A CASE SERIES OF SUBCONJUNCTIVAL TRIAMCINOLONE ACETONIDE INJECTION FOR THE TREATMENT OF UPPER EYELID RETRACTION IN THYROID EYE DISEASE

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This study aimed to descriptively assess changes in eyelid position, disease activity, and ocular surface parameters following subconjunctival triamcinolone acetonide (80 mg/2 mL) injection in patients with upper eyelid retraction associated with thyroid eye disease. A case series was conducted on patients treated at Hanoi Medical University Hospital from October 2024 to October 2025. A total of 10 patients and 13 eyes were analyzed; 70.0% of patients had unilateral involvement, while 30.0% presented with bilateral disease. All patients were in a euthyroid state and were maintained on Thyrozol 5-10 mg/day. The mean number of injections was 1.8 ± 0.79. The mean CAS decreased from 2.00 ± 0.89 to 1.36 ± 1.02, and the mean MRD1 decreased from 6.99 ± 1.92 mm to 4.32 ± 1.18 mm following treatment. Favorable clinical outcomes were achieved in 70.0% of patients, 20.0% demonstrated moderate improvement, and 10.0% did not reach the expected therapeutic response. Disease duration and pre-injection severity of eyelid retraction were associated with treatment outcomes. There was no complication reported, except for one case of subcutaneous drug deposition, which resolved spontaneously within one month of follow-up.

Keywords: Thyroid eye disease, Graves' ophthalmopathy, upper eyelid retraction, triamcinolone acetonide.

I. INTRODUCTION

Upper eyelid retraction represents one of the earliest and most defining clinical manifestations of thyroid eye disease, with a reported prevalence of up to 90% among affected individuals.[1] This abnormal eyelid position results in a broad range of functional disturbances, including ocular surface irritation, exposure-related symptoms, and visual instability.[2,3] Beyond functional impairment, upper eyelid retraction imposes considerable aesthetic consequences, contributes to psychosocial distress, and leads to a measurable decline in quality of life. If inadequately managed, the condition may progress, predisposing patients to corneal exposure, persistent visual dysfunction, and, in advanced cases, irreversible vision loss. These considerations underscore the necessity of timely therapeutic intervention to mitigate disease progression and preserve visual function.[2]

Current therapeutic strategies for upper eyelid retraction encompass both surgical and medical modalities. Surgical correction is widely recognized for its ability to restore eyelid positioning and improve both functional and cosmetic outcomes. Nevertheless, eyelid-

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lowering procedures are generally reserved for the inactive phase of thyroid eye disease and are typically undertaken only after orbital decompression and strabismus surgery, as well as after the patient has demonstrated a stable euthyroid state for a minimum of six months. Performing surgery during the active inflammatory phase is associated with an elevated risk of recurrence, limiting its applicability in this stage. Consequently, medical therapy remains the preferred approach during active disease.[4]

Medical management includes systemic and local pharmacologic interventions. Systemic corticosteroids administered orally or intravenously may attenuate inflammation; however, their use is constrained by the potential for significant systemic and ocular adverse effects, particularly with high-dose or prolonged regimens.[5] Therefore, the decision to initiate systemic therapy requires careful patient selection and coordinated, multidisciplinary supervision. Local therapeutic options, such as botulinum toxin A, may yield temporary improvement in eyelid position across various disease stages, yet their effects are transient and may induce complications such as ptosis or diplopia, thereby limiting their long-term utility.[6]

Triamcinolone acetonide, a long-acting corticosteroid, has emerged as a promising local treatment modality. Subconjunctival administration allows for targeted anti-inflammatory activity in the Müller muscle, levator palpebrae superioris, and conjunctiva while minimizing systemic exposure.[6] Prior investigations by Lee et al. (2013) and Xu et al. (2018) have demonstrated reductions in eyelid retraction severity and ocular inflammatory activity following subconjunctival triamcinolone acetonide injection. Despite these benefits, this approach requires vigilant monitoring of intraocular pressure due to the risk of steroid-induced ocular hypertension, in addition to the possibility of transient ptosis or diplopia.[7,8]

Upper eyelid retraction in thyroid eye disease may demonstrate spontaneous fluctuation or partial improvement over time, particularly as inflammatory activity subsides or thyroid function stabilizes. This natural disease course must be taken into account when interpreting outcomes from uncontrolled observational studies.

