

Falah, Raih Rizky Mega. 2018. **Perbandingan *Analytical Anisotropic Algorithm* (AAA) dan *Pencil Beam Convolution* (PBC) Untuk Perencanaan Distribusi Dosis Radiasi Booster Kanker Serviks**. Skripsi ini di bawah bimbingan Dr. Suryani Dyah Astuti, M.Si dan Bambang Haris, M.Si., FM, Sp.RT. Program Studi Fisika, Departemen Fisika, Fakultas Sains dan Teknologi, Universitas Airlangga.

ABSTRAK

Penelitian ini bertujuan untuk mengetahui perbandingan *Analytical Anisotropic Algorithm* (AAA) dan *Pencil Beam Convolution* (PBC) untuk perencanaan distribusi dosis radiasi booster pada pasien kanker serviks. Dilakukan simulasi kalkulasi dosis menggunakan seperangkat alat *treatment planning system*(TPS) Eclipse merk Varian model 11.0.0 pada enam pasien kanker serviks yang mendapatkan perencanaan radiasi booster. Dosis yang diberikan adalah 2 Gy dengan 10 fraksinasi. Dipilih teknik *box field* dengan empat lapang radiasi sudut gantry 0^0 , 90^0 , 180^0 , dan 270^0 pada mesin Linac energi 6 MV. Penelitian ini menggunakan parameter *homogeneity index* (HI) dan *conformity index* (CI) untuk membandingkan kalkulasi AAA dan PBC. Uji statistik pada parameter HI dan CI menunjukkan bahwa *Analytical Anisotropic Algorithm* (AAA) lebih baik daripada *Pencil Beam Convolution* (PBC) dengan nilai rata-rata HI_AAA $1,069 \pm 0,016$ dibanding HI_PBC $1,105 \pm 0,013$ serta nilai rata-rata CI_AAA $0,805 \pm 0,103$ dan CI_PBC $0,782 \pm 0,083$. Nilai dosis serap rata-rata yang diterima *organ at risk*(OAR) masih di bawah batas toleransi. Dosis serap rata-rata yang diterima Bladder $D_{\text{mean_AAA}} 1348.483 \pm 392.425$ dan $D_{\text{mean_PBC}} 1350.617 \pm 393.565$. Sedangkan dosis serap rata-rata yang diterima Rectum $D_{\text{mean_AAA}} 1027.000 \pm 567.121$ dan $D_{\text{mean_PBC}} 1021.650 \pm 573.5886$.

Kata kunci : *AAA*, *PBC*, distribusi dosis, radiasi booster, kanker seviks, *HI*, *CI*.

Falah, Raih Rizky Mega. 2018. Comparison of Analytical Anisotropic Algorithm (AAA) and Pencil Beam Convolution (PBC) for Planning the Doses Distribution of Radiation Booster in Cervical Cancer. This final project is guidance by Dr. Suryani Dyah Astuti, M.Si. and Bambang Haris, M.Si., FM, Sp.RT. Major of Physics, Departement of Physics, Faculty of Science and Technology, Airlangga University

ABSTRAC

This study aims to determine the comparison of Analytical Anisotropic Algorithm (AAA) and Pencil Beam Convolution (PBC) for planning the distribution of radiation booster doses in cervical cancer patients. A dose calculation simulation was performed using a treatment planning system (TPS) Eclips brand Varian model 11.0.0 in six cervical cancer patients who received radiation booster planning. The dose given is 2 Gy with 10 fractions. Selected box fields techniques with gantry angles at 00, 900, 1800, and 2700 used a 6 MV Linac energy machine. This study uses homogeneity index (HI) and conformity index (CI) as parameters to compare the calculations of AAA and PBC. Statistical tests on HI and CI parameters indicate that Analytical Anisotropic Algorithm (AAA) is better than Pencil Beam Convolution (PBC) with an average HI_AAA value of 1.069 ± 0.016 compared to HI_PBC 1.105 ± 0.013 and an average value of CI_AAA 0.805 ± 0.103 and CI_PBC 0.782 ± 0.083 . Mean dose received by organ at risk (OAR) is still below the tolerance limit. The average of mean dose received by Bladder Dmean_AAA was $1348,483 \pm 392,425$ and Dmean_PBC $1350,617 \pm 393,565$. While the average mean dose received by the Rectum was Dmean_AAA $1027,000 \pm 567,121$ and Dmean_PBC $1021,650 \pm 573.5886$.

Key word : *AAA, PBC, dose distribution, booster radiation, cervical cancer, HI, CI.*