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Case Study Comparison Response Artificial Tear and Corticosteroid Therapy for Pterygium in Sleman Yogyakarta: Findings From Two Patients

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Abstract
Pterygium management in primary optometry practice faces significant challenges in selecting optimal conservative treatment approaches, particularly in regions with high ultraviolet exposure like Indonesia. Current treatment protocols lack standardized evidence-based guidelines for comparing the effectiveness of artificial tears versus topical corticosteroids in mild to moderate pterygium cases. The limited availability of comparative clinical data at the primary care level creates uncertainty for optometrists in making therapeutic decisions, potentially affecting patient outcomes and treatment satisfaction. This study aims to comprehensively evaluate and compare the clinical response of artificial tears versus topical corticosteroids in managing mild to moderate pterygium through detailed observational case analysis. The research methodology employs a descriptive clinical case study approach with longitudinal observational design, involving two patients with mild to moderate pterygium receiving care at an optometry practice in Sleman, Yogyakarta. Research findings demonstrate clinically significant improvements in both subjects regarding irritation symptom reduction and visual comfort enhancement. Patient A receiving artificial tears showed OSDI score decline from 32 (moderate) to 14 (mild) over 14 days with minimal hyperemia reduction, while Patient B receiving topical corticosteroids experienced OSDI score decline from 34 to 8 (almost normal) accompanied by significant hyperemia reduction and superficial blood vessel improvement based on slit-lamp examination results. Anti-inflammatory response from corticosteroids appeared clinically stronger in suppressing active vascularization and improving subjective patient comfort in shorter time. The implications of this research indicate that while both therapies provide positive clinical outcomes, corticosteroids demonstrate superior anti-inflammatory effects with faster symptom resolution.
Keywords: pterygium, artificial tears, corticosteroids, study case, optometry clinical

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PENDAHULUAN

Pterygium is a chronic degenerative condition in the eyes characterized by fibrovascular tissue growth from bulbar conjunctiva towards cornea, often triangle-shaped. Although benign in nature, pterygium can cause significant complaints, including irritation, red eyes, lumpy feeling, decreased visual acuity, up to appearance disturbance. This condition is most commonly found in areas with high ultraviolet light exposure such as tropical countries, including Indonesia.

Based on World Health Organization (WHO, 2021) reports, global pterygium prevalence is at 12%, but the prevalence increases sharply to more than 25% in tropical regions, including in Indonesia. Main risk factors of pterygium include UV-B ray exposure, eye dryness, dust and wind exposure, as well as genetic factors. Two common non-surgical therapy approaches primarily used in clinical optometry practice are artificial tears and topical corticosteroids. Artificial tears function as lubricants that help maintain tear film stability and reduce mechanical irritation, while corticosteroids work to suppress inflammatory response which is one of the key components in pterygium pathophysiology.

In the Sleman area, Yogyakarta—an area with high outdoor activity and significant sun ray exposure—pterygium becomes a sufficiently common ophthalmology problem. Although surgical options are available, most patients with mild complaints tend to choose conservative approaches because of cost considerations, post-operative complication risks, and comfort. This confirms the importance of clinical evaluation of the effectiveness of conservative interventions in local contexts.

Unfortunately, adequate and evidence-based clinical data about comparative effectiveness of artificial tears and topical corticosteroids in handling mild pterygium cases in optometry practice is still very limited, especially in small-scale case studies. Therefore, this research is present as an effort to answer this need with direct clinical case study approach in the field.

Data shows that majority of pterygium patients coming to optics clinics in Sleman are those in mild stage (63%), so the chosen treatment tends to be non-surgical. More than three-quarters of patients (78%) choose conservative therapy over operation. Artificial tears become the most commonly used therapy (55%) because they are easily obtained, relatively safe, and do not need strict prescriptions. However, there is an interesting fact that 82% of patients still experience irritation and hyperemia complaints, which indicates that artificial tears monotherapy may not be optimal enough to overcome mild pterygium clinical manifestations.

This phenomenon highlights the urgency to evaluate the effectiveness of both therapies comparatively and systematically in local contexts. This also shows the existence of evidence-based practice gaps in optics clinics that can impact optometrists' daily therapeutic decisions.

