

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : JURNAL ILMIAH

Judul Karya Ilmiah (Artikel) : Silicone rubber with lead-acid composite as alternative radiation filter in digital radiography (DR)

Jumlah Penulis : 7 orang

Status Pengusul : ~~Penulis pertama~~/ Penulis ke-4/ ~~Penulis Korespondensi~~ **

Identitas Jurnal Ilmiah : a. Nama prosiding : Journal of Physics: Conference Series
b. Nomor ISSN : 1742-6588, 1742-6596
c. Tahun terbit, tempat pelaksana : 2020, Indonesia
d. Penerbit : IOP Publishing
e. Alamat web jurnal : <https://iopscience.iop.org/article/10.1088/1742-6596/1505/1/012035>
f. Terindeks di Scimagojr/Scopus atau di....**

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☐ Prosiding Forum Ilmiah Nasional

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	Reviewer I	Reviewer II	
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b. Ruang lingkup dan kedalaman pembahasan (30%)	8,6	8,5	8,55
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	8,5	8,5	8,5
d. Kelengkapan unsur dan kualitas penerbit (30%)	8,5	8,5	8,5
Total = (100%)			27,95
Nilai untuk Pengusul : $(40\% \times 27,95) / 6 = 1,86$			

Semarang, 27 Mei 2021

Reviewer 1



Prof. Dr. Drs. Muhammad Nur, DEA
NIP. 195711261990011001
Bidang ilmu/Unit kerja : Fisika/Fakultas Sains dan Matematika

Reviewer 2



Prof. Dr. Kusworo Adi, S.Si., M.T.
NIP. 197203171998021001
Bidang ilmu/Unit kerja : Fisika/Fakultas Sains dan Matematika

**LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
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b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,6
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9		8,5
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9		8,5
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4. Kelengkapan unsur dan kualitas terbitan:

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Semarang, 10 Juni 2022

Reviewer 1



Prof. Dr. Drs. Muhammad Nur, DEA

NIP. 195711261990011001

Unit Kerja : Fisika

Bidang Ilmu: Fakultas Sains dan Matematika

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	Internasional ☒	Nasional ☐	
a. Kelengkapan unsur isi prosiding (10%)	3		2
b. Ruang lingkup dan kedalaman pembahasan (30%)	9		8,5
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9		8,5
d. Kelengkapan unsur dan kualitas terbitan /prosiding (30%)	9		8,5
Total = (100%)	30		27,5
Nilai Pengusul = 40% x 1/6 x 27,5 = 1,83			

Catatan Penilaian artikel oleh Reviewer :

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Isi jurnal sesuai dan lengkap dari komponen-komponen yang ada abstrak, pendahuluan, prosedur eksperimen, hasil dan pembahasan, lalu kesimpulan dan daftar pustaka yang digunakan.

2. Ruang lingkup dan kedalaman pembahasan:

Paper ini membahas tentang filter radiasi alternatif untuk melindungi organ dan meminimalkan dosis yang diterima oleh pasien dengan tetap menjaga kualitas gambar pada pemeriksaan Digital Radiografi. Filter radiasi yang digunakan terbuat dari Silicone Rubber-Lead Acid (SR-Pb), dengan dimensi 17 x 17 x 0,6 cm³. Persentase Pb dalam SR-Pb divariasikan dari 0 sampai 5%. Hasil menunjukkan bahwa SR Pb sebagai filter radiasi alternatif untuk proteksi pada pemeriksaan DR, terutama untuk indikasi yang tidak memerlukan citra kontras rendah yang sangat baik.

3. Kecukupan dan kemutakhiran data/informasi dan metodologi:

Data-data dan serta metodologi yang digunakan dalam penelitian ini cukup baik dan mutakhir sedrta didukung dengan referensi terkini dengan jumlah referensi kurang dari 5 tahun sebanyak 11.

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Karya ini diterbitkan dalam prosiding internasional berkualitas Q3 oleh IOP Publishing dengan unsur-unsur yang lengkap serta kualitas yang baik.

