

## A STUDY ON THE EFFICACY OF INTRAORBITAL STEROIDS IN TREATING PROPTOSIS DUE TO NON-THYROID INFLAMMATORY CAUSES

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### Abstract

**Background:** Proptosis is a common condition which is encountered both in thyroid and non-thyroid disorders. The indicated treatment for an inflammatory proptosis is generally corticosteroids, but this has a serious of systemic side effects. This study focuses on the efficacy of intraorbital triamcinolone acetonide for a patient with non- thyroid inflammatory proptosis and also reducing the systemic side effects significantly. **Materials and Methods:** 5 patients with the diagnosis of non-thyroid inflammatory proptosis with the clinical and radiological confirmation of the disease were included in this prospective interventional study. All patients in this study received intraorbital triamcinolone acetonide (40 mg/ml). A maximum of three doses was given for each patient, with the decision to repeat the dose based on the clinical response. Proptosis measurement using two ruler method and Hertel's exophthalmometer and signs of inflammation were assessed both before and after treatment. **Result:** Complete resolution of proptosis was noted in all the patients, with variable periods of resolution. Three patients showed resolution with a single injection, while the other two required additional doses. Improvement in visual acuity and extraocular movements were observed in almost all cases along with the improvement of inflammatory signs. **Conclusion:** Intra orbital triamcinolone injections are a promising and effective treatment for non-thyroid inflammatory proptosis, with minimal systemic side effects. This treatment may be considered as a first-line option in selected cases, but larger studies are recommended to further evaluate the safety issues with these injections.

## INTRODUCTION

Proptosis is a passive protrusion of the eyeball classically seen in retro orbital space occupying lesions. It can be unilateral or bilateral. It can be caused by a variety of pathologies, most common cause being thyroid eye disease (TED). Causes of inflammatory proptosis other than thyroid orbitopathy include: Inflammation of orbital tissue (pseudotumor, Ig-G 4 disease, Inflammation of lacrimal gland (Dacryoadenitis) and inflammation of paranasal sinuses and eyelids. It causes functional and cosmetic issues for the patient. In some patients, it can be vision threatening due to optic neuropathy or exposure keratopathy.<sup>[1-3]</sup>

Due to the underlying inflammatory process, the treatment of non- thyroid inflammatory proptosis becomes a challenged one. Systemic corticosteroids possess broad anti-inflammatory effects and they are the first line drugs for this condition. However, long

term or repeated usage of systemic steroids can lead to significant side effects, including hyperglycemia, hypertension, weight gain, and immune suppression, which may not be well-tolerated by all patients. For this reason, localized treatment approaches like intra orbital corticosteroid injections, have gained attention as an alternative to minimize the systemic side effects by specifically targeting the orbital inflammatory site.<sup>[4,5]</sup>

Triamcinolone acetonide is a corticosteroid with potent anti-inflammatory and anti-permeability properties. It has been used successfully in various localized inflammatory conditions, including periocular, intraocular treatment for retinal vascular diseases, in the treatment of uveitis and also orbital inflammations. Delivering triamcinolone acetonide directly into the orbit, helps to achieve high local concentrations. Thus orbital inflammation is reduced without subjecting the patient to the systemic corticosteroid therapy and the serious side effects

caused by it. This study focuses on the efficacy of intraorbital triamcinolone acetonide for a patient with non- thyroid inflammatory proptosis and also reducing the systemic side effects significantly. Special focus is given for the rate of resolution, required number of doses, and safety profile of the drug.<sup>[6,7]</sup>



Figure 1: Triamcinolone Acetonide

## MATERIALS AND METHODS

**Study Design:** This is a prospective, interventional case series conducted between August 2023 and January 2024. Five patients with clinically and radiologically confirmed non-thyroid inflammatory proptosis were included in the study. With the help of a structured follow-up protocol each patient's progression and resolution were closely monitored.

### Inclusion and Exclusion Criteria

Inclusion criteria involved patients above 18 years with a confirmed diagnosis of non-thyroid inflammatory proptosis. Exclusion criteria which focus on avoiding complications were set not to include patients with increased intraocular pressure, one-eyed patients, local infection, or uncontrolled blood glucose levels.