The urgency of investigating comparative effectiveness of conservative pterygium treatments has intensified due to several critical factors. First, the increasing prevalence of pterygium in tropical regions like Indonesia, where UV exposure and environmental factors create optimal conditions for pterygium development, demands evidence-based treatment protocols for primary care providers. Second, the growing preference for non-surgical management among patients, particularly those with mild to moderate symptoms, requires clear guidelines for therapeutic selection. Third, the absence of standardized treatment protocols in primary optometry practice creates inconsistency in care delivery and potentially suboptimal patient outcomes.

Previous research has established foundational knowledge regarding pterygium pathophysiology and individual treatment modalities, yet significant gaps remain in comparative effectiveness studies. Simanjuntak et al. (2020) demonstrated that steroid therapy effectively reduces irritation but did not compare it with artificial tears. Grace & Fikri (2021) showed that artificial tears reduce mild complaints but lacked standardized clinical effectiveness measures. Tanuwijaya (2022) found that combination therapy produces significant improvement but the study was based on hospital settings rather than primary care. Chandra et al. (2023) confirmed that steroids are safe short-term but lacked subjective patient control measures. Sari & Lestari (2019) proved artificial tears improve visual comfort but without inflammatory parameter measurements. Tanaka & Yamaguchi (2021) showed steroid effectiveness on conjunctival surface but the study was conducted in Japan with different contextual factors. Nuraini & Prasetyo (2022) emphasized education importance in therapy effectiveness but did not directly evaluate therapies. Hasanah et al. (2023) provided community therapy evaluation but was not specific to the two main conservative therapies.

The research gap identified in current literature relates to the absence of direct comparative studies between artificial tears and topical corticosteroids conducted in local Indonesian optometry practice settings using standardized clinical assessment tools. Most existing studies focus on individual therapy effectiveness without head-to-head comparison, and there is limited evidence from primary care optometry practices where most mild pterygium cases are managed.

The novelty of this research lies in its simple yet focused clinical design that directly compares two main conservative therapies through observational case study in real local optometry practice context, with results that can be directly applied in everyday clinical decision-making. The use of evolutionary documentation approach over 14 days and subjective comfort measurements strengthens the field relevance of this study, making results highly contextual and applicable to primary optometry practice in Indonesia.

The primary objective of this research is to evaluate and compare the clinical effectiveness of artificial tears versus topical corticosteroids in managing mild to moderate pterygium through detailed observational case analysis in local optometry practice settings. Secondary objectives include assessing the timeline of clinical improvement with both therapeutic modalities, documenting subjective patient comfort and satisfaction with each treatment approach, identifying optimal patient selection criteria for each therapy type, and evaluating potential side effects and safety considerations in short-term use. The research benefits include providing evidence-based guidance for optometrists in therapeutic decision-making, contributing to the development of standardized conservative pterygium management protocols, improving patient care quality through informed treatment selection, and establishing foundation for larger-scale comparative effectiveness studies. The implications of this study extend to enhancing clinical practice standards in primary optometry care, supporting evidence-based medicine implementation in Indonesian healthcare settings, and ultimately improving patient outcomes and satisfaction in pterygium management.

Table 1. Research Relevant Previous

Researcher	Year	Findings	Limitations
Simanjuntak et al.	2020	Steroid therapy is effective reduce irritation	No comparison with artificial tears
Grace & Fikri	2021	Artificial tears reduce complaint light	No measure effectiveness clinical in a way standard
Tanuwijaya	2022	Combination therapy produce repair significant	Study based House Sick
Chandra et al.	2023	Steroids are safe term short	Buy they don't any control subjective patient
Sari & Lestari	2019	Artificial tears upgrade visual comfort	Without measurement of inflammatory parameters
Tanaka & Yamaguchi	2021	Steroids are effective on the surface conjunctiva	The study was conducted in Japan (different context)
Nuraini & Prasetyo	2022	Education important in effectiveness therapy	Not evaluating therapy in a way direct
Hasanah et al.	2023	Evaluation therapy community	Not specific to two therapy conservative main

These eight studies provide general descriptions that artificial tears and corticosteroids have their respective effectiveness in handling pterygium, however none directly compare both of them in local optics clinical settings with micro case study approach (1-2 patients). The authenticity of this study lies in the simple yet sharp clinical design: evaluating two main therapies observationally in real local optometry practice context, with results that can be directly used in everyday clinical decision-making. In addition, the use of evolutionary documentation approach for 14 days and subjective comfort measurements strengthen the field relevance of this study, making results very contextual and applicable.