Semarang, 4 Juli 2022
 Reviewer 2



Prof. Dr. Kusworo Adi, S.Si., M.T. NIP.
 197203171998021001
 Unit Kerja : Fisika
 Bidang Ilmu: Fakultas Sains dan Matematika



**17th South-East Asia Congress of Medical Physics (SEACOMP) &
3rd Annual Scientific Meeting on Medical Physics and Biophysics (PIT-FMB)**

Improvement on Patient Care and Safety through the innovation in Medical Physics

Certificate of Attendance

This certificate is awarded to

Yulia Irdawati

in recognition of his/her valuable contribution as

Oral Presentation

in the 17th SEACOMP & 3rd PIT-FMB
held on 8 – 10 August 2019 at Bintang Bali Resort, Bali, Indonesia

Jointly organized by

Indonesian Alliance of Higher Education in Medical Physics (AIPFMI)

Indonesian Association of Physicists in Medicine (AFISMI)

Sout-East Asia Federation of Organizations for Medical Physics (SEAFOMP)

The Congress is **AFISMI-approved** and accredited for **3 SKP points** (3 points for Workshops or 3 points for Congress)

Endarko, Ph.D
Organizing Chair
17th SEACOMP & 3rd PIT-FMB



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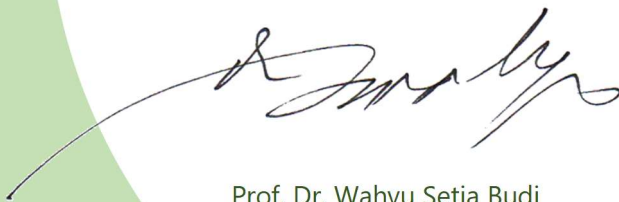
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Yulia Irdawati

atas kontribusinya dalam AFISMI-AIPFMI Research Colloquium Series sebagai

Pembicara

12 Agustus 2020



Prof. Dr. Wahyu Setia Budi
Ketua AIPFMI



Supriyanto Ardjo Pawiro, Ph.D.
Ketua Umum AFISMI

Sertifikat ini bernilai Satuan Kredit Profesi (SKP) AFISMI yang setara dengan 1 (satu) sesi aktivitas sebagai Pembicara pada acara seminar daring sesuai pedoman yang berlaku



17th South-East Asia Congress of Medical Physics (SEACOMP) 3rd Annual Scientific Meeting on Medical Physics and Biophysics (PIT-FMB)

“Improvement on Patient Care and Safety through the innovation in Medical Physics”

8 - 10 August 2019 | Bintang Bali Resort, Bali, Indonesia

IMPORTANT DATES



SPEAKERS

- | | | | |
|-------------------------------|----------------------------|--------------------------|-----------------------------|
| ● Prof. Dr. Ir. Hilde Bosmans | ● Prof. Dr. Agus Rubiyanto | ● Dr. Sparisoma Viridi | ● Dr. Deni Hardiansyah |
| ● Prof. Dr. Hidetaka Arimura | ● Dr. Hafiz Zin | ● Dr. Choirul Anam | ● S. Somanesan, MS |
| ● Prof. Dr. Gerhard Glatting | ● Dr. James Lee | ● Dr. Cheng B Saw | ● Nur Rahmah Hidayati, M.Sc |
| ● Prof. Dr. Kwan Hoong Ng | ● Dr. Warsito | ● Dr. Ola Holmberg | ● Kristina Wigati, M.Si |
| ● Prof. Anchali K | ● Dr. Toshioh Fujibuchi | ● Dr. Yessie Widya Sari | ● Ikhsan B Nasution, M.Si |
| ● Prof. Dr. Moh. Yasin | ● Dr. Freddy Haryanto | ● Dr. Ahmad kusumaatmaja | ● Wahyu Edy Wibowo, M.Si |

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Registration without accomodation:

International Participants

Early Bird Registration (Before 11 June 2019)	
AFOMP/SEAFOMP/MEFOMP Member	: USD 250
Non AFOMP/SEAFOMP/MEFOMP Member	: USD 300
Student*	: USD 175

