MODERN MEDICINE AND PRACTICE
https://inovatus.es/index.php/ejmmp
EUROPEAN JOURNAL OF MODERN MEDICINE AND PRACTICE
Vol. 5 No. 1 (Jan - 2025) EJMMP ISSN: 2795-921X

A COMPREHENSIVE REVIEW OF PTERYGIUM

Rajabov Hamid Rashid o`g`li
Workplace: Urgench branch of Tashkent Medical Academy,
Research Place: Ophthalmic Hospital of Urgench of Khorezm region,
Postal Address: Department of Pathomorphology, Republic of Uzbekistan Khorezm region Urgench city Al-Khorezm street home № 28

Abstract: Pterygium is a prevalent ocular condition characterized by the growth of fibrovascular tissue from the conjunctiva onto the cornea. While benign, it can cause significant visual impairment and cosmetic concerns. This article provides an in-depth review of pterygium, focusing on its etiology, pathophysiology, clinical presentation, diagnostic strategies, and management options. Particular attention is given to the environmental and genetic factors contributing to its development, alongside advancements in surgical techniques aimed at reducing recurrence rates.

Keywords: Pterygium, Conjunctiva, Cornea, AS-OCT, Surgical excision, Recurrence, Etiology, Pathophysiology, Environmental factors, UV radiation, Application of mitomycin C, Fibrovascular tissue, Excision techniques, Conjunctival autograft.

Introduction Pterygium, often referred to as “surfer’s eye,” is a chronic ocular disorder commonly encountered in individuals exposed to high levels of ultraviolet (UV) radiation. Its hallmark feature is a wing-shaped fibrovascular proliferation extending from the bulbar conjunctiva onto the cornea. Although typically asymptomatic in its early stages, progressive pterygia can lead to visual disturbances, chronic irritation, and cosmetic disfigurement. Despite its prevalence, particularly in tropical and subtropical regions, the precise pathogenesis of pterygium remains incompletely understood. This article explores the multifactorial nature of pterygium, including environmental, genetic, and inflammatory contributions, as well as current and emerging approaches to treatment.

Methodology

1. **Research Approach**: Literature review of pterygium's epidemiology, pathogenesis, clinical presentation, and treatment.
2. **Study Setting**: Data were sourced from studies conducted globally, with a focus on UV-induced ocular conditions prevalent in tropical and subtropical regions.
3. **Techniques Reviewed**:

- Diagnostic tools: Slit-lamp examination, AS-OCT, and corneal topography.
- Surgical methods: Bare sclera technique, conjunctival autograft, amniotic membrane transplantation, and adjunctive therapies like mitomycin C.

4. **Evaluation Metrics**:

- Recurrence rates post-surgery.
- Clinical outcomes, including vision improvement and cosmetic satisfaction.

Epidemiology Pterygium is a global condition, with higher prevalence rates reported in equatorial regions. Studies estimate that its prevalence ranges from 2% to 33%, depending on geographical location and population demographics. Men are slightly more affected than women, likely due to occupational exposure to outdoor environments. The condition typically manifests in adulthood, with incidence increasing with age.

Etiology and Risk Factors

1. **Ultraviolet Radiation** Prolonged exposure to UV radiation is the most significant risk factor for pterygium development. UV radiation induces oxidative stress, leading to DNA damage and increased production of matrix metalloproteinases (MMPs), which degrade the extracellular matrix of the conjunctiva and cornea.
2. **Environmental Irritants** Chronic exposure to wind, dust, and dry conditions exacerbates ocular surface irritation, further contributing to the development of pterygium. These factors are especially prevalent in arid and rural settings.
3. **Genetic Predisposition** Genetic susceptibility plays a role in pterygium pathogenesis, with several studies identifying polymorphisms in genes associated with inflammation, cell proliferation, and extracellular matrix remodeling.
4. **Age and Gender** Pterygium is more common in individuals over 40 years old. Men appear to be at higher risk, potentially due to outdoor occupational exposures.

