# Validasi dosimetri in-vivo EPID 2 dimensi menggunakan algoritma rasio korelasi = Validation 2-D EPID in-vivo dosimetry based on correlation ratio algorithm

Muhammad Mahdi Ramadhan, author



---

Abstrak

ABSTRAK<br>
Tahapan pasien spesifik QA bertujuan untuk menjamin kualitas parameter-parameter penyinaran sesuai dengan perencanaan terapi, verifikasi dilakukan sebelum dan saat penyinaran dilakukan. Riset menunjukkan terdapat 9 dari 17 kasus tidak dapat mendeteksi kesalahan saat verifikasi pre-treatment namun terdeteksi saat verifikasi treatment. Oleh karena itu, dibutuhkan dosimetri In-vivo yang cepat dan mudah digunakan. Penelitian dilakukan menggunakan pesawat Varian Unique milik Rumah Sakit Cipto Mangunkusumo (RSCM) dengan detektor a-Si 1000 Electronic Portal imaging Device(EPID). Dosimetri In-vivo dibuat berdasarkan informasi citra EPID yang diolah menggunakan algoritma rasio korelasi. teknik pengambilan citra adalah continuous acquisition. proses pembuatan dibagi menjadi dua tahapan, yaitu tahap commissioning sebagai pengambilan data set karakter EPID dan tahap pengujian dosimetri, selain itu dilakukan pengecekan karakter EPID dengan variasi MU dan laju dosis. Pengujian dosimetri menggunakan fantom homogen tipe slab ketebalan 5 cm dengan variasi lapangan 5×5,10×10,15×15,dan 20×20 cm2 dan fantom inhomogen tipe Rando female. Pada teknik IMRT dilakukan pengujian pada satu kasus pasien yang dipindahkan medianya ke fantom homogen tipe slab. Analisis dilakukan pada profile sebelum kalkulasi dan setelah kalkulasi ,yaitu full width half maximum (FWHM), beam symmetry, dan beam flatness. Kedua citra juga dibandingkan menggunakan gamma indeks 3%/3mm dan 2%/2mm. Dihasilkan citra distribusi dosis dosimetri dengan passing-rate > 95% untuk kriteria 3%/3mm dan > 80% untuk kriteria 2%/2mm pada kasus fantom homogen dan 84.464 % untuk kriteria 5%/3mm pada fantom Rando female dengan kesesuaian profil FWHM, beam symmetry, dan beam flatness memiliki rata-rata deviasi ≤ 2%.
<hr>
ABSTRACT<br>
The purpose of patients specific QA stage is to ensure the quality of radiation parameters in accordance with therapeutic planning, verification is carried out pre- and during treatment. Research shows that 9 out of 17 cases cannot detect errors when verifying pretreatment but are detected verification during treatment. Therefore, fast and easy In-vivo dosimetry is needed to solve that problem. The study was using a Varian Unique Linear Accelerator (Linac) at Cipto Mangunkusumo Hospital (RSCM) with a-Si 1000 Electronic Portal Imaging (EPID). The aim of this study is to development and validation 2-D EPID In-vivo Dosimetry (IVD) based on correlation ratio algorithm. The image was taking by continuous acquisition technique. The manufacturing process is divided into two stages, namely the commissioning stage as data characteristic of EPID image and calculation stage. In addition, it also checks the EPID character of increasing MU and dose rate. The validation dosimetry was test using a 5 cm homogeneous slab phantom with variations of field are 5×5,10×10,15×15,20×20 cm2 and one cases using inhomogeneous phantom, that is female Rando phantom. The IMRT technique was tested in one of the patient cases who was

transferred to a homogeneous slab phantom with the thickness is 10 cm. Analysis is carried out on the profile before calculation and after calculation, that is full width half maximum (FWHM), beam symmetry, and beam flatness, the images was also compare with gamma index 3%/3mm and 2%/2mm. The result is the doses distribution image produced by dosimetry have passing-rate > 95% for criteria 3%/3mm and > 80% for criteria 2%/2mm on homogeneous phantom cases and 84.464% for criteria 5%/3mm on female Rando phantom with profile suitability in FWHM, beam symmetry, and beam flatness parameters has an average deviation ≤ 2%.