DOI: 10.14744/eer.2025.27147
Eur Eye Res 2025;5(3):238–241

EUROPEAN EYE RESEARCH

ORIGINAL ARTICLE

Histopathological evaluation of excised pterygium tissues

Seray Sahin,[1] Mehmet Esat Teker,[2] Banu Yaman,[3] Taner Akalin,[3] Melis Palamar[1]

[1]Department of Ophthalmology, Ege University, Izmir, Türkiye
[2]Medical Palace Hospital, Kayseri, Türkiye
[3]Department of Pathology, Ege University, Izmir, Türkiye

Abstract

Purpose: The purpose of the study is to present the histopathological evaluation of the excised pterygium tissues and to investigate accompanying ocular surface pathologies.

Methods: The histopathologic data of the patients who underwent pterygium excision between 2013 and 2024 were retrospectively evaluated. The demographic data, pterygium location, and whether the pterygium was primary or recurrent were also noted.

Results: A total of 190 eyes of 190 patients were included. Mean age was 56.36±13.2 (range, 21–90) years, and the female-to-male ratio was 84/106. Pterygium was located in the nasal quadrant in all eyes (100%) and was recurrent in 20 (10.5%) of 190 eyes. The histopathological evaluation of the excised materials revealed that they were compatible with pterygium in 188 of the cases (98 .9%). At pterygium materials histopathologically, epithelial hyperplasia, goblet cell hyperplasia, solar degeneration, squamous metaplasia, stromal inflammation, and proliferation in fibrovascular tissue were seen. In one case (0.5%) of 188 patients with pterygium, additionally epithelial dysplasia was seen histopathologically. The other two cases with clinically consistent with pterygium were diagnosed as limbal dermoid (0.5%) and as intramucosal nevus (0.5%) histopathologically.

Conclusion: Pterygium is a common lesion on the ocular surface which is triggered by ultraviolet light exposure. Although the risk of malignant transformation is very low, its relationship with sunlight exposure indicates the risk of other malignancies. As pterygium location is similar and the appearance might mimic ocular surface squamous neoplasia, histopathological examination is important to achieve a proper diagnosis.

Keywords: Epithelial dysplasia; histopathology; ocular surface squamous neoplasia; pterygium.

Pterygium is a common lesion on the ocular surface and is characterized by the "wing-shaped" advancement of the bulbar conjunctiva onto the cornea, and this degenerative process is thought to develop as a result of chronic ultraviolet light exposure of limbal stem cells. Due to the effect of sunlight on the medial limbus, pterygium is typically located in the nasal interpalpebral region and is usually bilateral.[1]

Pterygium is considered a benign lesion and generally grows slowly. Surgical excision is needed when patients experience cosmetic discomfort or reach a size that causes astigmatism and covers the visual axis.[2]

The prevalence of pterygium has been reported to vary between 0.3% and 12%, and its prevalence increases in countries where ultraviolet B exposure is higher.[3,4]

Cite this article as: Sahin S, Teker ME, Yaman B, Akalin T, Palamar M. Histopathological evaluation of excised pterygium tissues. Eur Eye Res 2025;5(3):238–241.

Correspondence: Melis Palamar, M.D. Department of Ophthalmology, Ege University, Izmir, Türkiye
E-mail: melispalamar@hotmail.com
Submitted Date: 17.08.2024 **Revised Date:** 02.11.2024 **Accepted Date:** 03.12.2024 **Available Online Date:** 17.12.2025

Pterygium and ocular surface squamous neoplasia (OSSN) can coexist because they share common risk factors.[5-7] OSSN might mimic lesions such as pinguecula, pterygium, and conjunctival cyst, which are common corneal and conjunctival surface pathologies. Therefore, histopathological diagnosis is important for differentiation.[8]

The aim of this study is to evaluate the histopathologic results of the excised pterygium tissues and to investigate accompanying ocular surface pathologies in these patients.

