AbstractID: 10829 Title: Assessment of clinical response factors of acoustic neuromas after Gamma Knife treatment

Purpose
The aim of this study is to associate dosimetric measures and other treatment related parameters with the clinical follow-up results in order to examine factors that are related with the response of acoustic neuromas after Gamma Knife radiosurgery.

Materials and Methods
25 patients, who were treated for acoustic neuromas with the Leksell Gamma Knife (model C) unit and an automated positioning system (APS), are examined. For the development of the treatment plans, the dedicated GammaPlan treatment planning system was used. The imaging information was based on CT and MRI images using the stereotactic frame in position. Target response is expressed as a significant size reduction of the target volume (response group). For each patient, the treatment outcome (follow-up of at least 2 years) and the dose distribution were available.

Results
The initial target volume in the response group was 5.5 cc (0.7-12.1 cc) and 5.0 cc (0.2-19.3 cc) in the non-response group. The corresponding prescribed doses range between 11-12 Gy with a mean reference isodose of 49% (45-54%) and 11-14 Gy with isodose 47% (40-50%), respectively. The mean and minimum doses (D_{mean}, D_{min}) are 15.8 and 8.5 Gy against 16.4 and 8.1 Gy, respectively. The average Paddick conformity index was 0.8 (0.5-0.9) and 0.8 (0.7-0.9) in the two patient groups, respectively. The D_{min} seems to differentiate well the two patient groups since in a ROC analysis it gives an area under the ROC curve of 0.69. A positive association of target response with D_{min} was found (odds ratio = 4.3) at the cutoff dose of 8.7 Gy.

Conclusions
The probability of target response increases considerably for minimum doses above 8.7 Gy. Consequently, this dose can be considered as a primary threshold of response. The response group receives larger average minimum dose than the non-response group.