear film stability and surface comfort, and prevention of secondary infection.

Pterygium is a common degenerative fibrovascular condition of the ocular surface characterised by gradual encroachment of conjunctival tissue onto the cornea, which often originates from the nasal conjunctiva [2]. It is usually unilateral and single-headed; however, rare atypical variations like diheaded pterygium, in which fibrovascular tissue spreads onto the cornea from both the nasal and temporal sides, have been identified [3]. These unusual forms are frequently more aggressive in character, increasing the risk of visual morbidity caused by rapid progression and substantial corneal involvement. Recurrence is a major concern in advanced pterygium. Studies report recurrence rates of 30-80% with the bare sclera technique, whereas conjunctival autografting significantly reduces recurrence to approximately 5-15%, making it the preferred surgical approach in advanced cases [1,4].

Grade-IV pterygium is defined by protrusion into or across the pupillary visual axis, which can cause significant vision impairment. Visual loss in these situations is complex and can be caused by severe induced astigmatism, uneven corneal topography, stromal scarring, corneal thinning, or direct obscuration of the visual axis [5]. Long-standing injuries may also cause corneal conjunctivalisation, limbal stem cell failure, and chronic ocular surface inflammation, all of which compromise visual results [6]. When assessing pterygium, advanced imaging methods like Anterior Segment Optical Coherence Tomography (AS-OCT) might be helpful. By evaluating the depth of corneal invasion, epithelium thickness, and subepithelial fibrovascular tissue, AS-OCT improves lesion characterisation and facilitates surgical planning. Additionally, it can be used to track surgical recovery and distinguish pterygium from other ocular surface diseases. Whereas in this case, Limbal stem cell loss couldn't be assessed due to advanced stage of disease.

This case showed a bilateral double-headed (diheaded) pterygium with fibrovascular tissue spreading onto the cornea from both nasal and temporal sides, in contrast to the usual appearance of pterygium, which often develops unilaterally from the nasal conjunctiva. Rare and more aggressive, these presentations frequently result in fast corneal invasion and involvement of the pupillary visual axis, which severely impairs vision. Since most documented occurrences of pterygium feature a single head with minimal corneal extension, this case is clinically distinctive due to the lesion's bilateral and double-headed character. This patient's profound corneal involvement demonstrates the severity of the condition and its propensity to result in significant visual morbidity.

Long-term environmental and ocular surface risk factors may be linked to bilateral double-headed pterygium. Chronic exposure to Ultraviolet (UV) radiation is thought to be a key aetiological component, particularly for individuals working outside or residing in tropical areas [7]. Long-term exposure to wind, dust, dryness, and persistent ocular irritation are other factors that may encourage fibrovascular development and limbal stem cell destruction. These variables may account for the patient's simultaneous growth of pterygium from both the nasal and temporal sides, which led to considerable corneal involvement and highlighted the case's uncommon and aggressive character. Reducing progression and recurrence is mostly dependent on prevention. Patients should be encouraged to wear wide-brimmed hats and protective eyewear to reduce UV exposure, particularly in areas with significant sun exposure. In order to reduce ocular surface irritation and prevent the course of the condition, further precautions include the use of lubricating eye drops, protection from wind and dust, and routine ophthalmic follow-up [8].

Surgical treatment of advanced and atypical pterygiums remains difficult. Extensive lesions are linked to higher recurrence rates, more intraoperative difficulties, and a larger risk of postoperative problems [5]. To decrease recurrence and restore ocular surface architecture, meticulous surgical technique is required, which may include adjuvant techniques including conjunctival autografting or amniotic membrane transplantation [9]. Pre-existing corneal scarring and uneven astigmatism can also hinder visual rehabilitation after surgery, highlighting the significance of early intervention and meticulous postoperative treatment in such complex cases [10].

Adjunctive anti-vascular endothelial growth factor (anti-VEGF) therapy, such as bevacizumab, has been investigated as an adjunct to pterygium surgery and may reduce corneal neovascularisation and the risk of recurrence when administered before or after surgical excision [11]. Amniotic membrane transplantation, mitomycin-C administration, and fibrin glue-assisted graft attachment are other cutting-edge techniques that are intended to enhance surgical results and lower recurrence [9].

In this instance, conjunctival autografting was chosen as the ideal surgical approach since it has a lower recurrence rate and produces superior functional and cosmetic results than alternative treatments such as amniotic membrane transplantation or bare sclera excision. Conjunctival autografting reduces postoperative inflammation and fibrovascular regrowth by replacing the scleral defect with healthy conjunctival tissue, which helps repair the ocular surface given the advanced grade of pterygium with visual axis involvement. This method proves to be a better choice for treating severe and aggressive pterygium instances since it also maintains limbal stem cells and creates a more solid ocular surface [1].

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