

Five-Year Experience with Intravenous Methylprednisolone in the management of Thyroid Eye Disease at Moorfields Eye Hospital

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Introduction

Management of thyroid eye disease (TED) is fast evolving with new immunomodulatory drugs and biologics becoming available, yet intravenous corticosteroids remain a cornerstone for patients with active or sight-threatening disease. In moderate-to-severe and active TED, the European Group on Graves' Orbitopathy (EUGOGO) recommends first-line treatment with intravenous methylprednisolone (IVMP) combined with mycophenolate sodium, typically delivered as a cumulative dose of 4.5 g over 12 weekly infusions. Sight-threatening disease requires more intensive IVMP regimens, with urgent orbital decompression considered if steroid response is inadequate. This study describes the patient characteristics, treatment regimens used in practice, and clinical outcomes of individuals receiving IVMP for TED at a tertiary referral centre.

Methods

A retrospective review was performed using the electronic patient records of all patients with clinically active TED treated with IVMP at Moorfields eye hospital, a tertiary referral centre, between January 2020 and June 2025. Demographic and clinical variables included age, sex, underlying thyroid diagnosis, smoking status, indication for treatment. Clinical outcome measures including visual acuity, colour vision, intraocular pressure and proptosis were assessed. Treatment regimen, adverse effects, treatment discontinuation or deviation from the initial plan, cumulative steroid dose, and the use of additional therapies such as mycophenolate, radiotherapy, or orbital decompression were examined