Published data on subconjunctival triamcinolone acetonide injection for upper eyelid retraction in Vietnamese patients are limited. Therefore, the present exploratory case series aimed to descriptively assess clinical changes in eyelid position, disease activity, and ocular surface parameters following this treatment.

II. PATIENTS AND METHODS

1. Patients

This was a case series. Ten patients diagnosed with upper eyelid retraction due to thyroid eye disease who presented to Hanoi Medical University Hospital between October 2024 and October 2025 were enrolled in the study.

Inclusion criteria

Patients diagnosed with upper eyelid retraction due to thyroid eye disease in one or both eyes; patients not receiving systemic corticosteroid therapy at the time of enrollment; patients aged >18 years old.

Exclusion criteria

Patients with upper eyelid retraction from non-thyroid-related causes; patients with severe complications of thyroid eye disease; history of eyelid surgery or prior ocular trauma; history of hypersensitivity or contraindication

to corticosteroids; patients with uncontrolled systemic diseases.

2. Methods

All patients underwent a comprehensive baseline evaluation, including medical, family, and allergy history. Each patient received a full ophthalmic examination consisting of best-corrected visual acuity assessment, intraocular pressure measurement, and exophthalmometry using a Hertel exophthalmometer. Disease activity was assessed using the Clinical Activity Score (CAS). A slit-lamp biomicroscopic examination was performed. Fluorescein staining was performed to assess corneal integrity and tear break-up time (TBUT). Upper eyelid measurements, including Marginal Reflex Distance 1 (MRD1) and Palpebral Fissure Height (PFH), were obtained using standardized clinical photographs and analyzed with the ImageJ software. The treatment outcome of subconjunctival triamcinolone acetonide injection (80 mg/2 ml) was evaluated based on the following parameters: MRD1, ΔMRD1, ΔPFH, ΔCAS, TBUT, corneal status, and patient satisfaction. Subconjunctival triamcinolone acetonide injection was performed under sterile conditions by one ophthalmologist. After topical anesthesia with 0.5% proparacaine hydrochloride, triamcinolone acetonide (80 mg/2 mL) was injected into the superior bulbar conjunctiva, approximately 2-3 mm above the upper border of the tarsal plate, targeting the region of the Müller muscle. A 27-gauge needle was used to deliver 0.5-0.8 mL per injection, depending on the severity of eyelid retraction.

Gentle pressure was applied after injection to minimize reflux and subconjunctival drug deposition. Repeat injections were performed at intervals of 4-6 weeks based on clinical response, with a maximum of three injections per eye. The relatively short follow-up period may have limited the number of repeat injections administered in this series. With longer observation, additional injections might have been required to maintain or enhance clinical improvement. Treatment outcomes were categorized as good, moderate, or poor based on predefined changes in MRD1, PFH, and CAS, combined with patient-reported symptom improvement, including tear break-up time, corneal status, and patient satisfaction. Good and moderate outcomes were considered treatment success, while poor outcomes were defined as treatment failure. These categories were used for descriptive analysis only and were not considered a binary measure of treatment success. All patients were followed up at 1 week, 1 month, and 3 months after injection. At each visit, clinical examination and intraocular pressure measurement were performed to monitor treatment response and potential steroid-related adverse effects.

Statistical analysis

Collected data were entered and analyzed using SPSS Statistics version 20. Quantitative variables were analyzed to assess changes in clinical parameters over time. Quantitative variables were summarized using mean ± standard deviation. Changes in clinical parameters before and after treatment were analyzed using the Wilcoxon signed-rank test to compare pre- and post-treatment values. Outcomes were analyzed per eye rather than per patient, which may introduce intrasubject correlation; this was not statistically adjusted due to the exploratory nature and small sample size of the study. Statistical analyses were exploratory, and results were interpreted with caution.