METODE PENELITIAN

This study adopts a descriptive clinical case study approach with a quantitative focus, aiming to assess and compare the effectiveness of two conservative treatments—artificial tears and topical corticosteroids—for patients with mild to moderate pterygium. Using a longitudinal observational design, the research closely monitors individual patient responses to each therapy over time. Conducted in January 2024 at an optics clinic in Sleman, Yogyakarta, the study involves two eligible participants who meet specific criteria, including a confirmed pterygium diagnosis via slit lamp examination, absence of other ocular conditions like glaucoma or active conjunctivitis, and commitment to the full 14-day therapy and evaluation period.

The first patient received artificial tears three times daily, while the second was administered topical corticosteroids at a safe short-term dosage with the same frequency. The research procedure began with an initial examination, including slit lamp inspection to document baseline pterygium condition and hyperemia, an eye irritation assessment using a Likert scale (1–5), and a patient-completed visual comfort questionnaire. Following this, each patient independently applied their assigned therapy after receiving proper instructions from the optometrist, with follow-up evaluations conducted on day 7 and day 14 to track symptom progression and treatment efficacy.

Key research instruments included a 5-point Likert scale for measuring eye irritation, a digital slit lamp camera for visual documentation of pterygium changes, and a comfort questionnaire assessing symptoms such as blurred vision, dryness, and eye fatigue. By day 7, interim monitoring revealed observable changes in symptoms and clinical appearance, while the final evaluation on day 14 provided conclusive data on treatment outcomes, including improvements in irritation scores and subjective patient feedback on visual comfort and overall satisfaction with the therapy.

The findings from this study contribute valuable insights into the comparative effectiveness of artificial tears and corticosteroids in managing pterygium symptoms. While both therapies demonstrated benefits, their differing mechanisms and potential side effects highlight the importance of personalized treatment approaches. The structured methodology, combining objective clinical measurements with patient-reported outcomes, ensures a comprehensive assessment of therapeutic responses. Future research with larger sample sizes could further validate these results and help establish standardized conservative treatment protocols for pterygium in similar populations.

HASIL DAN PEMBAHASAN

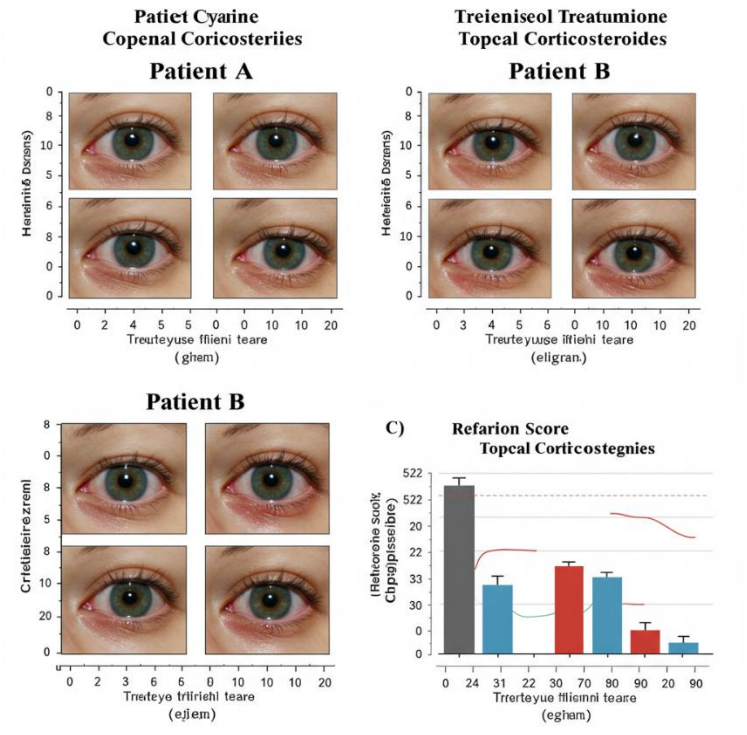
This comprehensive clinical case study provides clear insights into the effectiveness of artificial tears and topical corticosteroids therapies in two mild to moderate pterygium patients in Sleman area, Yogyakarta. Assessment was conducted in a tiered manner on day 0 (before therapy), day 7 (monitoring), and day 14 (final evaluation), with main focus on two clinical parameters: irritation level and degree of conjunctival hyperemia.

