

## Introduction

Glycerol rhizolysis, thermocoagulation and balloon compression are well-established in the treatment of trigeminal neuralgia. Despite this, very few direct comparisons between these procedures have been published. We aimed to compare the outcome profile of these three percutaneous procedures in a single-center over a long follow-up period.

## Methods

Over 19 years, 393 procedures were performed on 210 trigeminal neuralgia patients. Patient records and telephone follow-up were used to determine demographic and operative details and surgical outcomes. The length of follow-up extended to over 17 years. Given this extensive period of operations, we excluded any surgical learning effects by comparing outcomes from the same procedures at early vs. late time-points, which demonstrated no significant differences. Patients were selected for each of these procedures based largely on patient preference, with the exception of excluding thermocoagulation for pure V1 trigeminal pain.

## Results

We performed 152 glycerol rhizolyses, 155 thermocoagulations and 86 balloon compression procedures. Initial rates of complete pain relief with or without medications were 72% for glycerol, 80% for thermocoagulation, and 86% for balloon compression. Kaplan-Meier analysis of recurrence times showed balloon compression provides significantly longer relief than the other two procedures ( $p < 0.05$ , log-rank test). Complication rates for glycerol, thermocoagulation and balloon compression were 30.3%, 27.1% and 43.5% respectively. Analysis of repeat procedures showed no difference in recurrence times for balloon compression or thermocoagulation compared with primary procedures, but repeat glycerol procedures gave shorter recurrence times.

## Conclusions

Balloon compression provides longer pain relief than glycerol and thermocoagulation. Although balloon compression is more likely to give numbness and complications, the complications are largely minor and transitory. Moreover, balloon compression following previous percutaneous procedures remains highly effective. Based on these data, our center now offers balloon compression as the first-line percutaneous surgical treatment in medically-refractory cases of trigeminal neuralgia.

## Learning Objectives

- Balloon compression shows significantly longer pain relief compared with glycerol rhizolysis and thermocoagulation.
- All three procedures provide effective initial pain relief.
- Repeat percutaneous procedures are still effective.