3. Research ethics

This study was conducted with the approval of the leadership of the Department

of Ophthalmology, Hanoi Medical University Hospital. Research findings were reported accurately and transparently to the institutional scientific committee. All patient information, clinical data, and images were kept confidential, and written informed consent for participation and data use was obtained from patients.

III. RESULTS

The study included 10 patients with upper eyelid retraction due to thyroid eye disease, consisting of 2 males and 8 females. Patient age ranged from 28 to 59 years old, with a mean age of 42.3 ± 8.92 years old. All patients were receiving antithyroid therapy with Thyrozol 5-10 mg/day at the time of triamcinolone acetonide administration. Seven of the 10 patients presented with unilateral involvement, whereas three exhibited bilateral involvement. The mean number of injections was 1.8 ± 0.79. None of the patients had a history of smoking, and no allergic reaction was documented in the medical records.

Following subconjunctival injection of triamcinolone acetonide 80 mg/2 ml, the clinical parameters demonstrated significant improvement. Most patients were in the early active phase of thyroid eye disease, as reflected by baseline CAS values. The mean CAS decreased from 2.00 ± 0.89 to 1.36 ± 1.02 ($p = 0.007$). MRD1 in the 13 affected eyes decreased from 6.99 ± 1.92 mm to 4.32 ± 1.18 mm ($p = 0.0001$). PFH also significantly decreased from 13.81 ± 1.28 mm to 10.58 ± 1.13 mm ($p = 0.009$). Corneal inflammation was assessed using slit-lamp biomicroscopy and fluorescein staining and categorized qualitatively as improved, unchanged, or worsened compared with baseline. Patient satisfaction was evaluated at the final follow-up visit using a subjective three-point scale (very satisfied, satisfied, not satisfied). Ocular surface parameters showed variable improvement. Tear break-up time increased in 7 of 10 patients, while corneal status improved in 6 patients and remained unchanged in the remaining cases. Patient satisfaction was high, with most participants reporting being very satisfied with the treatment outcome at the final follow-up visit. Regarding safety, no serious ocular or systemic adverse event were observed during the follow-up period. Specifically, there were no case of increased intraocular pressure, ptosis, diplopia, infection, or deterioration in visual acuity. Intraocular pressure was measured at each follow-up visit, and no steroid-induced ocular hypertension was observed during the study period. Only one case of subconjunctival drug deposition occurred and resolved spontaneously within one month.

Individual patient outcomes, including changes in MRD1, CAS, PFH, ocular surface findings, and overall outcome classification, are summarized in Table 1. Representative clinical photographs demonstrating changes in eyelid position over time are presented in Figure 1.

Table 1. Treatment outcomes following injection

Patient	Post-injection MRD1 (mm)	ΔMRD1 (mm)	ΔCAS (points)	ΔPFH (mm)	Post-injection TBUT (seconds)	Corneal inflammation	Patient satisfaction	Overall outcome
1	3,81	2,98	1	3,53	Increased	No change	Very satisfied	Good
2	3,37	3,18	1	3,2	Increased	Decreased	Very satisfied	Good
3	3,82	3,26	0	3,47	Increased	Decreased	Very satisfied	Good
4	6,17 6,73	4,9 4,66	0	7,48 6,47	Increased	Decreased	Very satisfied	Good
5	3,03	3,49	1	3,48	Increased	Decreased	Very satisfied	Good
6	3,59	3,77	1	3,79	Increased	Decreased	Very satisfied	Good
7	6,04	0,24	0	0,1	No change	No change	Very satisfied	Poor
8	3,89	2,52	1	1,79	No change	No change	Very satisfied	Moderate
9	3,94 3,92	1,42 1,47	1	1,48 1,9	No change	No change	Very satisfied	Moderate
10	3,94 3,92	1,42 1,47	1	2,55 2,77	Increased	Decreased	Very satisfied	Good