**Treatment Protocol:** Patients received 1ml (40 mg/ml) of periorbital injection of triamcinolone acetonide. Maximum of 3 doses was planned with one month interval between the doses. The decision to repeat the injection at 4 weeks was based on the clinical response and signs of an active inflammatory process. Proptosis measurements using two ruler method and Hertel's exophthalmometer were recorded pre- and post-injection, with additional assessments of inflammation, measurement of extraocular movements, visual acuity, intraocular pressure, blood pressure, and serum glucose levels at each visit.

**Follow-Up:** Follow up visits were scheduled at 1 and 4 weeks. If no response was noted 4 weeks after the injection, the treatment was not repeated. The primary outcome was the resolution of proptosis, while secondary outcomes included improvements in visual acuity and extraocular movements. Patients

were assessed for systemic and local complications of corticosteroid injections.

### Review of Literature

Non-thyroid inflammatory proptosis comprises of various conditions, including idiopathic orbital inflammation, which presents with similar features to thyroid ophthalmopathy but lacks systemic thyroid dysfunction. Studies by Yuen et al. and Hsuan et al. describe the challenges of treating idiopathic inflammation, often necessitating corticosteroids due to its recurrent and aggressive nature.

While systemic corticosteroids remain a mainstay of treatment, their adverse effects such as hypertension, hyperglycemia, and immunosuppression, pose systemic side effects when there is a long-term treatment plan or repeated treatment with steroids. Intraorbital steroid injections, particularly with triamcinolone acetonide, have shown promising results in similar inflammatory conditions, as highlighted by Ebner et al., Elner et al., and other studies. These localized injections reduce systemic exposure, targeting inflammation directly in the orbital tissues with fewer systemic complications.

## RESULTS

### Demographics and Imaging Findings

This study included three male and two female patients, with an average age of 52.6 years. At imaging 1 patient had lacrimal gland involvement, 1 patient had superior rectus involvement, 2 patients were found to have features suggestive of IgG4 disease, 1 patient had involvement of lateral rectus.

### Clinical Outcomes

All 5 patients had complete resolution at different time intervals. 3 patients had complete resolution with single dose of injection. 2 patients required repeated dose of injections and had complete resolution.

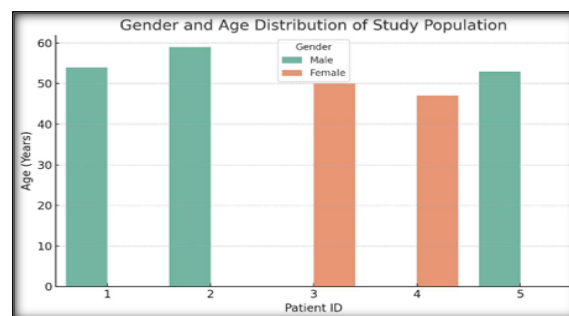
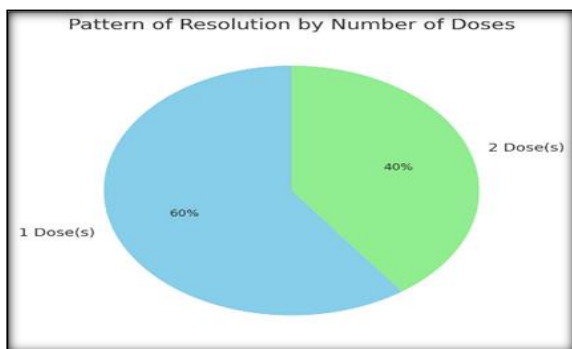
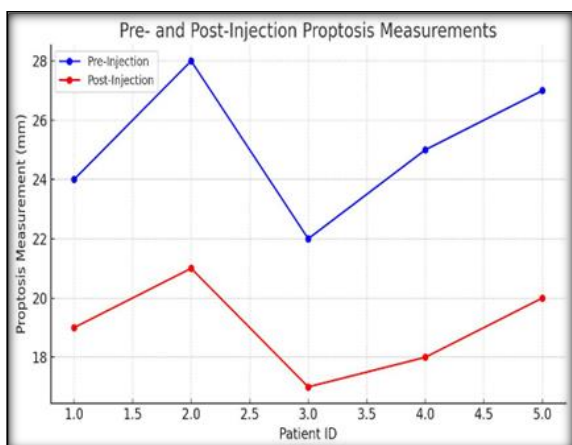


