ESTRO 2020 // Key Quality Management Abstracts

A Selection from Studies Featuring Sun Nuclear Solutions

SRS/SBRT QA

Featuring SRS MapCHECK®, StereoPHAN™, Multi-Met WL Cube

PO-1399

Evaluation of SRS MapCHECK® for SABR patient-specific QA

Y Miao, et al., Queen's Hospital - Barking Havering and Redbridge University Hospitals NHS Trust, United Kingdom

- *"The development and analysis of films causes delay between QA delivery and the availability of results."*
- *"Conclusion: SRS MapCHECK and GAFchromic film are interchangeable detector systems for SABR PSQA"*

PO-1385

CyberKnife® patient plan verification with the SRS MapCHECK® - First clinical experience

S Peters, et al., Strahlenzentrum, Germany

- *"Conclusion: The SRS MapCHECK allows easy and meaningful verification of patient plans without film, without restrictions of the angle of incidence and with little expenditure of time."*

PO-1359

Evaluation of a Beam Model for Stereotactic Radiotherapy using a 2D Semiconductor Array

A Roeser, et al., Helios Universitätsklinikum Wuppertal, Germany

- *"Conclusion: Measurements obtained with the SRS MapCHECK - for phantom-based as well as for real patient plans - are highly consistent with the calculated dose even using a gamma criteria of 1%/1mm."*
- *"…SRS MapCHECK is a suitable measuring device for dosimetry in stereotactic radiotherapy."*

PO-1311

Dosimetric evaluation of a 2D multidetector dedicated to stereotactic radiotherapy

R Villeneuve, et al., Centre Hospitalier Princesse Grace, France

- *SRS MapCHECK validation for 6X, 6FFF, and 10FFF*

PO-1374

Validation of SRS MapCHECK for patient specific QA

C. A. Marcos, et al., University Hospital La Princesa, Spain

- *SRS MapCHECK validation with Acuros, various methods*

PO-1414

Determination of dosimetric leaf gap (DLG) for FFF and WFF beams for a high definition MLC

C. A. Marcos, et al., University Hospital La Princesa, Spain

- *SRS MapCHECK used to tune DLG factors on HDMLC*

PO-1320

A machine QA tool to verify targeting accuracy of off-isocenter metastases

H Kudrolli, et al., Sun Nuclear Corp, Florida, US

- *"Results: Optimized delivery plans were developed, which allow data acquisition to be completed within 10 minutes on either the Edge of TrueBeam."*
- *"By introducing positioning errors of known magnitude, we demonstrated the ability of the tool to identify translational positioning errors to ± 0.1 mm and rotational positioning errors (pitch, roll, and yaw) ± 0.2 degrees."*

MR-GUIDED RT QA

Featuring ArcCHECK®-MR & EDGE Detector

SP-0727

Dosimetry and QA for MR-Linacs

J.W.H. Wolthaus, University Medical Center Utrecht, The Netherlands

- *ArcCHECK-MR used (along with other arrays) to perform MRI QA*
- *"The devices generally perform equally well in a 1.5 T magnetic field compared to the conventional linac use but require a recalibration of the detectors."*

OC-0633

The dose response of high-resolution diode detectors in magnetic field

T Tekin, et al., Medical Campus Pius Hospital - Carl von Ossietzky University, Germany

- *EDGE Detector and other diodes agreed with Monte Carlo simulations to within 1.7% when cross-calibration was performed in the magnetic field.*

Dosimetry QA

Featuring 3D SCANNER™

PD-0186

Impact of effective spot size parameter on MU calculation of Acuros algorithm in small MLC fields

A Fogliata, et al., Humanitas Research Hospital, Italy

Varian Medical Systems® Halcyon™ System QA

Featuring ArcCHECK® & 3D SCANNER™

PO-1347

Halcyon commissioning using a 3D water phantom: beam data validation and initial end-to-end tests

D San José Olmedo, Hospital Universitario Central Asturias, Spain

- *Halcyon model confirmation using 3D SCANNER*
- *End-to-End verification performed with ArcCHECK and other methods*

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A Selection from Studies Featuring Sun Nuclear Solutions

Patient QA

Featuring SunCHECK™ Patient (PerFRACTION™)

NOMINEE FOR **BEST POSTER**
IN PHYSICS CATEGORY

PH-0050
Results of 2 years of automated pre-treatment and absolute transit in vivo dosimetry.
E Bossuyt, et al., Iridium Kankernetwerk, Belgium

- *"Objective: Being a busy department with 5700 new patient plans/year and several satellite centers, efficiency, standardization and automation are key for a QA program"*
- *"Results: 56542 fractions were analyzed: 91% passed, 7% failed and 2% were not calculated. As in the 1st year, no relevant patient or machine errors were detected with analysis of log files alone"*
- *"Errors were caught such as: weight loss at start of treatment, problem with bellyboard, errors in planning, problems at simulation with 4DCT artefacts or contrast agents in bowel, pleural effusions cleared up by the time of treatment, poor breathing for gated breast patients."*
- *"Conclusion: …absolute verification enhances detectable errors..."*

- Conclusions

- A standardized transit dosimetry program was introduced in a busy department. The system allows for efficient QA for all patients and all fractions.
- Pre-treatment QA results are clearly better for Truebeams than for Clinacs.
- We believe in vivo based on log files only is not sufficient for patient QA, especially if not combined with CBCT images.
- In-vivo transit dosimetry efficiently reveals a wide variety of deviations, absolute verification enhances detectable errors.
- In vivo transit dosimetry shows potential to serve as a base for adaptive planning.