Regular Registration (After 11 June 2019)

AFOMP/SEAFOMP/MEFOMP Member	: USD 300
Non AFOMP/SEAFOMP/MEFOMP Member	: USD 350
Student*	: USD 200

Indonesian Participants

Early Bird Registration 1 (Before 11 May 2019)

AFISMI Member	: IDR 1.800.000
Non AFISMI Member	: IDR 3.000.000
Student*	: IDR 1.500.000

Early Bird Registration 2 (Before 12 May - 11 June 2019)

AFISMI Member	: IDR 2.000.000
Non AFISMI Member	: IDR 3.250.000
Student*	: IDR 1.600.000

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AFISMI Member	: IDR 2.200.000
Non AFISMI Member	: IDR 3.500.000
Student*	: IDR 1.700.000

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Indonesian Participants : Registration fees without accomodation + IDR 900.000/day (Deluxe Room-King Size/Twin Bed)

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Silicone rubber with lead-acid composite as alternative radiation filter in digital radiography (DR)

Irdawati, Yulia^{a, b}; Sutanto, Heri^{a, b} ; Anam, Choirul^a; **Hidayanto, Eko^a**; Zahroh, Fatimatuz^{a, b};

Wiratma Jaya, Gede^{a, b}; Susanto, Bambang^{a, b}

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^a Department of Physics, of Physics, Faculty of Sciences and Mathematics, Diponegoro University, Jl. Prof. Soedarto SH, Tembalang, Semarang, Central Java, 50275, Indonesia

^b Smart Material Research Center (SMARC), Diponegoro University, Jl. Prof. Soedarto SH, Tembalang, Semarang, Central Java, 50275, Indonesia

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Development of a novel artifact-free eye shield based on silicon rubber-lead composition in the CT examination of the head

Irdawati, Y. , Sutanto, H. , Anam, C. (2019) Journal of Radiological Protection

Characteristic of silicone rubber as radioprotection materials on radiodiagnostic using X-ray conventional

Sutanto, H. , Wjaya, G. , Hidayanto, E. (2019) Journal of Physics: Conference Series

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Preface

The 3rd Annual Scientific Meeting on Medical Physics and Biophysics (PIT-FMB) in conjunction with the 17th South-East Asia Congress of Medical Physics (SEACOMP) was held in Bali, Indonesia from 8 to 10 August 2019. The annual event is aimed to gather medical physics and biophysics communities in Indonesia and South-East Asian region for sharing of knowledge, expertise, scientific discussions, cultural exchange and updates of medical physics activities. The event is also acts as a platform for the establishments of regional education, training and professional developments in medical physics and for the advancement in status and standard of practice of the medical physics profession in the region. The theme for this congress is “Improvement on Patient Care and Safety through the innovation in Medical Physics”.

The congress was discussing four main themes: radiotherapy, diagnostic radiology, nuclear medicine and biophysics. The committee accepted 178 abstracts from more than 5 participating countries to be presented in the congress, 97 of which were listed as oral contributions and 81 were posters. The congress also had many invited lectures and workshops which discuss many in-depth topics related to the main themes, such as:

- radiotherapy: quality assurance, dose calculation, patient safety issue, patient-specific IMRT treatment verification and quality management;
- diagnostic radiology: optimization, technical and clinical image quality, multimodality molecular imaging and medical exposure in diagnostic imaging;
- nuclear medicine: patient safety and optimization, radionuclide metrology, radiation safety and radiation protection;
- biophysics: non-ionizing EMF, sensor for biomedical applications, monte carlo simulation for biological system and nanocellulose composite;

73 selected papers, all have been peer reviewed through processes administered by the proceedings Editors, are published in this volume of Journal of Physics: Conference Series. Each article was peer-reviewed by at least two reviewers from the scientific committee and appointed reviewers based on their field of expertise. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

We would like to express our gratitude to all invited speakers, oral and poster presenters for their participation and to the Organising Committee members for all their hard work in making the congress happen. We also would like to thank all authors who submitted the manuscript of the work presented at the congress to be included in



the volume, and to the Scientific Committee members and reviewers for reviewing the submitted manuscripts and improve the scientific quality of this proceedings. Finally, we especially thank all who attended the congress and the sponsors for their financial support.