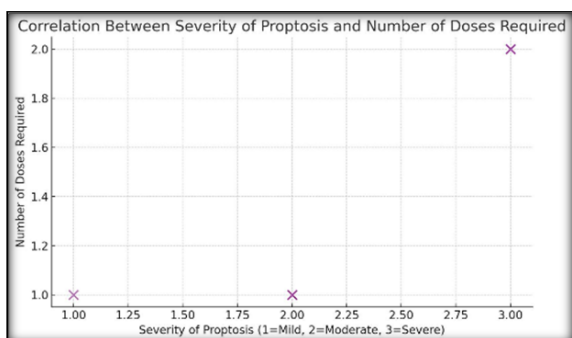
Figure 2: Gender and age distribution



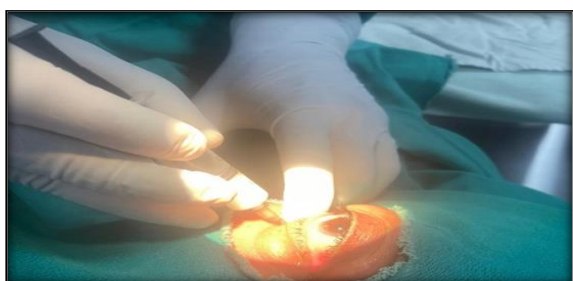
**Figure 3: Pattern of Resolution**



**Figure 4: Proptosis measurement graph pre and post injections**



**Figure 5: Correlation between severity of proptosis and number of injections required**



**Figure 6: Procedure of Intraorbital steroid injection**

### Visual and Functional Improvements

**Visual Acuity:** Vision was static for 1 patient, 1 line improvement was noted in 2 patients and 2 lines improvement was noted in 2 patients.

**Extraocular Movements:** Out of 5 patients, only 2 patients had movement restriction. Post treatment

both the patients showed complete improvement in the motility limitation.

**Correlation of Proptosis Severity and Dose Requirements:** Greater the amount of proptosis, more the number of doses required and the period of complete resolution is also increased, indicating that initial severity may guide dosing frequency in clinical practice.

## DISCUSSION

This study proves that intra orbital triamcinolone injections can be as effective as systemic steroids in the treatment of non-thyroid inflammatory proptosis, with all patients achieving complete resolution of symptoms. This positive outcome coincides with other studies, which suggest that localized steroid injections are a very good alternative to systemic therapy in reducing orbital inflammation while minimal systemic side effects.<sup>[8]</sup>

The other important observation in this study is the correlation between the severity of initial proptosis and the number of doses required. It helps to understand that a tailored treatment approach should be made for each patient. This emphasize the need for multiple follow-up visits for a patient with severe proptosis to improvise his treatment plan according to his/her response to the treatment.<sup>[9]</sup>

Additionally, improvements in parameters like visual acuity and extraocular movements shows that intra orbital steroids not only help in reducing proptosis but also enhances the visual function. This is an important aspect as movement restriction can cause diplopia and can be of great discomfort to the patient. Thus intraorbital steroid injections are capable of reducing inflammation that helps in both cosmetic and functional recovery.<sup>[10]</sup>

This treatment approach becomes significant for patients who may have contraindications to systemic corticosteroids or develop side effects and have limited tolerance. However, the study's limitations should be acknowledged. The sample size is small, and the follow-up period is limited to three months. This study lacks long-term evaluation of treatment response and rates of recurrence.



Figure 7: Before and after injection of patient 1



Figure 8: Before and after injection of patient 2

## CONCLUSION

Intra orbital injection of a corticosteroid is an effective treatment for non -thyroid inflammatory proptosis and may be considered as a first line treatment in selected patients.

A substantial number of patients may require repeated injections to achieve a therapeutic response. Larger studies will be required to further assess the local safety issues with the use of corticosteroid injections.

Relation between initial proptosis severity and the number of doses required offers a valuable insight that helps in making a tailored plan for each patient. Our findings demonstrate that intra orbital corticosteroid injections may be as efficacious as systemic corticosteroid therapy in treating non thyroid inflammatory proptosis with minimal systemic side effects.

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