Materials and Methods

This study was conducted retrospectively at Ege University Department of Ophthalmology and Department of Pathology in accordance with the Declaration of Helsinki and was approved by Ege University Committee of Ethics (number: 24–2.1T/8, date: February 22, 2024). The patients who underwent pterygium excision over 18 years of age and had anterior segment photographs were included. The histopathologic data of the patients who underwent pterygium excision between 2013 and 2024 were evaluated. The demographic data, pterygium location, and whether the pterygium was primary or recurrent were also noted. Written informed consent was obtained from all patients.

Statistical Analysis

Statistical analysis was performed using IBM Statistical Package for the Social Sciences (SPSS) Statistics 25.0 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.).

Results

A total of 190 eyes of 190 patients were included. Mean age was 56.36±13.2 (range, 21–90) years, and the female-to-male ratio was 84/106. Pterygium was located in the nasal quadrant in all eyes (100%) and was recurrent in 20 (10.5%) of 190 eyes. The histopathological evaluation of the excised materials revealed that they were compatible with pterygium in 188 of the cases (98.9%). At pterygium materials histopathologically, epithelial hyperplasia, goblet cell hyperplasia, solar degeneration, squamous metaplasia, stromal inflammation, and proliferation in fibrovascular tissue were seen (Fig. 1). In one case (0.5%) of 188 patients with pterygium, additionally, epithelial dysplasia was seen histopathologically (Fig. 2). The other two cases with clinically consistent with pterygium were diagnosed as limbal dermoid (0.5%) and as intramucosal nevus (0.5%) histopathologically.

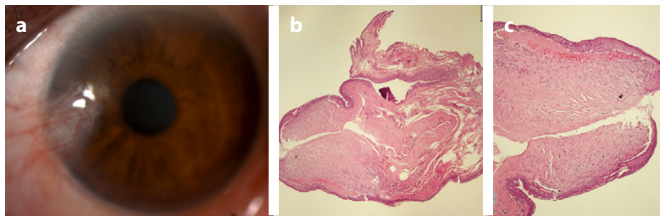

Fig. 1. **(a)** Anterior segment photograph of pterygium located in the nasal quadrant. **(b and c)**: Histopathological images of pterygium; epithelial hyperplasia, squamous metaplasia, solar degeneration, and fibrosis in the tunica propria (H&E ×40, ×100).

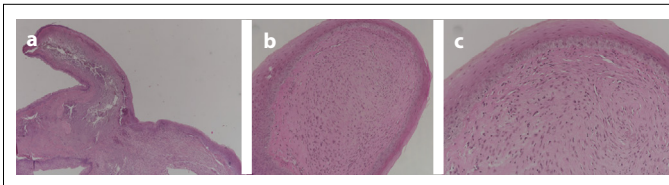

Fig. 2. **(a-c)** Histopathological images of epithelial dysplasia in pterygium (H&E ×40, ×100, ×200).

Discussion

Histopathologically, pterygium is characterized by goblet cell hyperplasia, squamous metaplasia in the epithelium, Bowman membrane damage involving fibroblasts, stromal proliferation, neovascularization, and extracellular matrix as a result of the transformation of limbal stem cells.[9] In this study, the results of histopathological examination had characteristics that defined pterygium, in accordance with the literature.

The ability of pterygium to invade adjacent corneal tissues and cause vascular growth is similar to neoplastic processes. The variability of recurrence rates also suggests that it may hide premalignant lesions.[10,11] Epithelial dysplasia is a conjunctival and corneal lesion with malignant potential, classified as pre-invasive OSSN.[7] Herein, the epithelial dysplasia rate in pterygium tissue was found to be 0.5% which is compatible with the 0.6% rate reported by Quhill et al.[12] Sobrinho et al.[13] reported that the rate of epithelial dysplasia and actinic keratosis was 1.2% in histopathological evaluation. However, in another study, the detection rate of unexpected OSSN in pterygium was reported to be 14.96%.[14] In addition, Bergeron et al.[15] reported that the rate of primary acquired melanosis and OSSN was 53.0% as a result of histopathological evaluation in pterygium excision. The difference in these reported rates might be related to variable ultraviolet light exposure. Even more, not only all excised pterygium tissues but also the suspicious lesions might have been sent for histopathologic evaluation. In addition, the most probable

fact might be that ophthalmologists who are more experienced in ocular surface tumors might have made a more accurate differential diagnosis with pterygium as the preliminary diagnosis.