Pathophysiology The pathogenesis of pterygium is multifactorial, involving UV-induced oxidative stress, chronic inflammation, and dysregulation of cell proliferation. UV radiation damages limbal epithelial cells, resulting in p53 gene mutations that impair apoptosis. This leads to uncontrolled cellular proliferation and fibrovascular growth. Concurrently, inflammatory cytokines and growth factors, such as vascular endothelial growth factor (VEGF) and transforming growth factor-beta (TGF-β), drive neovascularization and tissue remodeling. The overexpression of MMPs further contributes to corneal invasion by degrading the Bowman's membrane and stromal matrix.

Clinical Presentation

1. **Symptoms** Pterygium is often asymptomatic in its early stages. However, as it progresses, patients may experience:

- Persistent redness and irritation.
- Foreign body sensation.
- Dry eye symptoms due to tear film instability.
- Blurred vision or astigmatism, particularly if the lesion encroaches on the visual axis.

2. **Signs** Clinically, pterygium appears as a triangular, fleshy, and vascularized lesion extending onto the cornea. The lesion's head points towards the corneal center, while the body remains attached to the conjunctiva. Advanced cases may exhibit fibrosis, pigmentation, or lipid deposition.

Diagnosis Diagnosis is primarily clinical, based on characteristic findings during slit-lamp examination. Key features include:

- A fibrovascular lesion originating from the nasal conjunctiva.
- Invasion of the cornea, often with a leading edge known as the "Stocker's line" (iron deposition line).
- Absence of significant corneal scarring unless advanced.

Advanced imaging techniques, such as anterior segment optical coherence tomography (AS-OCT) and corneal topography, can be utilized to assess the lesion's depth and impact on corneal curvature. These tools are particularly useful for surgical planning.

Management

1. **Conservative Treatment**

- **Lubricants**: Artificial tears and lubricating eye drops alleviate irritation and dryness.
- **Topical Corticosteroids**: Short-term use of corticosteroids helps control inflammation but should be used cautiously to avoid complications such as glaucoma or cataract formation.
- **Sunglasses**: UV-blocking sunglasses reduce further UV-induced damage.

2. **Surgical Treatment** Surgery is indicated for progressive pterygia causing significant symptoms, visual impairment, or cosmetic disfigurement. Several surgical techniques are available:

- **Simple Excision (Bare Sclera Technique)**: Involves removal of the pterygium, leaving the sclera bare. However, this method has high recurrence rates (up to 80%).
- **Conjunctival Autografting**: This technique involves excision of the pterygium followed by transplantation of conjunctival tissue from the same eye to cover the bare sclera. It is the gold standard due to its low recurrence rate (5-15%).
- **Amniotic Membrane Transplantation**: The use of amniotic membrane grafts is an alternative for large or recurrent pterygia. It promotes healing and reduces inflammation.
- **Adjunctive Therapies**: Application of mitomycin C (MMC) or 5-fluorouracil (5-FU) during surgery reduces recurrence by inhibiting fibroblast proliferation. Postoperative beta irradiation has also been used but is less common due to potential complications.

Complications and Recurrence Despite advances in surgical techniques, pterygium recurrence remains a challenge. Risk factors for recurrence include young age, inadequate surgical technique, and poor postoperative care. Recurrent pterygia are often more aggressive and difficult to manage.

Postoperative complications include:

- Graft displacement or dehiscence.
- Infection or inflammation.
- Scleral thinning or necrosis (associated with mitomycin C use).

Prevention Preventive measures focus on reducing UV exposure and ocular surface irritation. Key strategies include:

- Wearing UV-protective sunglasses and wide-brimmed hats.
- Using artificial tears to maintain a stable tear film.
- Avoiding dusty or windy environments when possible.

Recent Advances Research into pterygium pathogenesis and treatment is ongoing. Notable developments include:

1. **Targeted Therapies**: Investigations into the role of anti-VEGF agents, such as bevacizumab, for reducing neovascularization.
2. **Gene Therapy**: Exploration of therapies targeting p53 mutations and MMP expression.
3. **Nanotechnology**: Development of drug delivery systems for sustained release of anti-inflammatory and anti-fibrotic agents.

