

# HIGHER DOSE RATES IMPROVE PAIN RELIEF IN LINAC-SRS FOR TRIGEMINAL NEURALGIA: A RETROSPECTIVE ANALYSIS

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## Introduction

- Radiation dose needed to manage trigeminal neuralgia (TN) with SRS is well established.
- The impact of dose rate on outcome remains controversial.
- We evaluated the effect of 2 discrete dose rates (800MU/min and 2400 MU/min) on pain relief in patients undergoing linac SRS for TN patients.

## Methods

- Frame immobilization
- Prescription: 40 Gy to 50% isodose line with maximum point dose of 80 Gy.



- Outcome assessed using Barrow Neurological Institute (BNI) pain intensity and facial numbness scale:

**Success** BNI = I-IIIb  
**Failure** BNI ≥ IV

- MS and non-MS patients were included in study

## Methods



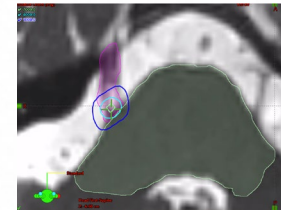
Retrospective review

2003–2017  
134 treatments



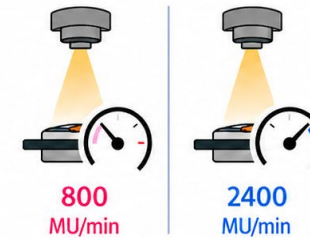
Treatment

Linac based SRS  
using 4–5 mm cone



Target

Proximal trigeminal  
nerve root



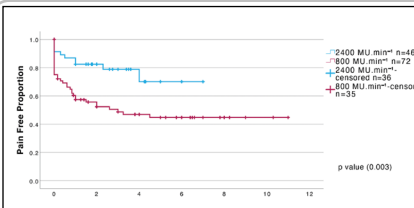
Dose rate

800 MU/min (~4 Gy/min)  
or 2400 MU/min (~12 Gy/min)

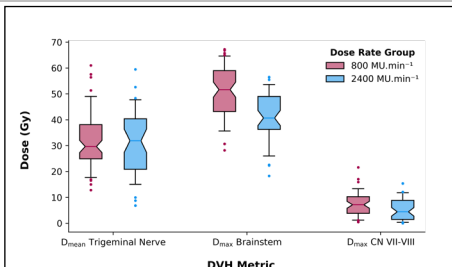
## Discussion

- Higher dose rate linac-SRS was associated with significantly improved pain relief in TN patients.
- Dose rate was the only statistically significant predictor of pain outcome after robust statistical adjustment for covariates with no increase in side effects.
- Dosimetric and geometric assessments showed comparable treatment delivery between the 800 MU/min and 2400 MU/min cohorts.
- These findings suggest that higher dose rate linac-SRS may improve clinical outcomes without introducing meaningful differences in treatment planning or delivery.

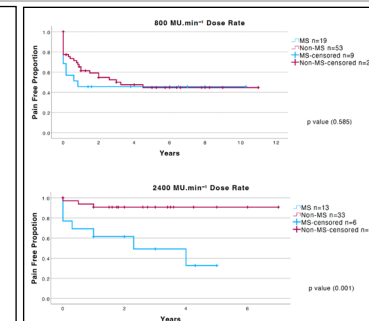
## Results



Kaplan-Meier curves of treatment response. BNI scores of I-IIIb considered success, while BNI IV-V considered failure



Mean dose to the target and point dose max to selected organs at risk. Box plots show the central 50% of the data, median, median confidence interval (notch), central 90% (whiskers), and outliers (fliers).



Kaplan-Meier curves of treatment response for MS and non-MS patients at each dose rate

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