The risk factors for the development of pterygium are various such as hereditary and immunologic features, viral infections, smoking, trauma, and irritation. It is also thought that there may be a relationship between pterygium and dry eye disease, regardless of genetic background and environmental factors.[16,17] However, the most prominent risk factor is considered to be ultraviolet light exposure. [18-20] Different ocular surface pathologies can coexist due to common risk factors in the development of OSSN and pterygium.[21,22] Therefore, it is thought that accurate diagnosis and appropriate treatment will be possible with a definitive histopathological diagnosis, and the follow-up processes of the patients should be carried out according to the results of histopathological examination.

Although histopathological examination of all excised tissues is mandatory, anterior segment optical coherence tomography (AS-OCT) may allow differential diagnosis between OSSN and pterygium with typical imaging features in the pre-operative period. AS-OCT is a non-contact, highly repeatable method with approximately 5 µm axial resolution. Typical appearance of OSSN on AS-OCT is a thickened hyper-reflective epithelial layer and an abrupt transition from normal to abnormal epithelium. [23,24] Suspicious lesions detected preoperatively with AS-OCT images may guide for wide surgical excision and cryotherapy.

Study Limitations

The present study has some limitations due to its retrospective nature. In some of the recurrent cases, the first excision was performed elsewhere and the surgical technique and whether a limbal autograft was used or not is unknown. In addition, these cases had a clinical diagnosis of pterygium, but we did not have histopathological examination, so comparison could not be made. In the cases where both excisions were performed in our clinic, histopathological materials were compared, and typical pterygium findings were detected.

Conclusion

Although the risk of malignant transformation of pterygium is not clearly documented, its relationship with sunlight exposure indicates the risk of other malignancies. In addition, as pterygium location is similar and the appearance might mimic OSSN, histopathological examination of all excised pterygium tissue is important to achieve an exact diagnosis and not to overlook an accompanying lesion.

Ethics Committee Approval: The Ege University Ethics Committee granted approval for this study (date: 22.02.2024, number: 24-2.1T/8).

Peer-review: Externally peer-reviewed.

Author Contributions: Concept: S.S., M.E.T., M.P.; Design: S.S., M.E.T., M.P.; Supervision: B.Y., T.A., M.P.; Resource: S.S.; Materials: B.Y., T.A.; Data Collection and/or Processing: S.S., M.E.T., B.Y., T.A., M.P.; Analysis and/or Interpretation: B.Y., M.P.; Literature Search: S.S.; Writing: S.S., M.P.; Critical Reviews: S.S., M.P.

Conflict of Interest: None declared

Use of AI for Writing Assistance: Not declared.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. 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;23:195–228. [CrossRef]
2. Chui J, Coroneo M, Tat L, Crouch R, Wakefield D, Di Girolamo N. Ophthalmic pterygium: a stem cell disorder with premalignant features. Am J Pathol 2011;178:817–27. [CrossRef]
3. Saw S, Tan D. Pterygium: prevalence, demography and risk factors. Ophthalmic Epidemiol 1999;6:219–28. [CrossRef]
4. Gichuhi S, Sagoo M, Weiss H, Burton M. Epidemiology of ocular surface squamous neoplasia in Africa. Trop Med Int Heal 2013;18:1424–43. [CrossRef]
5. Kiire C, Dhillon B. The aetiology and associations of conjunctival intraepithelial neoplasia. Br J Ophthalmol 2006;90:109–13. [CrossRef]
6. Di Girolamo N. Association of human papilloma virus with pterygia and ocular-surface squamous neoplasia. Eye 2012;26:202–11. [CrossRef]
7. Basti S, Macsai M. Ocular surface squamous neoplasia: A review. Cornea 2003;22:687–704. [CrossRef]
8. Hossain R, McKelvie J. Ocular surface squamous neoplasia in New Zealand: a ten-year review of incidence in the Waikato region. Eye (Lond) 2022;36:1567–70. [CrossRef]
9. Chui J, Di Girolamo N, Wakefield D, Coroneo M. The pathogenesis of pterygium: Current concepts and their therapeutic implications. Ocul Surf 2008;6:24–43. [CrossRef]
10. Fernandes AG, Salomão SR, Ferraz NN, Mitsuhiro MH, Furtado JM, Muñoz S, et al. Pterygium in adults from the Brazilian Amazon region: prevalence, visual status and refractive errors. Br J Ophthalmol 2020;104:757–63. [CrossRef]
11. Kaufman SC, Jacobs DS, Lee WB, Deng SX, Rosenblatt MI, Shtein RM. Options and adjuvants in surgery for pterygium: a report by the American Academy of ophthalmology. Ophthalmol 2013;120:201–8. [CrossRef]