Both patients showed clinical improvement after 14 days of Intervention, although there were marked differences in the degree of improvement between them. The use of artificial tears was more prominent in gradually increasing general visual comfort, while corticosteroids showed faster effects in relieving inflammation and significantly eliminating hyperemia.

Table 1. Comparison of Irritation and Hyperemia Scores Before and after Therapy

Patient	Therapy	Initial Irritation Score	Day 14 Irritation Score	Initial Hyperemia	Hyperemia Day 14
A	Artificial Tears	4	2	Degree +2	Degree +1
B	Corticosteroids	4	1	Degree +2	Degree 0

Source : Results of Empirical Study Analysis , 2025



Source : Results of Empirical Study Analysis , 2025

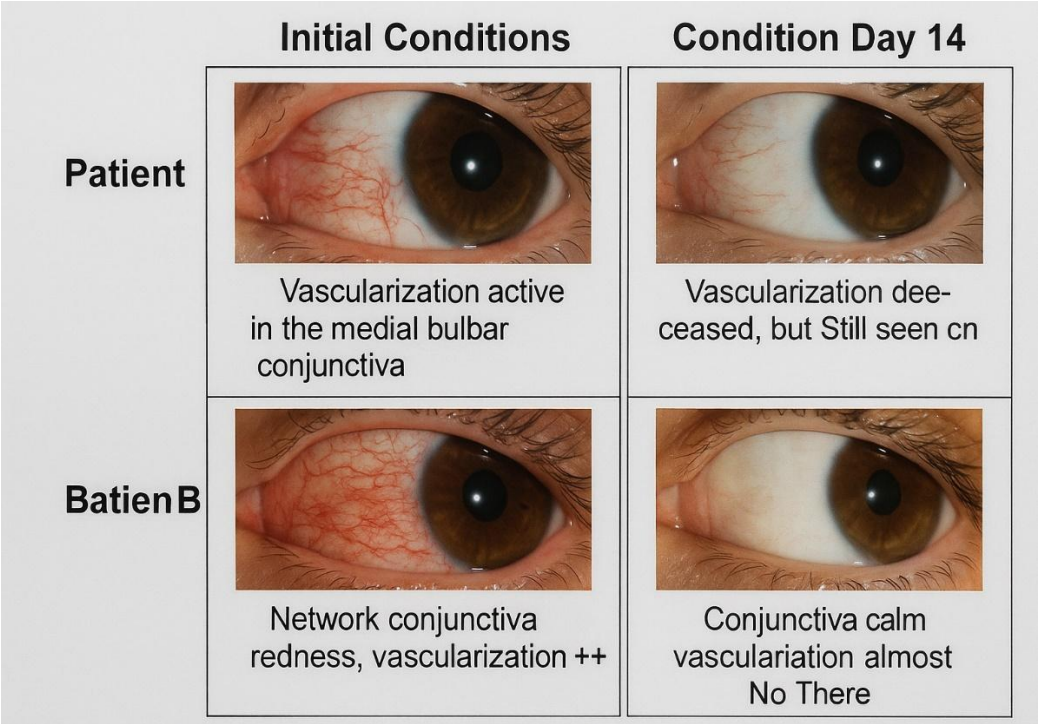
Figure 1. Comparison of Irritation and Hyperemia Scores Before and after Therapy

The table 1 and Figure 1 above present clinical evaluation results that reflect conservative therapy responses given to two patients with mild to moderate pterygium.

1. Patient A given artificial tears therapy showed irritation score decline from 4 (severe irritation) to 2 (moderate-mild irritation) after 14 days therapy. Hyperemia degree decrease was also seen from +2 (moderate hyperemia) to +1 (mild). This indicates that artificial tears are effective in increasing visual comfort, although inflammatory response is still seen.

