

Optic Nerve Sheath Meningioma Treatment Outcomes

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BACKGROUND

Optic nerve sheath meningiomas (ONSMs) are rare benign tumours arising from the meningotheelial cells of the optic nerve sheath, with the potential to cause devastating and progressive visual loss if untreated (1)

Fractionated radiotherapy (RT) is the primary treatment to arrest tumour progression in the context of compressive optic neuropathy and preserve vision (2, 3).

The purpose of this study was to investigate outcomes of ONSM patients in a real-world cohort, including:

- Delays to diagnosis and time to treatment
- Visual outcomes (Visual acuity (VA) and Goldmann visual field)
- Progression of OCT structural changes (RNFL and GCL)
- Comparison of RT-treated vs. non-RT observed patients

METHODS

Study design: Retrospective interventional cohort study conducted at Queen Elizabeth Hospital Birmingham, a tertiary neuro-ophthalmology referral centre.

Study period: 1st January 1990 – 1st August 2022

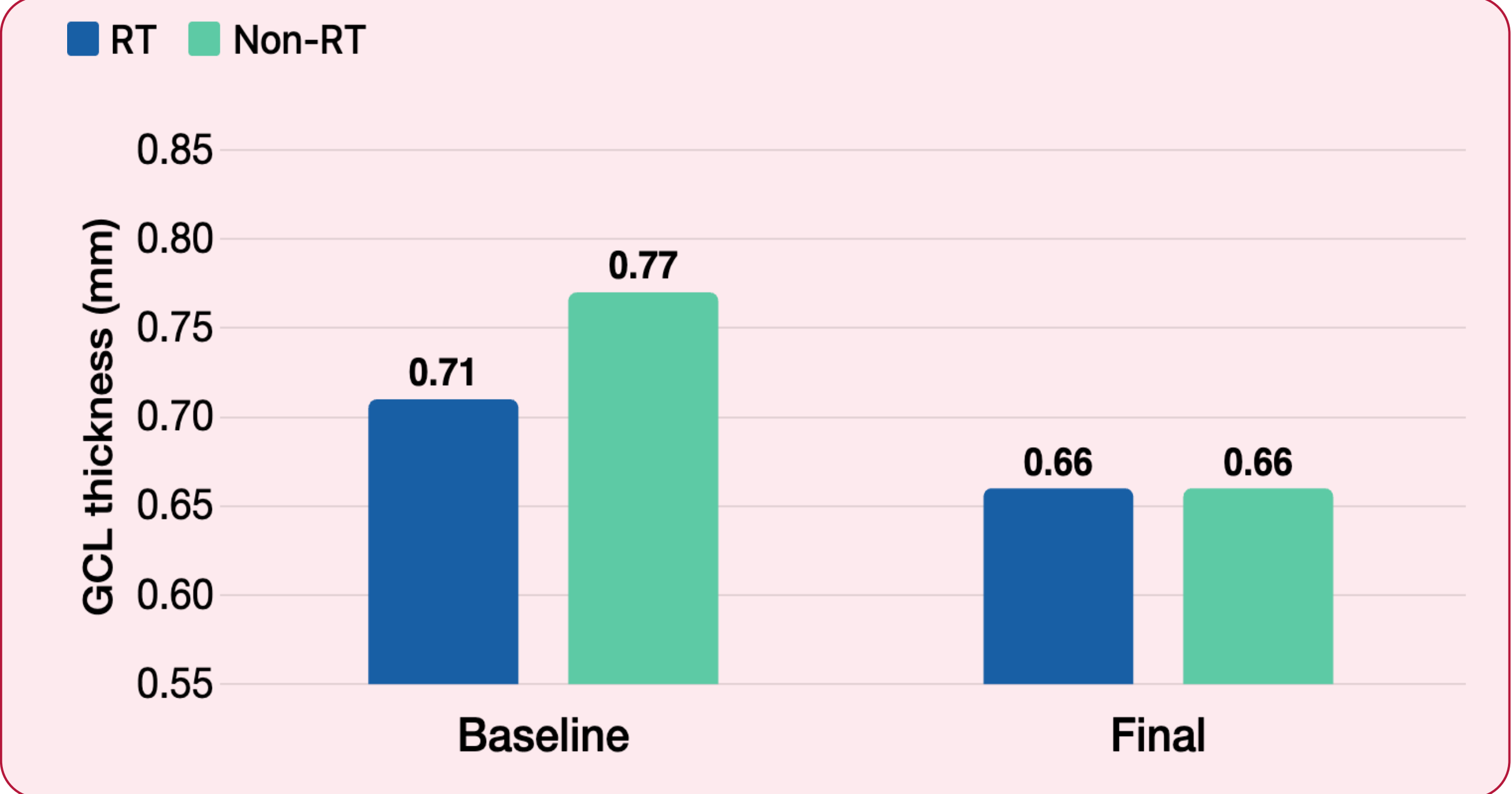
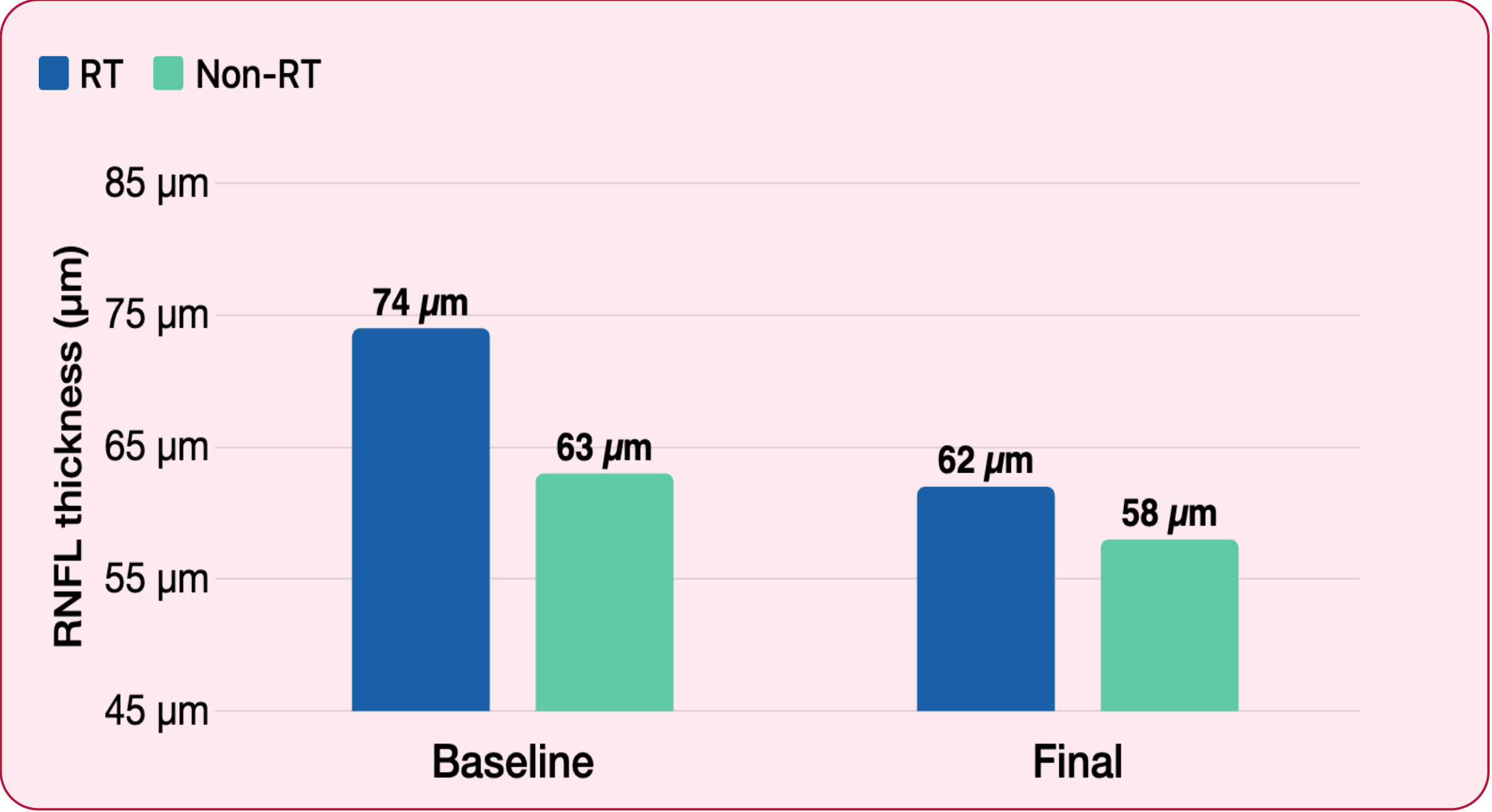
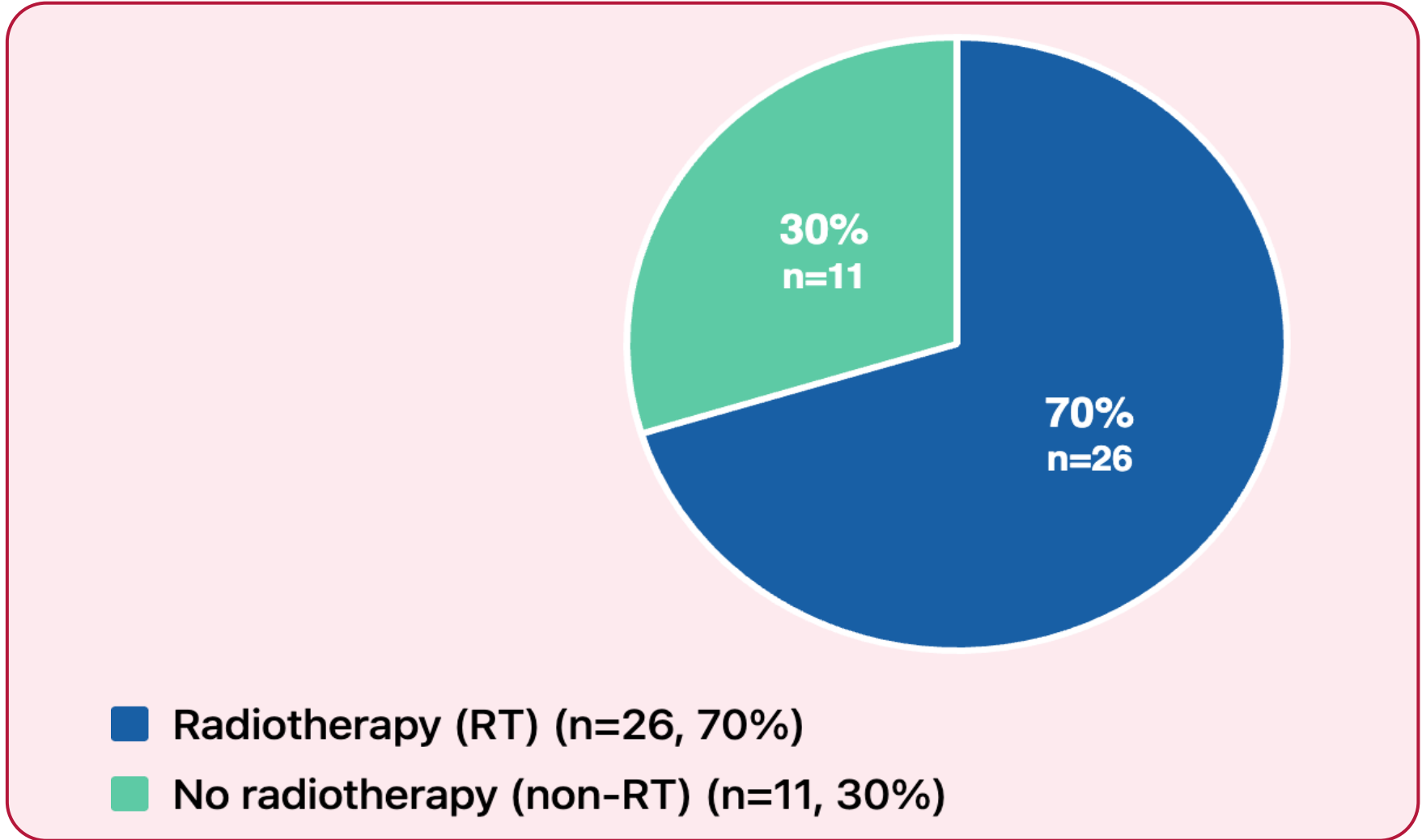
The study was assessed as not research, with no access to patient data outside the clinical care team and registered as an audit with University Hospitals Birmingham

