ANALISIS DOSIS RADIASI KANKER PARU MENGGUNAKAN TEKNIK *INTENSITY MODULATED RADIOTHERAPY* UNTUK MINIMALISASI PAPARAN *ORGAN AT RISK*

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Karya tulis sebagai salah satu syarat
untuk memperoleh gelar Sarjana Sains
dari Universitas Andalas

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ABSTRAK

Telah dilakukan analisis dosis radiasi kanker paru menggunakan teknik *intensity modulated radiotherapy* untuk minimalisasi paparan *organ at risk*. Penelitian dilakukan menggunakan 5 citra pasien kanker paru stadium IV yang diolah menggunakan *software Treatment Planning System* (TPS) *Eclipse* di Rumah Sakit Universitas Andalas. Penelitian ini dilakukan untuk mengetahui distribusi dosis radiasi pada pasien kanker paru dengan menganalisis nilai *Conformity Index* (CI), *Homogeinity Index* (HI), dosis radiasi *Organ at Risk* (OAR) berdasarkan kurva *Dose Volume Histogram* (DVH) dan dosis maksimum yang diterima *Planning Target Volume* (PTV) berdasarkan hasil perencanaan terapi. Analisis tersebut berdasarkan acuan *International Commission on Radiation Units and Measures* (ICRU) *Report* 62 dan Report 83 untuk nilai CI dan HI. Dosis radiasi pada OAR paru-paru dan jantung dianalisis berdasarkan acuan *Quantitative Analysis of Normal Tissue Effect in the Clinic* (QUANTEC). Hasil penelitian untuk nilai CI diperoleh nilai mendekati 1 berdasarkan ICRU *Report* 62 dan nilai HI mendekati 0 berdasarkan ICRU *Report* 83. Dosis radiasi yang diterima OAR jantung sesuai dengan rekomendasi QUANTEC yaitu <10% sedangkan dosis radiasi yang diterima OAR paru-paru terdapat 2 pasien yang melebihi batasan volume yang direkomendasikan QUANTEC yaitu < 30%-35%. Pada dosis maksimum terdapat 2 pasien yang sama melebihi dosis rekomendasi ICRU *Report* 62 sebesar 107%.

Kata Kunci: Kanker Paru, *Conformity* Index, *Homogenity Index, Dose Volume Histogram, Planning Target Volume, Organ at Risk*

ANALYSIS OF RADIATION DOSE IN LUNG CANCER USING INTENSITY MODULATED RADIOTHERAPY TECHNIQUE TO MINIMIZE EXPOSURE ORGAN AT RISK

ABSTRACT

Radiation dose analysis of lung cancer using intensity modulated radiotherapy technique has been conducted to minimize exposure to organs at risk. The study was conducted using 5 images of lung cancer stage IV patients processed using Eclipse Treatment Planning System (TPS) software at Andalas University Hospital. This study was conducted to determine the radiation dose distribution in lung cancer patients by analyzing the value of Conformity Index (CI), Homogeinity Index (HI), Organ at Risk (OAR) radiation dose based on the Dose Volume Histogram (DVH) curve and the maximum dose received by Planning Target Volume (PTV) based on the results of therapy planning. The analysis is based on the International Commission on Radiation Units and Measures (ICRU) Report 62 and Report 83 for CI and HI values. Radiation dose in OAR lungs and heart was analyzed based on the Quantitative Analysis of Normal Tissue Effect in the Clinic (QUANTEC) reference. The results of the study for CI values obtained values close to 1 based on ICRU Report 62 and HI values close to 0 based on ICRU Report 83. The radiation dose received by the heart OAR is in accordance with the QUANTEC recommendation of <10% while the radiation dose received by the lung OAR there are 2 patients who exceed the volume limit recommended by QUANTEC which is <30-35%. At the maximum dose there are 2 patients who both exceed the recommended dose of ICRU Report 62 by 107%.

Keywords: Lung Cancer, Conformity Index, Homogeneity Index, Dose Volume Histogram, Planning Target Volume, Organ at Risk