

AAPM 2019 // Key Quality Management Abstracts

A Selection from 65+ Studies Featuring Sun Nuclear Solutions

SRS/SBRT QA

Featuring SRS MapCHECK®, StereoPHAN™ & MultiMet-WL Cube

SU-I330-GePD-F4-1

Characterization and Validation of SRS MapCHECK for Patient Specific QA On CyberKnife M6

D Parsons, et al., UT Southwestern Medical Center, Dallas, TX

- CyberKnife® validation for MLC, Iris, and Cone – using 2%/1mm criteria
- “The use of SRS-MC has been characterized and validated for patient specific QA on CyberKnife for a variety of clinical plans. The results show that SRS-MC is well suited for this task.”

HEAR FROM THE AUTHOR

Tuesday, July 16, 12:20 - Sun Nuclear Lunch Symposium, Meeting Room 217 (A-C)

TU-C1000-GePD-F4-4

Characterization of a Two-Dimensional Diode Detector Array for Use in Patient Specific, Pre-Treatment QA of Stereotactic Plans

D Wiczorek, et al., Miami Cancer Institute, Miami, FL

MO-I345-GePD-F4-2

Development and Implementation of a Mechanical and Radiation Tests for a Novel Stereotactic Radiosurgery Device Utilizing a 2D Detector Array, to Replace the Film-Based QA

S Becker, et al., Univ. of Maryland School of Medicine, Baltimore, MD

- SRS MapCHECK used to QA GammaPod SBRT system for breast treatments
- “Beam delivery time was identical to the film-based QA, however the analysis time reduced from 1 hr min to 5 min.”

PO-GePV-T328

Dosimetric Evaluation of An SRS MapCHECK for SBRT QA

F Mostafaei, et al., Department of Radiation Oncology, University of Arizona, Tucson, AZ

- Gamma passing rates between SRS MapCHECK and MapCHECK® 2: 98.2% vs. 95.1% (2%/2mm) and 93.6% vs. 67.1% (2%/1mm)
- “Average number of active diode detector points between SRS MapCHECK and MapCHECK2 was 396 vs. 26 for SBRT fields.”

MO-E115-GePD-F4-6

Evaluation of a High Spatial Resolution Detector Array for SRS Patient Specific QA in Comparison with GafChromic Films and Diamond Detector

J Duan, et al., Duke University Medical Center, Durham, NC

- “Absolute dose and 2D dose distribution measured with SRSMC are consistent with those of film dosimetry and point dose measurement with a diamond detector. SRSMC provides an effective solution to high spatial resolution 2D dose evaluation for SRS patient specific QA.”

PO-GePV-T319

Evaluation of the SRS MapCHECK for CyberKnife Patient-Specific QA

S D Davis, et al., Miami Cancer Institute, Miami, FL

- Use SRS MapCHECK for dose evaluation of M6 (MLC) Monte Carlo plans

SU-K-SAN1-6

Using Sun Nuclear SRS MapCHECK and StereoPHAN to Evaluate the Accuracy of SRS/SRT Deliveries on An Elekta Linac with ExacTrac Position Verification and Hexapod Position Correction

Y Liang, et al., Allegheny Health Network, Pittsburgh, PA

PO-GePV-T368

Validating the Brainlab Cranial SRS Element for the Versa HD

C Knill, et al., Beaumont Hospital, Dearborn, MI

WE-C930-GePD-F4-5

Commissioning and Clinical Experience of Brainlab's Multimet Element Planning System for Cranial SRS Treatments on Elekta's VersaHD

R Sandhu, et al., Beaumont Health, Dearborn, MI

SU-I330-GePD-F4-2

Development of a Phantom to Verify Targeting Accuracy of Single-Isocenter Multiple Lesion Stereotactic Radiosurgery

A Murray, et al., Sun Nuclear Corporation, Melbourne, FL

“Our results indicate a targeting accuracy within 1 mm for off-isocenter targets up to 7 cm of the linac isocenter... This phantom is a readily useable off-the-shelf solution and a clinically useful tool for machine daily QA as it provides a simple method to verify targeting accuracy for multiple lesions with single isocenter.”