Results

- **Prevalence**: Pterygium is more common in equatorial regions, with higher male susceptibility due to occupational exposure.
- **Pathogenesis**: UV radiation-induced oxidative stress, inflammation, and MMP overexpression contribute to fibrovascular growth.
- **Clinical Presentation**:
- ✓ Symptoms: Redness, irritation, astigmatism, and dry eye.
- ✓ Signs: Fleshy, triangular lesion extending onto the cornea.
- **Management Outcomes**:
- ✓ Conjunctival autografting showed the lowest recurrence rates (5-15%).
- ✓ Adjunctive therapies reduced fibroblast activity and recurrence.
- ✓ Complications include graft displacement, infection, and scleral thinning.

Discussion

1. **Etiological Factors**:
- ✓ UV exposure as a primary risk.
- ✓ Environmental irritants and genetic predisposition.
2. **Management Challenges**:
- ✓ High recurrence rates with basic surgical methods.
- ✓ Complications of adjunctive therapies, including scleral thinning and delayed healing.
3. **Advancements**:
- ✓ Anti-VEGF agents for neovascularization control.
- ✓ Gene therapies targeting p53 and MMP pathways.
- ✓ Nanotechnology for sustained drug delivery.
4. **Prevention**:
- ✓ Emphasis on UV protection and ocular surface maintenance.
- ✓ Role of early diagnosis in preventing progression.

Conclusion Pterygium is a multifactorial condition with significant clinical and public health implications. While the exact pathogenesis remains incompletely understood, advancements in surgical and medical therapies have improved outcomes. Preventive measures, including UV protection and early intervention, are essential for reducing disease burden. Future research aimed at elucidating molecular mechanisms and developing targeted therapies holds promise for further enhancing patient care.

List of used Sources:

1. Rashid ogli, Rajabov Hamid. "HISTOLOGY AND PATHOLOGY OF PTERYGIUM." *World Bulletin of Public Health* 32 (2024): 173-176.
2. Rajabov, Hamid. "HISTOLOGY OF PTERYGIUM." *Евразийский журнал медицинских и естественных наук* 4.3 (2024): 111-115.
3. Rashid o'g'li, H. R. (2023, April). OPERATSIYADAN KEYINGI PTERIGIUM. In *Proceedings of International Educators Conference* (Vol. 2, No. 4, pp. 72-74).
4. Hamid, R. (2023). Morphology of pterygium. *Texas Journal of Medical Science*, *19*, 48-49.
5. Hamid, R. (2022). Cataract and Glaucoma Patients Before and After Surgical Treatment. *Texas Journal of Medical Science*, *10*, 90-91.
6. Hamid, Rajabov. "Prevention and treatment of corneal lesions in endocrine ophthalmopathy." (2022).
7. Rashid o'g'li, H. R. (2023, April). PTERIGIUM EKTOMIYA. In *Proceedings of International Conference on Modern Science and Scientific Studies* (Vol. 2, No. 4, pp. 359-362).
8. Moran DJ, Hollows FC. Pterygium and ultraviolet radiation: a positive correlation. Br J Ophthalmol. 1984.
9. Ang LP, Chua JL, Tan DT. Current concepts and techniques in pterygium treatment. Curr Opin Ophthalmol. 2007.
10. Liu T, Liu Y, Xie L, et al. Progress in the pathogenesis of pterygium. Curr Eye Res. 2013.
11. Hirst LW. The treatment of pterygium. Surv Ophthalmol. 2003.
12. Dushku N, Reid TW. Immunohistochemical evidence that human pterygia originate from an invasion of vimentin-expressing altered limbal epithelial basal cells. Curr Eye Res. 1994;13(7):473-81.
13. Parikh SN, Crawford AH, Do TT, Roy DR (May 2004). "Popliteal pterygium syndrome: implications for orthopaedic management". Journal of Pediatric Orthopedics. Part B. 13 (3): 197–201. doi10.1097/01202412-200405000-00010. PMID 15083121.
14. Romano V, Cruciani M, Conti L, Fontana L (December 2016). Cochrane Eyes and Vision Group (ed.). "Fibrin glue versus sutures for conjunctival autografting in primary pterygium surgery". The Cochrane Database of Systematic Reviews. 2016 (12): CD011308. doi:10.1002/14651858.CD011308.pub2. PMC 6463968. PMID 27911983.
15. Yuan F (2–5 April 2014). PO286 The Efficacy and Safety of the Oculusgen (ologen) Collagen Matrix Implanted During Surgical Excision of Primary Pterygium. The 2014 WOC. Tokyo.