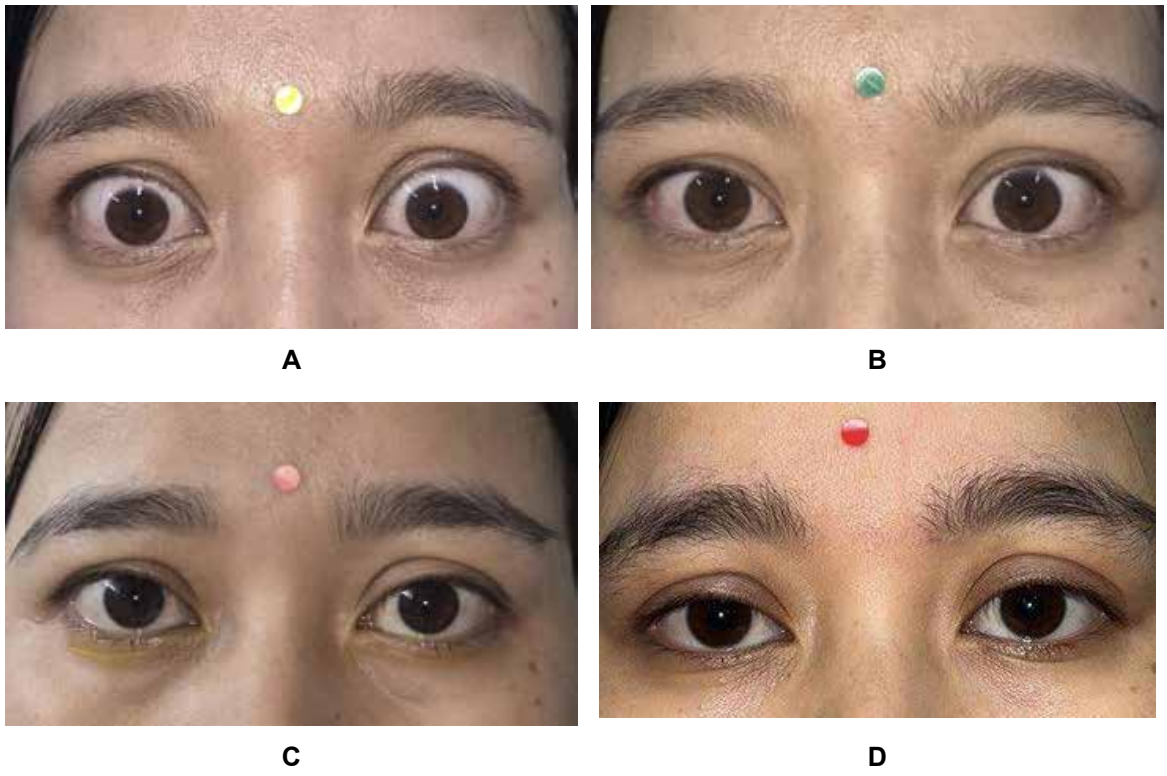

Figure 1. Patient 4 before and after injection in primary gaze

A. Before the first injection; B. One week after the first injection;

C. One month after the third injection; D. Three-month follow-up

IV. DISCUSSION

Subconjunctival triamcinolone acetonide injection was associated with short-term improvement in upper eyelid position and inflammatory activity in patients with thyroid eye disease, particularly during the early active phase. These findings suggest a potential role for local corticosteroid therapy as a minimally invasive option in selected patients, especially within the first months of disease onset.

In the present case series, the mean CAS significantly decreased from 2.00 ± 0.89 to 1.36 ± 1.02 ($p = 0.007$), indicating an improvement in active inflammatory status following local triamcinolone acetonide injection.

This finding is consistent with previous research. Hamed-Azzam et al. (2015) reported a reduction in CAS from 3.81 ± 1.80 to 0.63 ± 0.72 after six months of treatment ($p < 0.0001$).[9]

After treatment, the mean MRD1 decreased from 6.99 ± 1.92 mm to 4.32 ± 1.18 mm ($p = 0.0001$). The mean change in ΔMRD1 among affected eyes was 2.68 ± 1.40 mm ($p = 0.0001$). Similarly, Xu et al. (2012) reported a significant reduction in mean MRD1 from 6.39 ± 1.51 mm to 5.60 ± 1.65 mm after one month and 4.20 ± 1.98 mm at the final follow-up ($p = 0.001$).[10]

These findings support the hypothesis that local corticosteroid administration may influence

periocular inflammatory processes contributing to eyelid retraction.

