

## Supplementary Material 1

### Gamma Knife Radiosurgery

Gamma Knife planning software (Elekta GammaPlan™) was used to place the 4mm isocentre on the mid-cisternal segment of the symptomatic trigeminal nerve. Patients underwent GKRS using Leksell Gamma Knife Perfexion unit (Stockholm, Sweden). A standard dose of 80 Grays of radiation was delivered to the radiosurgical target, while brainstem exposure was limited to 15 Grays or less.

### Image Acquisition

A 3T GE Signa HDx scanner with an 8-channel head coil was used to acquire MR images of the brain. T1-w FSPGR images and 60-direction DWI were acquired at the preoperative and postoperative time-points. T2-w FIESTA and FLAIR images were also obtained preoperatively. T2-w FIESTA images were used to assess neurovascular contact.

T1-w FSPGR image were obtained from each patient with the following parameters: voxel size =  $0.86 \times 0.86 \times 1 \text{ mm}^3$ , matrix =  $256 \times 256$ , repetition time (TR) = 11.96 ms, echo time (TE) = 5.05 ms, inversion time (TI) = 300 ms, flip angle =  $20^\circ$ , field of view (FOV) = 22 cm. The scan time for T1-w FSPGR was 7.3 minutes.

The 60-direction DWI were acquired with the following parameters: 1 B<sub>0</sub> scan, spin echo planar sequence,  $b = 1000 \text{ s/mm}^2$ , voxel size =  $0.94 \times 0.94 \times 3 \text{ mm}^3$ , matrix =  $256 \times 256$ , TE = 88.6 ms, TR = 17000 ms, flip angle =  $90^\circ$ , FOV = 24 cm, 1 excitation, ASSET. The scan time for DWI was 12.6 minutes.

T2-w FIESTA images were acquired with the following parameters: voxel size =  $0.43 \times 0.43 \times 4 \text{ mm}^3$ , matrix =  $512 \times 512$ , TR = 5200 ms, TE = 94.14 ms, flip angle =  $90^\circ$ , FOV =  $170^\circ$ . The scan time for T2-w FIESTA images was 6.1 minutes.

FLAIR images were acquired with the following parameters:  $0.43 \times 0.43 \times 4 \text{ mm}^3$ , matrix =  $384 \times 224$ , TE = 141.4 ms, TR = 8652 ms, flip angle =  $90^\circ$ , FOV = 22 cm. The scan time for FLAIR images was 5.8 minutes.

All MR images were anonymized. Authors were blinded to the patients' side of pain, response to treatment, and other clinical information until data collection was complete.