MR-GUIDED RT QA

Featuring ArcCHECK®-MR & EDGE Detector

SU-L-SAN2-2

Clinical Experience of Patient-Specific QA for Online Adaptive Radiotherapy Using Elekta Unity MR-Linac

J Yang, et al., UT MD Anderson Cancer Center, Houston, TX

MO-C930-GePD-F2-3

First MR-Guided Online Adaptive Patient Treatment in North America On An In-Room High Field (1.5 T) MRI Linac

S Vedam, et al., MD Anderson Cancer Center, Houston, TX

HEAR FROM THE AUTHOR

Tuesday, July 16, 1:20 - Sun Nuclear Lunch Symposium, Meeting Room 217 (A-C)

MR-GUIDED RT QA

Featuring ArcCHECK®-MR & EDGE Detector Continued

MO-I345-GePD-F5-3

Implementing Absolute Dose Measurements on Sun Nuclear ArcCHECK-MR in a 0.35T MR-Linac

A Price, et al., Washington University School of Medicine, St. Louis, MO

- Studies dose linearity, absolute dose, and gamma pass rates for 95 patients

MO-C930-GePD-F2-5

Patient Specific QA for Online Adaptive Radiotherapy on an MR-Linac System

B Maraghechi, et al., Washington University School of Medicine, St. Louis, MO

- ArcCHECK used to validate secondary checks and online adaptive deliverability software

TU-C930-GePD-F4-1

Evaluation of a Plastic Scintillation Detector for Commissioning Data Acquisition in an MR-Guided Linear Accelerator

B Barraclough, et al. University of Wisconsin, Madison, WI

- Validated W2 scintillator against ion chamber, film and EDGE, showing W2/EDGE agreement within 2%

Halcyon™ System QA

Featuring ArcCHECK®

SU-F-SAN4-8

Clinical Evaluation of Lung SBRT for the Halcyon Platform and Dosimetric Comparison with the Truebeam STx and Millennium MLC Systems

C Kennedy, et al., University of Pennsylvania, Philadelphia, PA

- ArcCHECK used to perform patient QA on lung SBRT plans – with 90/3/3 criteria

PO-GePV-P-89

Plan Quality Comparison for Cervical Carcinoma Treated with Halcyon and Trilogy Intensity Modulated Radiotherapy

C Li, et al., Department of Radiation Oncology Physics, Shandong Cancer Hospital Affiliated to Shandong University, Jinan

TU-F115-GePD-F7-4

Optimized Volumetric Modulated Arc Therapy (VMAT) Technique for Left Sided Breast Cancer Comprehensive Radiation Therapy Via the Halcyon Delivery System

S Goddu, et al., Washington University School of Medicine, St. Louis, MO

PO-GePV-T-207

Plan Quality and Delivery Efficiency Comparison Between Halcyon 2.0 and Tomotherapy Hi-Art

W Feng, et al., St. Barnabas Medical Center, Livingston, NJ

Patient QA

Featuring ArcCHECK®

PO-GePV-T143

Dosimetric Evaluation of the Compass Program for Patient Dose Analysis in IMRT Delivery Quality Assurance

J Song, Chonnam National University Medical School

- “It is necessary to verify the accuracy of the calculated dose in advance before the commercialized dose reconstruction program is applied in clinical practice.”

PO-GePV-T-326

Evaluation of ArcCHECK Towards Small Field Plan QA Measurement Based on Output Factor Results

Y Wang, et al., Credit Valley Hospital/Trillium Health Partners, Mississauga, ON

PO-GePV-T-152

Quality Assurance of Multiple Isocentric Volumetric Modulated Arc Therapy for Craniospinal Irradiation

J Zhang, et al., Southern California Permanente Medical Group, Los Angeles, CA

- “ArcCHECK has better potential to verify the QA quality. Also, it helps to verify the treatment delivery errors from the set up.”