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2020

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The 3rd Annual Scientific Meeting on Medical Physics and Biophysics (PIT-FMB) and the 17th South East Asian Congress of Medical Physics (SEACOMP) 8-10 August 2019, Indonesia

Accepted papers received: 03 December 2020

Published online: 15 June 2020

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Preface

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Dosimetric comparison between single and double isocenters VMAT for SRT with multiple targets

Wai Lwin Lwin Kyaw, Sivalee Suriyapee, Chotika Jumpangern and Taweap Sanghangthum

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Computer-Aided Diagnosis (CAD) to Detect Brain Abnormality from PET Image using

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012029

Effect of Iterative Reconstruction Algorithm Associated with Low Contrast Detectability Performance from CT Pulmonary Angiography Examinations

H H Harun, M K A Karim, N A Muhammad, H R A Razak, A Sabarudin and S C Muniandy

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012030

Effect of Computed Tomography Slice Thickness on Calculated Coronary Artery Calcium Score in the Assessment of Possible Radiation Induced Cardiac Toxicity

C. Alexander and R. Rajapakshe

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012031

Development of a low-cost imaging performance evaluation phantom for a generic multi-detector CT scanner

C J Calleja, R C Caballar and A Peralta

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012032

A Potential Biomarker from Diffusion Weighted Imaging and Parametric Response Map Analysis for Treatment Response Prediction in Nasopharyngeal Cancer

T Jirawatwanith, T Tangyoosuk, C Lertbutsayanukul, N Jittapiromsak and Y Rakvongthai

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012033

Study of Longitudinal Relaxation Time Multi Echo Multi Planar (T1 MEMP) and Diffusion Weighted Imaging (DWI) on Magnetic Resonance Imaging (MRI) Image

D Y Alam, Milani, N Rauf and B A Samad

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012034

Automated patient position in CT examination using a Kinect camera

Nissa Afrieda, Choirul Anam, Wahyu Setia Budi and Geoff Dougherty

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012035

Silicone rubber with lead-acid composite as alternative radiation filter in digital radiography (DR)

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Yulia Indrawati, Heri Suarno, Choirul Anam, **Eko Hidayanto**, Fatimatuz Zahroh, Gede Wiratma Jaya and



Monte Carlo Study of Nuclear Fragmentation in Water Irradiated with Protons and ^{12}C Ions for Particle Therapy Applications

V Convicto^{1,2,3}, D R Pamisa^{1,2}, A Lintasan^{1,2,4}, C T Quiñones^{1,2}

¹ Mindanao Radiation Physics Center, Premier Research Institute of Science and Mathematics, Mindanao State University-Iligan Institute of Technology, A. Bonifacio Avenue, 9200 Iligan City, Philippines

² Physics Department, Mindanao State University-Iligan Institute of Technology, A. Bonifacio Avenue, 9200 Iligan City, Philippines

³ Physics Department, Mindanao State University-Marawi Campus, 9700 Marawi City, Philippines

⁴ Mathematics and Science Department, Mindanao State University-Tawi-tawi, Sangasanga Campus, Bongao, 7500, Philippines

Email: vernie.convicto@g.msuiit.edu.ph

Abstract. In this study, the nuclear fragmentation of the secondary particles produced when water is irradiated with protons and carbons were investigated. Proton beams with varying incident energies of 100 MeV, 130 MeV, 150 MeV and 160 MeV were used with corresponding ^{12}C ion beams of about 187.50 MeV/u, 241.67 MeV/u, 285.42 MeV/u and 308.33 MeV/u respectively. The kinetic energy distribution and energy deposition of primary and secondary particles were studied via Monte Carlo simulation with the aid of GATE v.8.0 via GEANT4 simulation toolkit version 10.3.2 with 1×10^6 incident beams. The physics list used was QGSP_BIC (Quark Gluon String Pre-compound Binary Cascade). When the primary ^{12}C ion and proton beams interact with water, secondary light-charged and heavy-charged particles are produced with atomic number $Z > 2$ are produced. In general, it was shown that the incident ^{12}C ions are less scattered as they traverse mater compared to the incident protons. Thus, the energy deposition of ^{12}C ions is well-defined and is better in terms of conformation.