PO-1398
Validation and clinical Implementation of Sun Nuclear DoseCHECK and PerFRACTION for Varian Halcyon
E Almond, et al., Queen's Hospital- Barking Havering and Redbridge Hospitals NHS Trust, United Kingdom

- *"Conclusion: DoseCHECK and PerFRACTION have shown good dose distribution agreement with Eclipse TPS. The result shows that DoseCHECK and PerFRACTION are both viable systems for independent dose calculations for patients being treated on the Halcyon platform in our clinic."*

PO-1365
EPID 2D transit In Vivo Dosimetry: Can relevant anatomy and positioning differences be detected?
N Jornet, et al., Hospital de la Santa Creu i Sant Pau, Spain

- *"Purpose or Objective: To study the sensitivity of a 2D EPID transit IVD system to detect imposed anatomy and positioning differences"*
- *"Conclusion: The PerFRACTION module for 2D IVD performs well regardless of the treatment technique, being capable of identifying all the changes imposed on the phantom."*

PO-1646
Evaluation of the feasibility of EPID-based in vivo dosimetry system for prostate cancer patients
N Kadoya, et al., Tohoku University Graduate School of Medicine, Japan

- *"Our result showed that PerFRACTION with EPID exit images effectively detected the body shrinkage and rectal gas during the treatment course."*

PO-1836
Impact of bladder and rectum preparation on in vivo dosimetry for prostate cancer patients
Y Fiagan, et al., Iridium Kankernetwerk, Belgium

- *Used PerFRACTION to study how preparation instruction on bladder/rectal filling affected patients. The group given instruction had fewer failed fractions.*

PD-1865
Improving radiotherapy accuracy with EPID in-vivo dosimetry: results from a multicentric study.
M Esposito, et al., USL CENTRO TOSCANA, Italy

- *"Conclusion: The implementation of IVD improved dosimetric accuracy and treatment reproducibility in all Centers participating to this study."*

PO-1383
Comparing the error detection performance of Portal Dosimetry and PerFRACTION in pre-treatment VMAT QA
S Moloney, et al., Poole Hospital NHS Foundation Trust, UK

- *Addresses PerFRACTION implementation based on adequate performance, linac independence and automated image retrieval/analysis.*

PO-1608
Assessment of shoulder position variation and its impact on VMAT doses using an EPID-based software
I Valverde Pascual, et al., Hospital de la Santa Creu i Sant Pau, Spain

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Machine QA

Featuring SunCHECK™ Machine

PO-1865

Quality control of SBRT treatments with VMAT

J Válgoma Solanas, et al., Hospital Universitario Basurto, Spain

- *To meet current standards and perform efficient SBRT QA, they used SunCHECK Machine Linac QA with good results*
- *"Purpose or Objective: As radiotherapy techniques have been increasing in complexity, prescription doses are higher and dose gradients are steeper, the quality controls (QC) of the treatments have become more exhaustive in order to guarantee their correct administration."*

Patient QA

Featuring PlanIQ™

PO-1470

Personalized Planning for prostate radiotherapy in Pinnacle Evolution improves planning efficiency

M Kuster, et al., Radboud university medical center, The Netherlands

Patient QA

Featuring ArcCHECK®

PO-1404

Safe number of transfers between Truebeam & Clinac for different treatment sites without replanning

T Newbold, Poole Hospital NHS Foundation Trust, United Kingdom

PO-1348

Can reference data for TPS beam parameters be used to create a good quality dose calculation model?

M Hussein, Centre for Metrology in Medical Physics - MEMPHYS, United Kingdom

Radixact™ & TomoTherapy QA

Featuring ArcCHECK®

PO-1768

A pre-treatment quality assurance survey on patients treated with the new Accuray Radixact platform

M. Fusella, et al., Istituto Oncologico Veneto, Italy

PO-1368

Clinical implementation of RayStation for Accuray Radixact tomotherapy platform

M. Fusella, et al., Istituto Oncologico Veneto, Italy

PO-1361

Treatment plan preparation and verification for total body irradiation using tomotherapy

E Konstanty, et al., Greater Poland Cancer Centre, Poland

PO-1363

Dosimetric impact of leaf open time and other planning parameters on DQA in helical tomotherapy

K Chang, et al., Yonsei Cancer Center, South Korea

- *"We confirmed that plans having a proportion of LOT below 100 ms is more than 25% could affect DQA failures."*