WE-C1000-GePD-F7-5

Automated Planning and Delivery of Hippocampal Avoidance Whole-Brain Radiotherapy for Brain Metastases Using HyperArc Technology

I Rusu, et al., Loyola Univ Medical Center, Maywood, IL

PO-GePV-T-148

Evaluation of Factors Affecting Absolute Gamma Passing Rates in ArcCHECK Measurements in Tomotherapy

C.W. Cheung, et al., Hong Kong Sanatorium & Hospital, Hong Kong

PO-GePV-T-155

A Multi-Institution Study on the Impact of TG218 QA Tolerance Change on the Tomotherapy DQA Passing Rate

T Oldland, et al., University of Kentucky, Lexington, KY

TU-C1030-GePD-F1-2

Comprehensive Assessment of Dosimetric Performance, Planning Efficiency and Risk of Secondary Cancers for MCO-VMAT Using 10-MV Versus 6-MV Photons

S Ziemiński, et al., Massachusetts General Hospital, Harvard Medical School, Boston, MA

Patient QA
Featuring ArcCHECK® (continued)

PO-GePV-T-305

Distributive Quality Assurance and Delivery of Stereotactic Ablative Radiotherapy Treatments Amongst Beam Matched Linear Accelerators: A Feasibility Study

J Rijken, GenesisCare, Adelaide, Australia

- ArcCHECK used to validate distributive QA across 9 linacs

PO-GePV-T-238

Implementing a Nationwide Beam Model for Varian TrueBeam and Edge Linacs

M Wanklyn, GenesisCare Australia, Crows Nest, NSW

Patient QA
Featuring MapCHECK®

PO-GePV-T-153

Dose Verification of IMRT Plans: Reconsideration of Acceptance Criteria and Analysis Method

M Rezaee, et al., Johns Hopkins University, Baltimore, MD

TU-F115-GePD-F6-6

Evaluation of Metal Artifacts and Dosimetric Deviations with Multiple Energy CT Imaging

N Alsbou, et al., University of Central Oklahoma, Edmond, OK

PO-GePV-T-182

Clinical Viability of Aperture Shape Controller for VMAT Optimization in Eclipse 15.6

E Meekins, Geisinger Health System, Danville, PA

PO-GePV-T-147

Comparison of the Error Detection Capabilities of 2D-Arrays

T Stelljes, et al., University Clinic for Medical Radiation Physics, Medical Campus Pius Hospital, Carl von Ossietzky University, Oldenburg, Germany

PO-GePV-P-77

Quality Assurance Analysis of Elements Multiple Brain Metastases Treatment Technique

X Liu, et al., Kaiser Permanente, Los Angeles Medical Center, CA

Machine QA
Featuring IC PROFILER™

SU-K-SAN1-5

Quality Assurance of Beam Energy and Output for Gated Treatment Delivery Using IC Profiler and Quad Wedges

L Hu, D Barbee, NYU Langone Health, New York, NY

"ICP provided stable energy and output measurement for very low MU delivery, validating its use for gating QA."

SU-E-221AB-7

Reconstruction of Continuous Volume Averaging Effect-Free Beam Profiles from IC Profiler Measurements Using a Machine-Learning Technique

K Mund, et al.

WE-C1000-GePD-F3-2

Artificial Profile Errors in Clinical IMRT Plans Were Poorly Detected with Patient Specific Commercial QA Phantom Tests

T Paasonen, et al., Helsinki University Hospital, Helsinki

PO-GePV-P-37

Characterization of a Non-Clinical FLASH Beam

R Sadagopan, et al., MD Anderson Cancer Center, Houston, TX

Machine QA
Featuring Daily QA™ 3

PO-GePV-T-269

CyberKnife Output Constancy Utilizing Daily QA3 Device

T Reynolds, et al., MN Oncology, St Paul, MN

- "The DQA3 device showed a good agreement with ion chamber measurements making a suitable device for detection of output variations during routine measurements."