1. Introduction

Nowadays, there are two major modalities used in radiotherapy, namely light-ions (conventional radiotherapy) which utilize photons and electrons and heavy-ions (hadron therapy) such as protons, carbons and oxygen. The major physical advantage of heavy-charged particles over light-ions is their unique characteristic, i.e. depth-dose profile known as the Bragg curve or Bragg peak, a feature that allows high dose deposition to a locally restricted volume (Fig. 1(a)). Their physical depth-dose distribution in tissue is characterized by a small entrance dose, sharp increase of dose in a well-defined depth and the rapid dose fall-off beyond the maximum dose deposition at the distal edge. The well-defined range and small lateral beam spread make it possible to deliver the dose up to millimeter precision [1-2].



Prediction of excess volume in implementing the ABC system for breath-hold treatment: A preliminary study

A T Hoang¹, W L Jong² and N M Ung²

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Abstract. Deep inspiration breath-hold (DIBH) is a clinical technique intended to reproduce organ position at the chest or abdominal region during radiotherapy sessions [1]. Active Breathing Coordinator™ (ABC) is a system that is used for the implementation of DIBH which has shown to reduce heart dose in breast cancer radiotherapy [2]. Since the ABC system's main function is motion control of the torso region, attempts were made to apply the system to other cancer cases such as lung, liver, lymphoma and pancreas, in which treatment margins are stricter than in breast cancer. Hence, an evaluation on the technical aspects of the ABC system is essential. Data collection on patients treated with the assistance of the ABC system at the University of Malaya Medical Centre have been carried out since September 2018. The volume at the start of breath-hold moment, the maximum volume in the breath-hold session, the time delay between those two moments, the discrepancy in volume between those two moments, and the air flow rate leading to the breath-hold moment were all extracted from the data. The distribution and correlation of these parameters were evaluated between different groups of nominal threshold volume. The performance of the ABC system was characterised based on the discrepancy between the nominal volume and the real volume (excess volume) of a breath-hold session. The correlation coefficient of multiple regression of excess volume on nominal volume, air flow rate and time delay were 0.760, 0.714, 0.688 in group of nominal volume of 1.2 L, 1.3 L, 1.4 L, respectively. The correlation coefficient of regression of excess volume on air flow rate were 0.883 in group of nominal volume of 2.0 L. The excess volume can potentially be predicted by the nominal volume, the air flow rate and the time delay. Further investigation on assessing these parameters separately and on how the excess volume affects the treatment outcome is needed.

1. Introduction

Thanks to its proven effectiveness and robustness in cancer treatment, radiotherapy remains as one of the main treatment modalities for tumour since it was first introduced in the 19th century. As technology is rapidly evolving, new treatment techniques and its respective systems are being introduced into the radiotherapy practice. Breath-hold technique is such an innovative way of taking into account the uncertainty in the treatment of the thoracoabdominal region.



Dosimetric comparison between single and double isocenters VMAT for SRT with multiple targets