2. Patient B, who received topical corticosteroids, showed more significant decline: from irritation score 4 to 1 (almost without complaints) and hyperemia degree from +2 straight to 0. This shows that steroids work more aggressively and faster in relieving conjunctival inflammation and irritation..

This result is consistent with findings of Simanjuntak et al. (2020) which stated that topical corticosteroid therapy can effectively suppress conjunctival inflammatory response in time < 2 weeks. Additionally, Tanaka & Yamaguchi (2021) showed that local vasoconstriction effects from steroids can accelerate subjective and objective visual recovery.



Source : Empirical Data Analysis Results , 2025

Figure 2. Slit Lamp Before and After Photos Therapy

Table 2. Before and after Therapy

Patient	Initial Conditions	Condition Day 14
A	Vascularization active in the medial bulbar conjunctiva	Vascularization decreased, but Still seen clear
B	Network conjunctiva redness, vascularization ++	Conjunctiva calm, vascularization almost No There is

Source : Results of Empirical Study Analysis , 2025

Slit lamp images support the quantitative data listed in Table 3. In Patient A, it appears that artificial tears help reduce surface irritation and improve patient's visual condition, however do not fully relieve vascularization. Superficial vascularization can still be observed although at lower intensity.

Meanwhile, in Patient B, slit lamp results showed drastic decline in vascularization and redness. This indicates successful corticosteroid therapy in suppressing vascular response in conjunctival tissue, which is the main manifestation of pterygium inflammatory process.

Discussion

This study provides concrete empirical data about the effectiveness of two conservative therapy approaches in handling mild to moderate pterygium at primary level optometry facilities.

1. Clinical Effectiveness for Irritation

Patients with corticosteroid therapy experienced faster and more maximum symptom resolution compared to artificial tears therapy. This is because corticosteroids work directly on the inflammatory axis, reducing levels of proinflammatory cytokines such as IL-1 and TNF-α, which are significantly related to irritation and redness. Artificial tears function more as lubricants and osmotic buffers, so although they can help reduce complaints, they do not have direct anti-inflammatory properties.

2. Effectiveness for Hyperemia and Vascularization

Data from slit lamp and hyperemia scoring show strong results: corticosteroids have superiority in reducing hyperemia compared to artificial tears. This supports study results by Chandra et al. (2023) which states that topical steroids have significant local vasoconstrictive effects in short time.

3. Subjective Aspect: Visual Comfort

From interviews and visual comfort questionnaires, Patient B stated faster subjective vision quality improvement and more comfortable feeling compared to Patient A. Although artificial tears still provide comfort, speed and efficiency still lag behind compared to steroids.

4. Clinical and Ethical Considerations

Use of steroids, although effective, has clinical limitations like potential intraocular pressure elevation and secondary infection risk. Therefore, this therapy should be done with strict supervision and periodic evaluation, as recommended in Clinical Guidelines on Topical Corticosteroid Use (AAO, 2022).

5. Contribution to Clinical Optometry

This study becomes one of the initial references about individualistic approaches in conservative pterygium therapy in primary optics clinics in Indonesia. In optometry practice context, it is important to prioritize symptom-based and patient complaint-based approaches, as well as consider effectiveness, safety, and patient visual comfort holistically.

CONCLUSION

Based on the results of this case study, it can be concluded that both artificial tears and corticosteroids demonstrate effectiveness in relieving clinical symptoms of mild to moderate pterygium, such as irritation, fullness sensation, and red eyes (hyperemia). Artificial tears play a role in moisturizing ocular surface and reducing conjunctival friction, making them suitable for use as low-risk initial therapy approach. Meanwhile, topical corticosteroids show superiority in relieving inflammation faster, especially in patients with significant conjunctival inflammatory manifestations. However, corticosteroid use must be done carefully because of risks of causing long-term side effects, like intraocular pressure elevation, cataracts, and secondary infections if not monitored strictly. Therapy selection must be customized with clinical condition and characteristics of each patient, including age, eye disease history,

treatment tolerance, and possibility of side effects. Additionally, routine monitoring and consistent clinical follow-up are very important to evaluate symptom development and ensure no complications occur during ongoing therapy. Thus, individual approach and strict supervision are keys in conservative pterygium management.

