3D dosimetry by compass program with array detector for volumetric modulated arc therapy

Hyun Do Huh*, Sang Hyoun Choi*, Woo Chul Kim*, Hun Jeong Kim*, Seong Hoon Kim*, Young Hoon Ji†, Kum Bae Kim‡, Dong oh Shin§, Suk Lee¥, Jang Bo Shim¥, Sam Ju Cho‡, Sang Hoon Lee§, Kwang Hwan Cho‡, Chul Kee Min‡

*Department of Radiation Oncology, College of Medicine, Inha University, †Department of Radiation Oncology, College of Medicine, Hanyang University, ‡Department of Radiation Oncology, Korea Institute of Radiological and Medical Science, §Department of Radiation Oncology, School of Medicine, Kyunghee University, Department of Radiation Oncology, College of Medicine, Korea University, Department of Radiation Oncology, Eulji University, Seongnam, Department of Radiation Oncology, Cheil General Hospital & Women’s Health care Center, Kwandong University College of Medicine, Department of Radiation Oncology, Soonchunhyang University

E-mail: hyundohuh@gmail.com

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Introduction

The aim of this study was to analyze the accuracy of dose of volumetric modulated arc therapy using the home-made phantom, a glass detector, GafChromic Film, ion chamber and a compass program with matrixx detector.

Method and Materials

In the Eclipse 8.6 environment, the arc optimizer was used to generate treatment plans that was tow circle shape target. The treatment machine is a Clinac 23iX(Varian, USA). A plan was measured several times consecutively. The measurement was performed using the home made multi-purpose VMAT phantom. Tools of measurement were a glass detector, Gafchromic film, farmer type ion chamber and compass analysis program with matrixx detector.

Results and Discussion

We measured the isodose curve in the RT_target, LT_tagert and G4 using the compass program and Matrixx detector.
with homemade multi-purpose VMAT phantom, three times a day measured by five days. Measurements were compared with the calculated values. Compass analysis program was used to analysis relative iso dose curve. As a result, average passing rate were 85.22% ± 1., 89.96% ± 2. and 95.14 % ± 1.18

**Discussion**

Using the Compass program, relative dose difference showed a 10% or more at targets. The result of every measurement showed difference. The relative error in the measurement with the film showed at least 7% difference. The absolute absorbed dose was analyzed at the Targets and other area using ion chamber and glass detector. For Targets, the difference was good agreement within 2%, but for steep area, relative error was 8%. A more research is needed to accurately measure the relative dose distribution. In inter-fraction treatment radiation therapy, reproducibility verification of MLC position is required in every treatment.

**Conclusions**

Compass analysis program and Matrixx detector are useful dose verification tools for Volumetric Modulated Arc Therapy. However, doses were somewhat different between calculated dose and measured dose at steep dose gradient region and low dose region. We recommend that absolute dose be necessary to be measured using the glass detector and ion chamber at region.

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**References**