Dosimetry
Featuring EDGE Detector™

MO-AB-SAN1-10

Small Field Dosimetry: Detector Dependency On Output Factor and Off-Axis-Ratio Measurements for a Novel Radiosurgery System

D Pinnaduwege, et al., Barrow Neurological Institute (BNI) St. Joseph's Hospital & Medical Center, Phoenix, AZ

SU-F-302-5

SRS Cone Output Factors: TRS-483 Correction Factors Vs. Daisy Chain Method

V Gutti, et al., Baylor Scott & White Health, Temple, TX

PO-GePV-T-320

Validation of Small Field Dosimetry for Stereotactic SRS Cones and Effect of Angular Dependence with Respect to the Scanning System

S Kucuker Dogan, et al., Northwestern Memorial Hospital, Chicago, IL

Machine QA

Featuring SunCHECK™ Machine (SNC Machine™)

PO-GePV-T256

Which One Is More Reliable in Determining Leaf Position Uncertainties: SNC Machine™ Hancock MLC Test or AutoCAL™ MLC Test

K Jacobs, et al., Department of Radiation Oncology, University of Mississippi Med. Center, Jackson, MS

- "It can be concluded both statically and for best clinical use that the SNC Machine™ Hancock test is a more reliable and robust test than AutoCAL™ for absolute MLC position tests."

PO-GePV-T322

Resolution and Accuracy of BB Detection in Commercial and In-House Winston-Lutz Analysis Algorithms

M Malin, et al., NYU Langone Medical Center, New York, NY

- "All algorithms tested can detect submillimeter BB positional variations with an accuracy of 0.1 mm or better."

PO-GePV-T264

Simultaneous Optimization of Radiation-Imaging Coincidence for All Versa HD Photon Energies

C Knill, et al., Beaumont Hospital, Royal Oak, MI

- Developed a method to optimize imaging isocenter with all VersaHD beams; Used SNC Machine Hancock W/L in procedure

Patient QA

Featuring SunCHECK™ Patient (PerFRACTION™)

TU-F115-GePD-F3-3

Detection of Treatment Variability Using Universal Metrics in EPID In-Vivo Dosimetry

D Hernandez, S Dieterich, et al., UC Davis Medical Center, Sacramento, CA

- Study to determine if applying Universal Metrics to PerFRACTION's 3D in-vivo EPID dosimetry data to detect radiation delivery errors is as efficient as customized analysis
- "The use of universal metric successfully flags large treatment deviations, while reducing the time needed to design patient-specific template metrics by about 10 min/patient."

[HEAR FROM THE AUTHOR](#)

Tuesday, July 16, 9:35 - Sun Nuclear Booth 300

PO-GePV-T142

Using EPID in Vivo Dosimetry to Quantify Treatment Delivery Accuracy in Canine Head and Neck Tumors

J Lambeck, et al., University of California Davis, Sacramento, CA

- "This work demonstrates the ability to chart dose variability over the course of a patient's treatment, allowing for the implementation of adaptive radiotherapy practices."

SU-K-302-7

VMAT-Based Total Body Irradiation Treatment Plans with Eclipse Scripting for Field Configuration: A Dosimetric Evaluation

J Teruel, et al., NYU Langone Health, New York, NY

- Multi-isocenter TBI treatments validated with PerFRACTION and ArcCHECK



HEAR FROM OUR SENIOR DIRECTOR OF RESEARCH

Jeff Kapatoes, Ph.D., joins a panel of industry and clinical experts for this event focused on the value of integration and independence in radiation oncology QA.

Vendor Provided Data, Tools and Test Procedures

Wednesday, July 17, 1:45 PM - 3:45 PM

Room: 304ABC