12. Quhill H, Magan T, Thaung C, Sagoo M. Prevalence of co-existent neoplasia in clinically diagnosed pterygia in a UK population. Eye (Lond) 2023;37:3757–61. [CrossRef]
13. Sobrinho MVDA, de Souza FB, Neves GL, Zuppi RD, Nutels GS, de Mattos AC. Analysis of the histopathological results of patients submitted to pterygium excision. Pan-American J Ophthalmol 2024;6:1–5. [CrossRef]
14. Mejía L, Zapata M, Gil J. An Unexpected Incidence of Ocular Surface Neoplasia on Pterygium Surgery. A Retrospective Clinical and Histopathological Report. Cornea 2021;40:1002–6. [CrossRef]
15. Bergeron S, Ito H, Dossous YE, Burnier MN. Histopathological Variability and Concomitant Lesions in Pterygium in a Large Case Series. J Ophthalmol 2021;2021:6623794. [CrossRef]
16. Ozsutcu M, Arslan B, Erdur S, Gulkilik G, Kocabora S, Muftuoglu O. Tear osmolarity and tear film parameter with unilateral pterygium. Cornea 2014;33:1174–8. [CrossRef]
17. Kiyat P, Karti O. Evaluation of dry eye in eyes with unilateral pterygium. Eur Eye Res 2023;3:12–5. [CrossRef]
18. Moran D, Hollows F. Pterygium and ultraviolet radiation: A positive correlation. Br J Ophthalmol 1984;68:343–6. [CrossRef]
19. Detorakis E, Sourvinos G, Spandidos D. Detection of herpes simplex virus and human papilloma virus in ophthalmic pterygium. Cornea 2001;20:164–7. [CrossRef]
20. Hill J, Maske R. Pathogenesis of pterygium. Eye (Lond) 1989;3:218–26.
21. Kapoor A, Vempuluru V, Laghimshetty S, Roy A, Sharma S, Mishra D, et al. Ocular Surface Squamous Neoplasia With Coexistent Microbial Keratitis: Incidence, Risk Factors, Clinical Features, Microbiological Profile, and Treatment Outcome. Cornea 2022;41:294–303. [CrossRef]
22. Zhang K, Aurit S, Silberstein P. Racial and socioeconomic disparities in ocular surface squamous neoplasia: a National Cancer Database analysis. Ophthalmic Epidemiol 2022;29:319–27. [CrossRef]
23. Thomas B, Galor A, Nanji A, El Sayyad F, Wang J, Dubovy SR, et al. Ultra high-resolution anterior segment optical coherence tomography in the diagnosis and management of ocular surface squamous neoplasia. Ocul Surf 2014;12:46–58. [CrossRef]
24. Atallah M, Joag M, Galor A, Amescua G, Nanji A, Wang J, et al. Role of high resolution optical coherence tomography in diagnosing ocular surface squamous neoplasia with coexisting ocular surface diseases. Ocul Surf 2017;15:688–95. [CrossRef]