Analisis parameter dosimetri pada stereotactic radiosurgery pasien schwannoma vestibular dengan teknik intensity-modulated radiotherapy step and shoot, volumetric-modulated arc therapy, dan helical tomotherapy = Dosimetric parameter analysis of stereotactic radiosurgery on vestibular schwannoma with intensity-modulated radiotherapy step-and-shoot, volumetric-modulated arc therapy and helical tomotherapy

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Abstrak

ABSTRAK
 Latar Belakang: Stereotactic Radiosurgery (SRS) merupakan salah satu modalitas non invasif dalam tatalaksana kasus schwannoma vestibular. Sampai saat ini, belum ada penelitian yang membandingkan parameter dosimetri antara tiga teknik SRS yaitu Intensity-Modulated Radiotherapy Step and Shoot IMRT-SS , Volumetric-Modulated Arc Therapy VMAT , dan Helical Tomotherapy HT pada kasus schwannoma vestibular. Metode: Dilakukan planning IMRT-SS, VMAT, dan HT pada sebelas data CT plan kasus schwannoma vestibular. Dosis tepi yang diberikan adalah 12 Gy dengan fraksi tunggal. Hasil: Rerata ukuran tumor 8,23 cm 5,08 cm3. Tidak terdapat perbedaan bermakna pada rerata CI, GI, V100 , dan V50 antara ketiga teknik. Tidak terdapat perbedaan bermakna rerata dosis maksimal pada batang otak, cochlea ipsilateral, chiasma opticum, nervus opticus ipsilateral dan kontralateral antara ketiga teknik. Terdapat perbedaan bermakna rerata dosis maksimal pada cochlea kontralateral antara teknik IMRT-SS dan VMAT. Rerata durasi penyinaran terpanjang didapatkan dengan teknik HT yaitu 1209,18 390,20 detik, diikuti teknik IMRT-SS yaitu 665,05 73,40 detik, dan yang terpendek dengan teknik VMAT yaitu 362,87 24,55 detikTerdapat perbedaan bermakna rerata MU dan durasi penyinaran antara teknik IMRT-SS vs VMAT, VMAT vs HT, serta IMRT-SS vs HT. Kesimpulan: Teknik VMAT dapat dijadikan pilihan untuk tatalaksana SRS kasus schwannoma vestibular mengingat dapat memberikan konformitas dan gradient index sama baik dengan teknik IMRT-SS dan HT, dengan menyelamatkan cochlea kontralateral lebih baik dibandingkan dengan teknik IMRT-SS, dan terutama karena memberikan durasi penyinaran yang jauh lebih singkat dibandingkan IMRT-SS dan HT. ABSTRACT
 Background: Stereotactic Radiosurgery SRS is non-invasif modality in management of vestibular schwannoma. There is limited study comparing dosimetric parameters between three techniques SRS in vestibular schwannoma cases, thus Intensity-Modulated Radiotherapy Step and Shoot IMRT-SS , Volumetric-Modulated Arc Therapy VMAT , and Helical Tomotherapy HT . Method: Treatment planning with IMRT-SS, VMAT, and HT on eleven CT plan data for schwannoma vestibular cases. The marginal dose is 12 Gy with single fraction. Results: Mean tumor size was 8.23 ?? ??cm 5.08 cm3. No significant difference were found in the mean CI, GI, V100 , and V50 among the three techniques. There were no significant difference in maximal dose to brainstem, ipsilateral cochlea, optic chiasm, ipsilateral and contralateral optic nerve between the three techniques. There was significant difference of maximum dose on contralateral cochlea between IMRT-SS and VMAT techniques. The longest beam-on time was done with HT technique 1209,18 390,20 second , followed by IMRT-SS technique 665,05 73,40 second , and the shortest was with VMAT technique 362,87 24,55 second . There was significant difference in mean MU and beam on time between IMRT-SS vs. VMAT, VMAT vs

HT, and IMRT-SS vs HT. Conclusion: VMAT technique could be an option for SRS of vestibular schwannoma cases to provide conformity and gradient index as well as IMRT-SS and HT techniques, with better rescue to contralateral cochlea compared with IMRT-SS techniques, and provides much shorter beam-on time rather than IMRT-SS and HT.