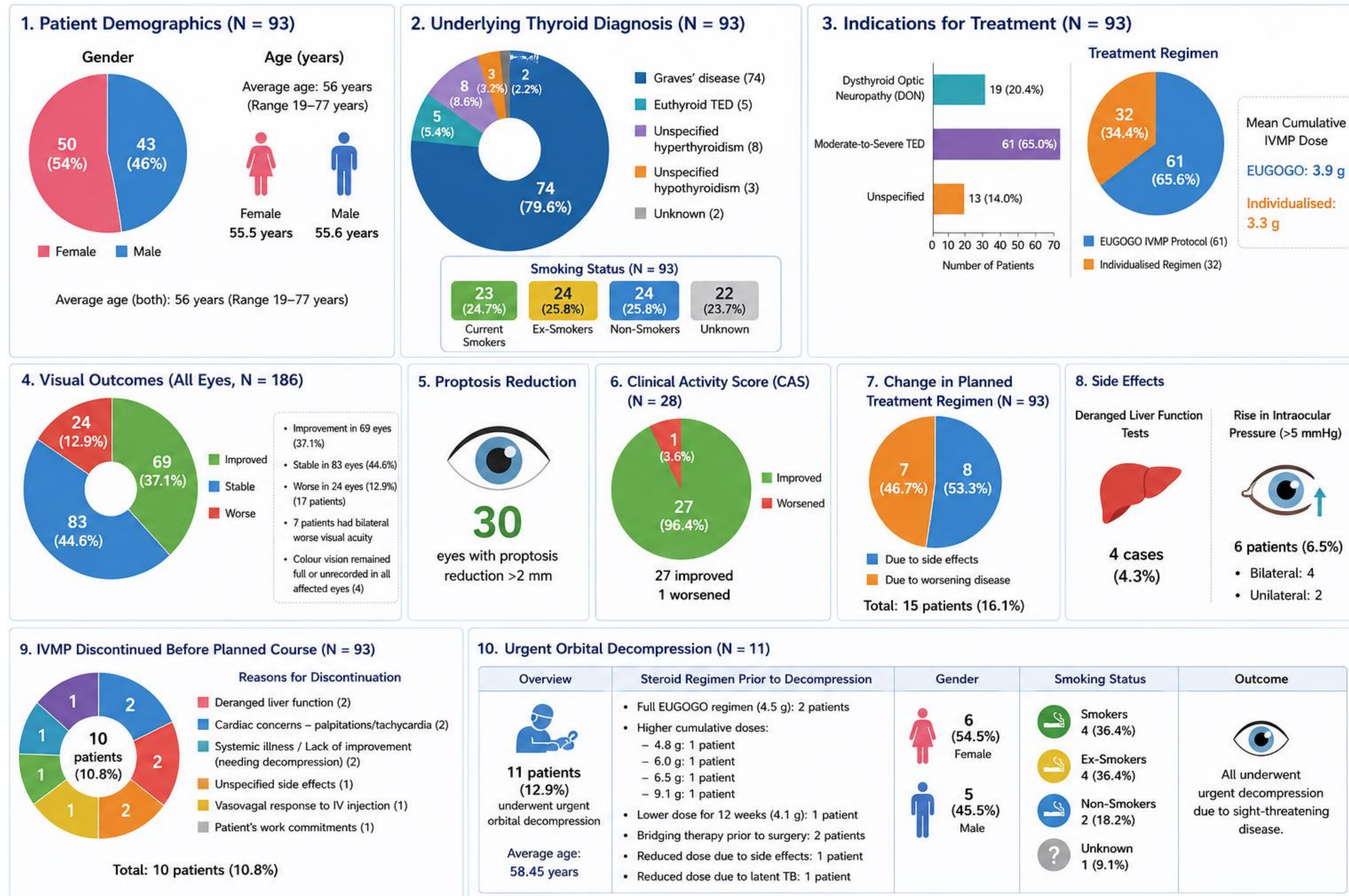


References:

The 2021 European Group on Graves' orbitopathy (EUGOGO) clinical practice guidelines for the medical management of Graves' orbitopathy

L. Bartalena, G. E. Krassas, W. Wiersinga, C. Marcocci, M. Salvi, C. Daumerie, C. Bournaud, M. Stahl, L. Sassi, G. Veronesi, C. Azzolini, K. G. Boboridis, M. P. Mourits, M. R. Soeters, L. Baldeschi, M. Nardi, N. Currò, A. Boschi, M. Bernard, G. von Arx, for the European Group on Graves' Orbitopathy, Efficacy and Safety of Three Different Cumulative Doses of Intravenous Methylprednisolone for Moderate to Severe and Active Graves' Orbitopathy, *The Journal of Clinical Endocrinology & Metabolism*, Volume 97, Issue 12, 1 December 2012, Pages 4454–4463, <https://doi.org/10.1210/jc.2012-2389>

S. Zang, K. A. Ponto, G. J. Kahaly, Intravenous Glucocorticoids for Graves' Orbitopathy: Efficacy and Morbidity, *The Journal of Clinical Endocrinology & Metabolism*, Volume 96, Issue 2, 1 February 2011, Pages 320–332, <https://doi.org/10.1210/jc.2010-1962>



Results

1. 93 patients were identified over the 5.5 year study period, of whom 50 (54%) were female and 43 (46%) male. The average age was 56 years (range 19–77 years) for both male (55.6years) and female patients (55.5years).

2. Underlying thyroid diagnoses were: Graves' disease in 74 (79.6%), euthyroid TED in 5 (5.4%), unspecified hyperthyroidism in 8 (8.6%), and unspecified hypothyroidism in 3 (3.2%)

Underlying diagnosis was unknown in 2 cases.

23 patients were current smokers (24.7%), 24 were ex-smokers (25.8%), 24 non-smokers, and smoking status was unknown in 22 cases (23.7%)

3. Indications for treatment included dysthyroid optic neuropathy (DON) in 19 cases (20.4%) and moderate-to-severe TED in 61 (65%), unspecified in 13 (14.0%)

The EUGOGO IVMP protocol was initiated in 61 patients while 32 patients received an individualised regimen based on close monitoring and treatment response. The mean cumulative IVMP dose was 3.9g in the EUGOGO group compared to 3.3g in the individualised treatment group.

4. Overall, (80%) 69 eyes of 186 (37.1%) showed improvement, 83 eyes (44.6%) remained stable. 12.9%, 24 eyes, 17 patients had worse visual acuity at final visit compared to pre-IVMP. With respect to visual outcomes, 24 eyes, 17 patients (demonstrated reduced visual acuity at final review compared to pre-IVMP review ,7 bilaterally worse. Colour vision in all these patients remained full or unrecorded in the affected eye (4)

5. Proptosis reduction of >2mm was observed in 30 eyes.

6. Of 28 cases with a documented pre and post IVMP CAS score, 27 showed an improvement of CAS score. 1 had a documented worsening.