Data collected included investigations performed, treatment received, and serial ophthalmic measurements:

1. OCT global retinal nerve fibre layer (RNFL) thickness
2. OCT mean ganglion cell layer (GCL) volume
3. Best-corrected visual acuity (BCVA)
4. Goldmann visual field (VF)

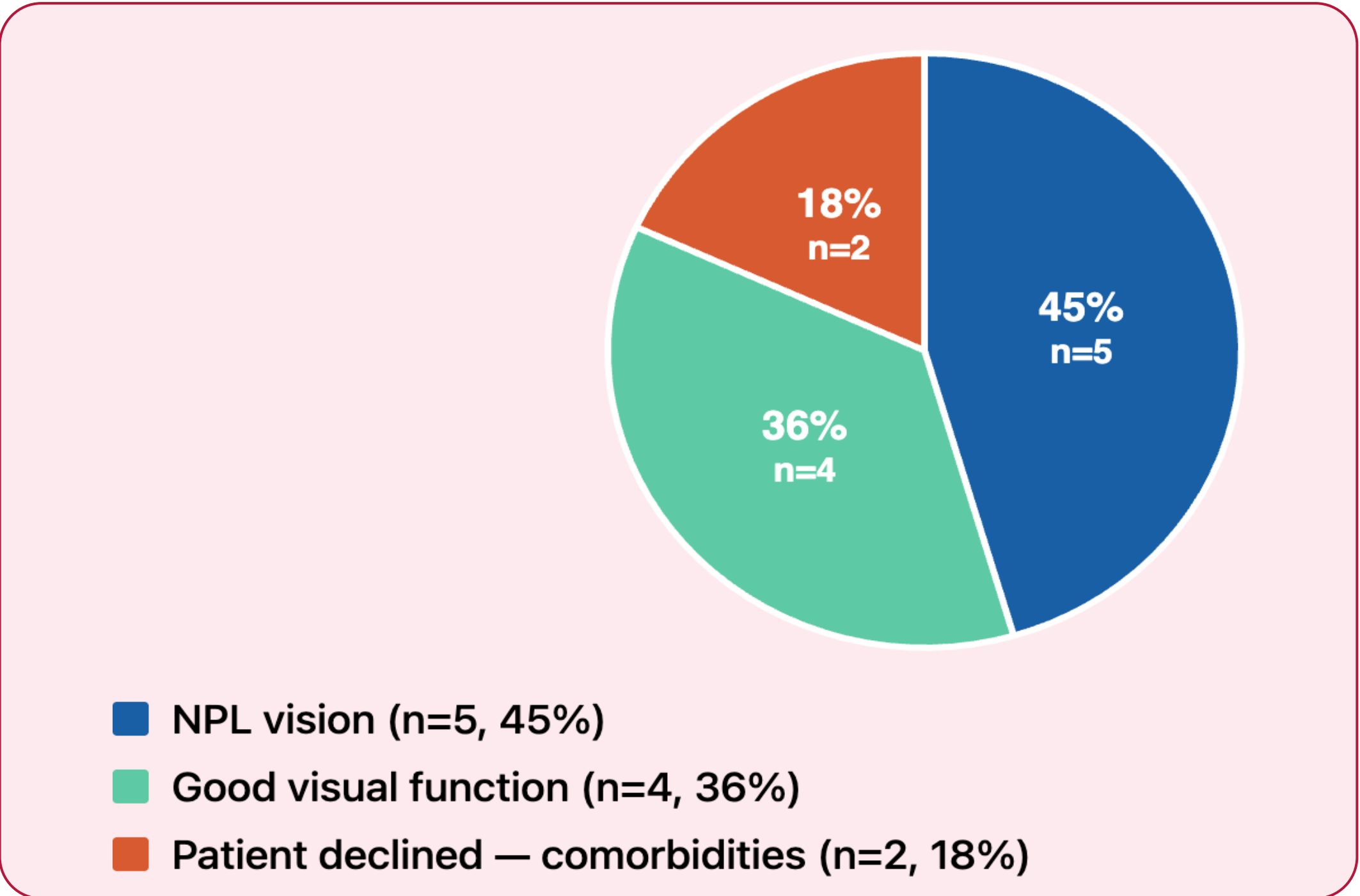
RESULTS

- **Thirty seven patients (43 eyes)** were included in the study: **26/37** were treated with **radiotherapy (RT)** and **11/37** managed by observation (**non-RT**) (**figure 1**)
- **RNFL (figure 2) and GCL (figure 3)** in RT and non-RT groups were reduced at baseline and last recorded follow-up. Although, the RT group demonstrated a 1.98 micron greater annual decline in RNFL thickness than the non-RT patients ($p=0.009$)



Visual Outcomes:

- In the non-RT group, RT was not performed due to: patient declining treatment due to comorbidities (n=2), good visual function (n=4) and NPL vision (n=5) (**figure 4**)
- Hence **RT group had better visual acuity at baseline**
- On average **logMAR VA worsened by 0.012 annually** ($p=0.076$; 95% CI -0.001 to 0.026) and was **0.73 better in patients receiving RT than in non-RT patients** ($p=0.068$; 95% CI -0.054 to 1.508).



CONCLUSION

- **Most ONSM treated with RT had stable or improved visual function.**
- **Progressive RNFL thinning over time to a greater extent than GCL thinning was observed in the RT treated group compared to the non-RT group.**

REFERENCES

1. Dutton JJ. Optic nerve sheath meningiomas. Surv Ophthalmol 1992;37(3):167-83.
2. Parker RT, Ovens CA, Fraser CL, Samarawickrama C. Optic nerve sheath meningiomas: prevalence, impact, and management strategies. Eye Brain 2018;10:85-99.
3. Bloch O, Sun M, Kaur G, Barani JJ, Parsa AT. Fractionated radiotherapy for optic nerve sheath meningiomas. J Clin Neurosci 2012;19(9):1210-5.