

Evi Nurafida, 2018, “Perbandingan Dosis Radiasi *Organ At Risk* Pada Kanker Nasofaring dengan Metode Perhitungan AAA (*Analytical Anisotropic Algorithm*) dan PBC (*Pencil Beam Convolution*)”, skripsi ini dibuat dibawah bimbingan Dr. Suryani Dyah Astuti, M.Si dan Bambang Haris, M.Si., FM.,Sp.RT, Jurusan Fisika Fakultas Sains dan Teknologi Universitas Airlangga, Surabaya.

ABSTRAK

Treatment Planning System (TPS) bertujuan untuk menentukan volume dan distribusi dosis untuk tumor dan OAR (*Organ at Risk*). Metode perhitungan yang digunakan untuk distribusi dosis adalah AAA dan PBC. Akan tetapi terdapat organ sehat di sekitar kanker nasofaring yang menerima radiasi. Organ sehat yang dimaksud adalah *brainstem* dan *spinal cord*. Penelitian ini bertujuan untuk mengetahui dosis yang diterima *brainstem* dan *spinal cord* pada metode perhitungan AAA (*Analytical Anisotropic Algorithm*) dan PBC (*Pencil Beam Convolution*). Sebanyak 5 data dosis radiasi *brainstem* dan *spinal cord* diperoleh dari metode perhitungan AAA dan 5 data diperoleh dari metode perhitungan PBC. Evaluasi dosis adalah dengan melihat DVH (*Dose Volume Histogram*) pada *brainstem* dan *spinal cord*. Perhitungan dosis radiasi *brainstem* dan *spinal cord* dianalisis dengan menggunakan SPSS uji independent t test ($\alpha = 0,05$). Dosis rata – rata yang diterima *brainstem* pada metode perhitungan AAA sebesar $34,55 \pm 0,02$ Gy dan metode perhitungan PBC sebesar $34,34 \pm 0,02$ Gy. Dosis rata – rata yang diterima *spinal cord* pada metode perhitungan AAA sebesar $41,26 \pm 0,02$ Gy dan metode perhitungan PBC sebesar $41,02 \pm 0,02$ Gy. Perbedaan dosis radiasi yang diterima oleh *brainstem* dari metode perhitungan AAA dan PBC tidak signifikan ($p=0,91$). Perbedaan dosis radiasi yang diterima oleh *spinal cord* dari metode perhitungan AAA dan PBC tidak signifikan ($p=0,51$). Sehingga kedua metode perhitungan memiliki tingkat keamanan yang sama berdasarkan uji statistik yang telah dilakukan.

Kata kunci: Linac, Dosis radiasi, AAA (*Analytical Anisotropic Algorithm*), PBC (*Pencil Beam Convolution*), DVH, *Brainstem*, *Spinal Cord*

Evi Nurafida, 2018, "Comparison of Radiation Doses of Organs At Risk in Nasopharynx Cancer with AAA (Analytical Anisotropic Algorithm) and PBC (Pencil Beam Convolution)", this thesis is made under the guidance of Dr. Suryani Dyah Astuti, M.Si and Bambang Haris, M.Si., FM.,Sp.RT, Department of Physics Faculty of Science and Technology Airlangga University, Surabaya.

ABSTRACT

TPS (Treatment Planning System) aims to determine the volume and dose distribution for tumor and OAR (Organ at Risk). The calculation method used for dose distribution is AAA and PBC. However, there are healthy organs around nasopharyngeal cancer that receive radiation. Healthy organs are brainstem and spinal cord. The aim of this study is to determine the dose which are received by brainstem and spinal cord on AAA (Analytical Anisotropic Algorithm) and PBC (Pencil Beam Convolution) method. There are 5 data of brainstem and spinal cord dose that are obtained from the AAA calculation method and 5 data are obtained from the PBC calculation method. The dose evaluation is done by looking at the DVH (Dose Volume Histogram) on the brainstem and spinal cord. Calculations of brainstem and spinal cord radiation doses are analyzed by using SPSS independent t test ($\alpha = 0,05$). The average dose that received by brainstem on AAA calculation method is $34,55 \pm 0,02$ Gy and PBC calculation method is $34,34 \pm 0,02$ Gy. The average dose that received by spinal cord of AAA calculation method is $41,26 \pm 0,02$ Gy and PBC calculation method is $41,02 \pm 0,02$ Gy. There is no significant difference between radiation dose received by brainstem from AAA and PBC calculation methods ($p = 0.91$). And there is no significant difference between radiation dose received by spinal cord from AAA and PBC calculation methods ($p = 0.51$). So both of two calculation methods have the same level of security based on statistical tests that has been done.

Keywords: Linac, Radiation dose, AAA (Analytical Anisotropic Algorithm), PBC (Pencil Beam Convolution), DVH, Brainstem, Spinal Cord