7. Change in planned treatment regime was documented in 15 patients; 8 due to side effects and 7 due to worsening disease.

8. Side effect s included deranged liver function tests in 4 cases, 6 patients (6.5%) developed a significant (>5mmHg) rise in intraocular pressure following IVMP, 4 bilateral and 2 unilateral rises.

9. IVMP treatment was discontinued in 10 cases prior to completing their planned course. Reasons included deranged liver function (2), cardiac concerns with palpitations and tachycardia (2), systemic illness, or lack of clinical improvement necessitating progression to orbital decompression (2), unspecified side effects(1) , vasovagal response to IV injection (1), patient's work commitments (1).

10. 11 (12.9%), patients underwent urgent orbital decompression either during or after completion of course of IVMP. 2 were treated with the full EUGOGO regimen with a total of 4.5g IVMP, 4 patients were treated with higher cumulative doses (4.8, 6.0, 6.5, 9.1mg of steroids), 1 patient was treated for 12 weeks with a lower dose (4.1g), 2 patients were listed for urgent decompression on first review and received steroids as bridging therapy prior to surgery, 1 had a reduced dose due to side effects, another due to diagnosis of latent TB. Of these patients, 5 were male, 6 female,. 8 were either smokers (4) or ex-smokers (4), 2 non-smokers and 1 unknown. Average age 58.45 years.

Discussion

This five-year retrospective review demonstrates that intravenous methylprednisolone (IVMP) remains an effective and generally well-tolerated treatment for active and sight-threatening thyroid eye disease (TED) in tertiary clinical practice.

The cohort showed only a slight female predominance, mean age in the mid-50s, and Graves' disease accounting for the majority of underlying thyroid diagnoses; a function of the more severe disease presentation in male patients.

A substantial proportion of patients were current or former smokers, consistent with smoking being a recognised risk factor for TED severity and poorer treatment response.

Most patients were treated for moderate-to-severe TED, while one fifth had dysthyroid optic neuropathy (DON). The majority received the standard EUGOGO IVMP regimen, although over one third required an individualised approach based on treatment response or tolerability. Mean cumulative steroid doses remained within accepted safety thresholds in most patients,

Visual outcomes following IVMP were favourable, with approximately 82% of eyes demonstrating improvement or stability in visual acuity. Only a minority experienced deterioration at final follow-up. Improvement in Clinical Activity Score (CAS) was also observed in nearly all patients with documented pre- and post-treatment scores, supporting the anti-inflammatory efficacy of IVMP in active TED. Reduction in proptosis was less common, consistent with the recognised limitation of IVMP in reversing established structural orbital changes.

IVMP was generally well tolerated, although treatment modification or discontinuation was required in a subset of patients due to side effects or disease progression. Documented adverse events included deranged liver function tests and raised intraocular pressure, but serious complications were uncommon.

The rate of treatment discontinuation attributed to adverse effects (6%) was higher than the <2% major adverse event rate reported by Zang et al. However, the adverse effects observed in this cohort were generally milder than those described in the literature. Two patients discontinued treatment due to deranged liver function tests, although elevations were modest and did not exceed twice the upper limit of normal, compared with the fourfold elevation commonly used to define significant hepatotoxicity in published studies. The comparatively higher discontinuation rate may therefore reflect a lower threshold for treatment cessation within the nurse-led monitoring pathway, prioritising patient safety and cautious biochemical surveillance.

12.9% of patients required urgent orbital decompression during or after IVMP therapy, reflecting the complexity and severity of disease managed in a tertiary referral centre. Many of these patients had additional risk factors, including smoking history or severe inflammatory disease requiring higher cumulative steroid doses or had bridging therapy prior to planned urgent surgery.

Overall, these findings support IVMP as an effective and safe first-line treatment for active TED in real-world clinical practice while highlighting the importance of careful monitoring, flexible treatment pathways, and improved standardisation of clinical documentation.

Conclusion

This five-year review provides real-world evidence on the use, safety, and effectiveness of intravenous methylprednisolone in managing active and sight-threatening TED within a tertiary centre.

This five-year review highlights the effectiveness and safety profile of intravenous methylprednisolone in routine clinical practice. The majority of patients achieved stability or improvement in visual function, and adverse events leading to treatment cessation were uncommon.