

An Evaluation of Frequency of Rapid Improvement in Glycaemic Control and the Subsequent Effects on Diabetic Retinopathy

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INTRODUCTION

To identify patients in Gloucestershire with no diabetic retinopathy (DR) or non-referable DR (R0M0, R1M0) with rapid improvement in glycaemic control and assess whether there is any associated risk of developing referable (R1M1, R2M0, R2M1) or proliferative DR (R3AM1 or R3AM0).

METHODS

All patients with diabetes who were registered with the Gloucestershire Diabetic Eye Screening Programme (DESP) who experienced a rapid drop in their HbA1c between 2019-2025 and had not opted out of data use for quality improvement were included.

HbA1c results of these patients were reviewed and correlated with their DESP screening outcomes over a 5-year period if they experienced a rapid drop in their HbA1c.

Rapid improvement in glycaemic control was defined as a drop in HbA1c of **16 mmol/mol (1.5% drop) over 3 months** or **22 mmol/mol (2% drop) over 6 months**.

Screening outcomes were reviewed within the 2.5 years prior, or 1 year after the date of the HbA1c drop.

RESULTS

Total of 5,459 patients within the inclusion criteria, resulting in a total of 7,680 HbA1c drop episodes (3,866 single episodes, 1,593 multiple episodes). 96.5% had Type 2 Diabetes (T2DM). Retinopathy grades were available for 4,838 episodes.

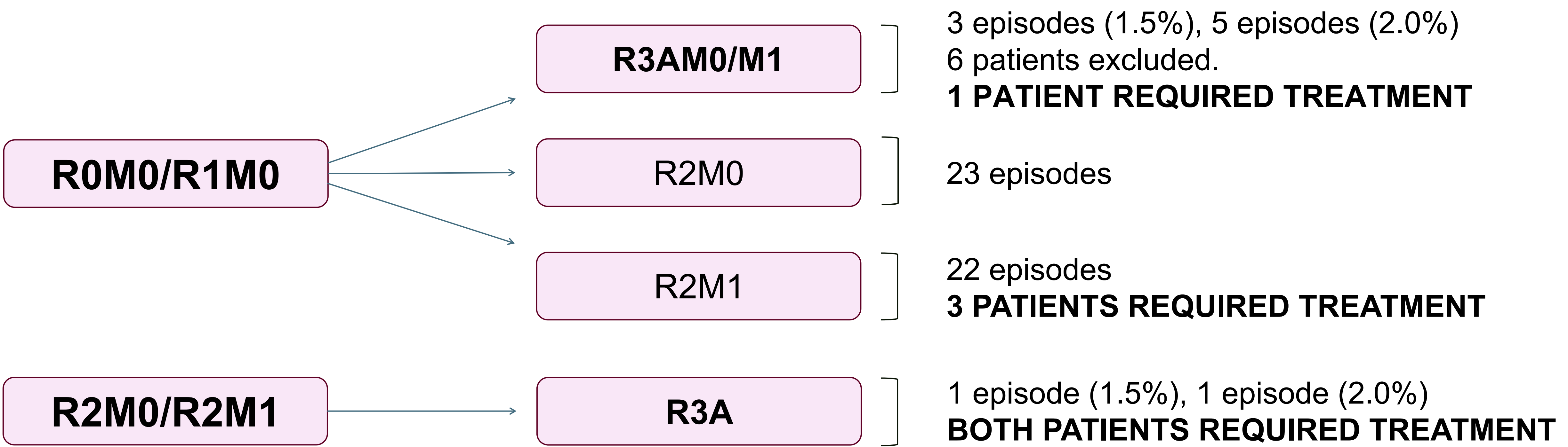
Progression from baseline diabetic retinopathy grading of R0M0 or R1M0 (no retinopathy or background retinopathy) to R3A (R3AM0/R3AM1; proliferative retinopathy) within 12 months of a documented HbA1c drop was identified in 3 episodes (1.5%) and 5 episodes (2.0%), involving 7 patients overall.

Subsequent case-note review led to the exclusion of 6 patients, as they did not meet true progression criteria: either their pre-referral grading was not R0M0/R1M0, or proliferative disease (R3) was not confirmed upon assessment in the Hospital Eye Service (HES). For instance, one case was reclassified as retinal vein occlusion rather than proliferative disease, while another demonstrated intraretinal microvascular abnormalities (IRMA), consistent with R2 rather than R3 grading on HES evaluation.

Only one patient fulfilled criteria for genuine progression from background diabetic retinopathy to proliferative disease; this individual underwent treatment with panretinal photocoagulation (PRP).

All patients with new R3A (n=10) following a drop in HbA1c had T2DM. No patients progressed from R3S (stable treated) to R3A (active) following a HbA1c drop.

The median age at the time of HbA1c drops was 64 years.



CONCLUSION

Similar numbers of episodes were noted for both 1.5% and 2.0% drops in HbA1c. Progression to proliferative diabetic retinopathy within 1 year of a rapid fall in HbA1c was uncommon. Of the 4,838 graded episodes, only 10 episodes showed a progression of diabetic retinopathy to R3A within 1 year of the drop in HbA1c with 7 out of 10 episodes (6 patients) being excluded from this group on further review. All these patients had T2DM.

These findings suggest that within this population, rapid improvement in glycaemic control was rarely associated with a clinically significant deterioration in diabetic retinopathy. This provides an important observation given the continuing improvements and evolution of medical diabetes management with Hybrid Closed Loops, Glucagon-Like Peptide (GLP)-1 and GIP/GLP-1 receptor agonists.