

## Peran Radiasi Adaptif Pada Kasus Radiasi Definitif Kanker Nasofaring, Tinjauan Aspek Dosimetri = The role of adaptive radiation in definitive radiation cases for nasopharyngeal cancer, a review of dosimetry aspect

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### Abstrak

Tujuan : untuk mengetahui waktu terbaik dilakukan adaptasi perencanaan radiasi terhadap kasus kanker nasofaring yang menjalani radiasi di RSCM serta mencari tahu hubungan penurunan berat badan dan pengecilan ukuran tumor terhadap perubahan dosimetri pasien kanker nasofaring serta batasan perubahan separasi leher yang memerlukan tindakan adaptasi perencanaan radiasi. Metode : Dilakukan studi kohort prospektif pada 11 pasien kanker Nasofaring. Dilakukan pengukuran berat badan dengan timbangan dan separasi pada tip mastoid , kelenjar getah bening terlebar menggunakan alat ukur di TPS pada data set CT Simulator dan pada CBCT fraksi 1,6,11,16,21,26,dan 31. Data set hasil CBCT dilakukan fusi terhadap data set CT simulator kemudian dilakukan delineasi dan dilanjutkan rekalkulasi dosis dengan parameter yang sama seperti perencanaan radiasi awal kemudian dilakukan evaluasi dosimetri. Jika terdapat deviasi pada minimal 1 organ normal berisiko atau target volume maka masuk ke kriteria untuk dilakukan adaptasi perencanaan radiasi. Batasan waktu dalam menilai hubungan adaptasi perencanaan radiasi dengan parameter klinis dilakukan menggunakan kurva ROC (Receiving Operator Characteristic) Hasil : Dari 11 pasien yang diteliti,terdapat 10 pasien yang memerlukan adaptasi perencanaan radiasi dikarenakan melewati batas toleransi. Perubahan dosimetri yang menyebabkan adaptasi perencanaan radiasi, terjadi pada fraksi dan struktur organ yang berbeda. Hubungan antara waktu fraksinasi dengan indikasi tindakan adaptasi perencanaan radiasi signifikan mulai fraksi ke 6 sedangkan perubahan relative risk terbesar terdapat pada fraksi 11 ke fraksi 16. Indikasi adaptasi perencanaan radiasi dengan parameter klinis; separasi KGB terlebar (AUC 0.951, 95% CI 0.905-0.996), separasi Tip mastoid (AUC) 0.741, 95% CI 0.631-0.852, persentase berat badan ((AUC) 0.911, 95% CI 0.844-0.978). dengan batas tengah kurva ROC pada separasi KGB terlebar 1,21 cm dan persentase berat badan 4,49 %. Kesimpulan : dari penelitian ini, pasien kanker nasofaring membutuhkan radiasi adaptif untuk memberikan terapeutik ratio yang baik dan didapatkan adanya hubungan antara perubahan separasi dan penurunan berat badan dengan adaptasi perencanaan radiasi.

.....Objectives: to determine appropriate timing for adaptive radiation therapy for nasopharyngeal cancer cases undergoing radiation at the RSCM and to find out the relationship between weight loss and tumor size reduction on dosimetry changes in nasopharyngeal cancer patients and the cut off of changes in neck separation that require adaptive radiation therapy. Methods: A prospective cohort study was conducted on 11 nasopharyngeal cancer patients. Separation measurements were made on the tip mastoid, the widest neck lymph node using a measuring instrument at the treatment planning system (TPS) on the CT Simulator data set and the CBCT data set fractions 1,6,11,16,21,26, and 31. The CBCT data set was fused to the CT data set. The CBCT data set was then delineated and continued with dose recalculation using the same parameters as the initial radiation plan, then dosimetry evaluation was carried out. If there is deviation in at least 1 normal organ at risk or target volume, then it is included in the criteria for adaptive radiation therapy.

The time limit in assessing the relationship between adaptive radiation planning adaptive and clinical parameters was carried out using the ROC (Receiving Operator Characteristic) curve. Results: there were 10 out of 11 patients who required adaptive radiation planning due to exceeding the tolerance limit. Dosimetry changes that cause adaptive radiation planning occur in different fractions and organ structures. The relationship between fractionation time and indications of radiation planning adaptative measures is significant starting from the 6th fraction, while the largest relative risk changes are found in fractions 11 to 16. Indications of adaptive radiation planning with clinical parameters; widest lymph node separation (AUC 0.951, 95% CI 0.905-0.996), tip mastoid separation (AUC) 0.741, 95% CI 0.631-0.852, weight percentage ((AUC) 0.911, 95% CI 0.844-0.978). with the middle limit of the ROC curve at the widest KGB separation 1.21 cm and body weight percentage 4.49%. Conclusion: Nasopharyngeal cancer patients require adaptive radiation to provide a good therapeutic ratio and there is relationship between changes in separation and weight loss with adaptive radiation planning