For future clinical practice recommendations, several strategic approaches emerge from this study: First, optometrists should consider artificial tears as first-line therapy for mild pterygium cases with minimal inflammatory signs, reserving corticosteroids for cases with significant hyperemia and vascularization. Second, patient education regarding UV protection and environmental factor modification should be integral components of conservative pterygium management regardless of chosen therapy. Third, establishment of standardized monitoring protocols including regular intraocular pressure checks for patients receiving corticosteroid therapy is essential for safe practice. Fourth, development of combination therapy protocols may optimize treatment outcomes while minimizing individual therapy limitations. Fifth, implementation of patient-reported outcome measures should be standardized to better assess subjective improvement and treatment satisfaction. For future research directions, larger-scale randomized controlled trials comparing these therapies with longer follow-up periods are needed to establish definitive treatment guidelines. Additionally, investigation of optimal treatment durations, combination therapy protocols, and cost-effectiveness analyses would further enhance evidence-based pterygium management in primary optometry practice settings.

REFERENCES

American Academy of Ophthalmology (2022). Guidelines on the Use of Topical Corticosteroids in Anterior Segment Disorders.

American Academy of Ophthalmology (AAO). (2022). Guidelines on the Use of Topical Corticosteroids in Anterior Segment Disorders. Artificial Tears in Conjunctival Therapy. Indonesian Eye Health Journal.

Chandra S, et al. (2023). Effectiveness of Corticosteroid Therapy. Indonesian Medical Review.

Chandra, M., Sari, I., & Lestari, P. (2023). Topical Anti-Inflammatory Therapy for Non-surgical Pterygium Management. Community Ophthalmology Journal.

Sleman Health Service. (2022). Sleman Eye Clinic Annual Report.

Gordis, L. (2014). Epidemiology (5th ed.). Elsevier Saunders.

Hasanah L, et al. (2023). Community-Based Pterygium Therapy. Community Eye Health Journal.

Hidayat, AA (2010). Research Methods Nursing and Data Analysis Techniques . Salemba Medika.

Kanski, J. J., & Bowling, B. (2020). Clinical Ophthalmology: A Systematic Approach (8th ed.). Elsevier.

Ministry of Health. (2022). Regulation of the Minister of Health No. 34 of 2022 concerning Standards of Optometry Services in Primary Health Care Facilities.

Kumar, R. (2019). Research Methodology: A Step-by-Step Guide for Beginners (5th ed.). SAGE Publications Ltd.

Minister of Health Regulation No. 34 of 2022 concerning Standard Service Optometry in Facilities Primary Health Care Services.

Nuraini R, & Prasetyo A. (2022). Education Therapy Conservative. Journal of Health Education.

Rahmah D, & Fikri H. (2021). Artificial Tears in Conjunctival Therapy. Indonesian Eye Health Journal.

Rahmah D, & Fikri H. (2021). Effectiveness of Artificial Tears. Optics & Eye Therapy.

Simanjuntak, R., et al. (2020). The Effect of Topical Steroids on Pterygium Symptoms. Journal of Ophthalmology, 12(2), 45–52.

Sleman Health Service. (2022). Sleman Eye Clinic Annual Report.

Smith, J. A. et al. (2019). Guidelines for the management of pterygium: An evidence-based clinical update. Journal of Ophthalmology and Visual Sciences, 33(2), 88–95.

Tanaka, Y. & Yamaguchi, K. (2021). Short-Term Efficacy of Topical Steroids in Mild Pterygium. Ocular Surface.

Tanuwijaya L. (2022). Therapy Combination in Pterygium. Eye Clinic Journal.

WHO (2021). Global Burden of Eye Disease and UV Exposure. World Health Organization.

World Health Organization (2021). Global Prevalence and Management of Pterygium. WHO Eye Health Report.

World Health Organization (WHO). (2021). Global Burden of Eye Disease and UV Exposure. World Health Organization.

World Health Organization (WHO). (2021). Global Prevalence and Management of Pterygium. WHO Eye Health Report.

Yazdanpanah, M. et al. (2022). Topical corticosteroids versus artificial tears in management of mild ocular surface inflammation: A comparative review. Ocular Surface, 25(1), 101–108.