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Abstract. The focal irradiation approach for brain metastasis (BMs) Stereotactic Radiosurgery (SRS) or Stereotactic Radiotherapy (SRT) has emerged as an important modality for multiple BMs. This study aimed to evaluate the dosimetric effects between single isocentre (SI) and double isocentres (DI) VMAT SRT of multiple brain metastases. Eighteen VMAT SRT plans with varying lesions size, number and distance were simulated on patient CT image using Eclipse treatment planning system version 15. The plan consists of 3 techniques in: 2 coplanar arcs SI, 1 coplanar combine with 2 non-coplanar arcs SI and 2 non-coplanar and 1 coplanar arc DI. The VMAT plans were generated with 21Gy prescription dose to all lesions in 3 fractions. The plans were evaluated in terms of Gradient index (Paddick GI), Conformity index (Paddick CI), and Homogeneity index (ICRU HI) for PTV and V_{12Gy} and V_{6Gy} for normal brain. The same dose constraints were used to optimize for all cases. On the average result from 3 techniques, 3 arcs SI plans and DI were better in GI (14.79 ± 5.83 , 13.70 ± 4.72) and CI (0.63 ± 0.08 , 0.62 ± 0.09) than 2 arcs SI (17.56 ± 6.15 , 0.62 ± 0.11), while HI values was comparable for all techniques. For normal brain, V_{12Gy} for 2 arcs and 3 arcs SI plans were comparable with DI and the volumes of normal brain receiving 6 Gy in 3 arcs SI and DI ($77.40 \pm 34.30 \text{ cm}^3$, $68.94 \pm 30.50 \text{ cm}^3$) were better than 2 arcs SI ($108.10 \pm 57.20 \text{ cm}^3$). Moreover, the number of arcs, monitoring units and treatment time were also increased and inconvenience in practice in DI. In conclusion, 3 arcs non-coplanar SI VMAT technique presents the suitable in dosimetric evaluation in 2-5 lesions metastases SRT.

Keywords: SRT, SI, DI and VMAT.

1. Introduction

Nowadays, brain metastases are the most common diagnosis in patients who are complications of systemic malignant disease as morbidity and mortality rates are high in patients who develop brain metastasis. The incidence rate of 54% has been reported for brain metastases in patients with adenocarcinoma of the lung. ^[1, 4] Due to the significant of these diseases, the use of better treatment techniques also may have contributed to a higher survival rate for brain metastases. The different types of radiation treatment to brain that are led from whole brain treatment to advanced SRS VMAT.



Development of a Fluence Generating Programme for Patient-Specific Quality Assurance and Calibration of an Amorphous Silicon EPID

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Abstract. Patient-specific quality assurance (QA) is an essential part of intensity-modulated radiotherapy (IMRT) and volumetric arc therapy (VMAT) treatments. This study aims to develop a Patient-specific QA system through the development of a fluence generating programme and utilization of amorphous silicon (aSi) electronic portal imaging device (EPID). The EPID was investigated on the dependency of dose rate, uniformity of detector sensitivity and output factor. A fluence generating programme was written using MATLAB. Five simple dynamic arc plans and one patient VMAT plan were created using the Monaco treatment planning system which were used in the programme to generate fluence maps. The accuracy of the programme was evaluated by performing gamma analysis between the generated and measured fluence. EPID signal was found to be linearly proportional to dose (1-1000 MU) and independent of dose rate. The mean uniformity ratio was $1.07 \pm 0.04\%$. The measured fluence maps were corrected for uniformity before gamma analysis. Output factor and dose deposition were taken into account in the process. The average result of the gamma analysis passed the 95% threshold. A fluence generating programme was developed, serving as the foundation of the Patient-specific QA system using aSi EPID for IMRT/VMAT delivery in this centre.

1. Introduction

The Patient-specific QA is an important part of the IMRT, it ensures the accuracy of dose delivery due to the high complexity of fields. EPID, which is incorporated with LINAC is used for setup verification purpose. It was first used in 1991 for dose measurement [1] and the characterization was done in various studies [2]. EPID was reported to be independent of gantry angle [3] and can be used interchangeably with 2D or 3D arrays [3-5]. It also has a higher spatial resolution [6] and high image contrast [7]. Amorphous silicon (aSi) based EPID is the most commonly used EPID nowadays [2].

PortalVision system developed by Varian (Varian Medical Systems, Palo Alto, CA, USA) enables the use of EPID for patient-specific QA. However, this functionality is not available for some other systems. Hence, centres with such systems may benefit from the development of a fluence generating program. Performing Patient-specific QA using EPID requires two components: the predicted response of EPID to energy fluence of the treatment and a calibrated EPID. For simplicity, the response of EPID to energy fluence will be represented as “fluence” in this article.