In addition to changes in eyelid position and inflammatory activity, improvement in ocular surface-related symptoms was noted. Increased tear break-up time and improvement in corneal status were observed in a proportion of patients, suggesting enhanced tear film stability and reduced exposure-related discomfort. These observations are consistent with prior reports indicating that reduction in eyelid retraction may secondarily improve ocular surface integrity.[11]

However, the observed clinical improvements should be interpreted with caution. Several alternative explanations may have contributed to the outcomes, including the natural course of thyroid eye disease, which may demonstrate spontaneous fluctuation or partial regression over time, placebo effects associated with interventional treatment, and stabilization under concurrent antithyroid therapy. In the absence of a control group, a direct causal relationship between subconjunctival triamcinolone acetonide injection and clinical improvement cannot be definitively established.

This study has several important limitations. First, the small sample size (n = 10) and descriptive case series design limit the generalizability of the findings and preclude robust statistical inference. Second, the relatively short follow-up period restricts assessment of long-term efficacy, recurrence of eyelid retraction, and the potential need for subsequent surgical intervention. Third, although no cases of increased intraocular pressure or other steroid-related complications were observed, systematic long-term monitoring for adverse effects such as steroid-induced ocular hypertension was not performed and remains an important consideration.

Despite these limitations, this case series provides preliminary clinical data supporting the potential role of subconjunctival triamcinolone acetonide injection as an adjunctive treatment for upper eyelid retraction in the active phase of thyroid eye disease. Future studies with larger sample sizes, standardized treatment protocols, longer follow-up, and controlled comparative designs are necessary to clarify its long-term efficacy, safety profile, and appropriate clinical indications.

V. CONCLUSION

This study of 10 patients with upper eyelid retraction due to thyroid eye disease at Hanoi Medical University Hospital showed a predominance of females (male-to-female ratio 2:8), with a mean age of 42.3 ± 8.92 years old. Most patients presented with unilateral involvement (70%) and common symptoms such as eyelid retraction, foreign-body sensation, tearing, and dryness. After subconjunctival triamcinolone acetonide injection, clinical parameters improved significantly: the mean CAS decreased from 2.00 ± 0.89 to 1.36 ± 1.02, MRD1 decreased from 6.99 ± 1.92 mm to 4.32 ± 1.18 mm, and PFH decreased from 13.81 ± 1.28 mm to 10.58 ± 1.13 mm. Treatment outcomes were favorable in 70% of patients, moderate in 20%, and unsatisfactory in 10%. Disease duration and baseline MRD1 were associated with treatment response, whereas sex, age, pre-injection CAS, number of injections, and degree of proptosis showed no significant relationship. The procedure demonstrated good safety, with no major complication observed; only one case of subcutaneous drug deposition occurred and resolved spontaneously within one month.

Associations between shorter disease duration, baseline severity of eyelid retraction, and treatment response were observed; however, these findings should be considered preliminary and exploratory, given the small sample size and uncontrolled study design.

No definitive conclusion regarding treatment efficacy, long-term safety, or predictors of response can be drawn from this series.

The procedure was generally well tolerated over the short follow-up period, with no serious ocular or systemic adverse events documented. Nevertheless, the absence of long-term monitoring and the lack of systematic evaluation for steroid-related complications, such as ocular hypertension, limit the assessment of safety.

Overall, the findings suggest that subconjunctival triamcinolone acetonide injection may represent a potentially useful adjunctive treatment for upper eyelid retraction in selected patients with thyroid eye disease during the active phase. However, recommendations for routine clinical use cannot be made on the basis of this study alone. Larger, well-designed prospective studies with standardized protocols, control groups, and extended follow-up are required to clarify its long-term efficacy, safety profile, and clinical role.

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