



IMPLEMENTATION OF THE FULL SUNCHECK PLATFORM DOSECHECK™ and PERFRACTION™ IN A COMMUNITY SETTING.

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INTRODUCTION

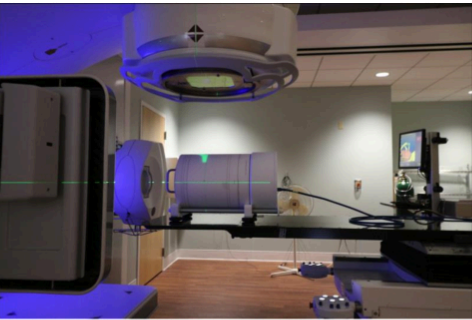
Verifying IMRT and 3D patient plans is recommended before the start of radiation treatment. Traditionally, this is done by verifying the accuracy of the treatment plan computer software (TPS) calculations by identifying any clinical errors during radiation delivery.

AIM

In this study, the novel SunCHECK™ DoseCHECK™ and PerFRACTION™ software were implemented in our clinic to carry out the verification procedure of the TPS Pinnacle version 16.2 with two beam matched Elekta Linear Accelerators (LINAC) with 160 MLC's.

METHOD

- Five IMRT and five 3D patient cases with beam energies ranging from 6 to 10 MV were studied.
- Dose calculations of Monitor Units (MU) from the TPS are compared to RADCALC® and DoseCHECK™ for all cases.
- IMRT plans were also delivered to the ArcCHECK™ (AC) phantom.
- The results were compared to those from the PerFRACTION™ using the Electronic Portal Imaging Device (EPID).
- Both LINACs were used for comparison.



Pre-treatment QA using Arc Check phantom



Pre-treatment QA for PERFRACTION using EPID Panel

RESULTS

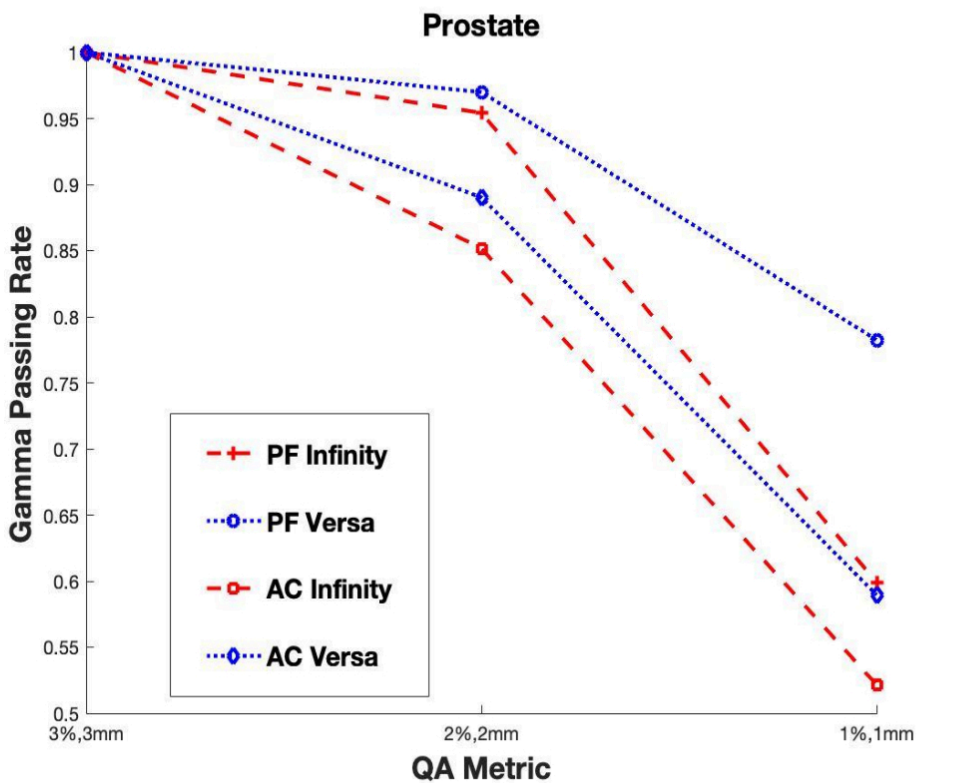
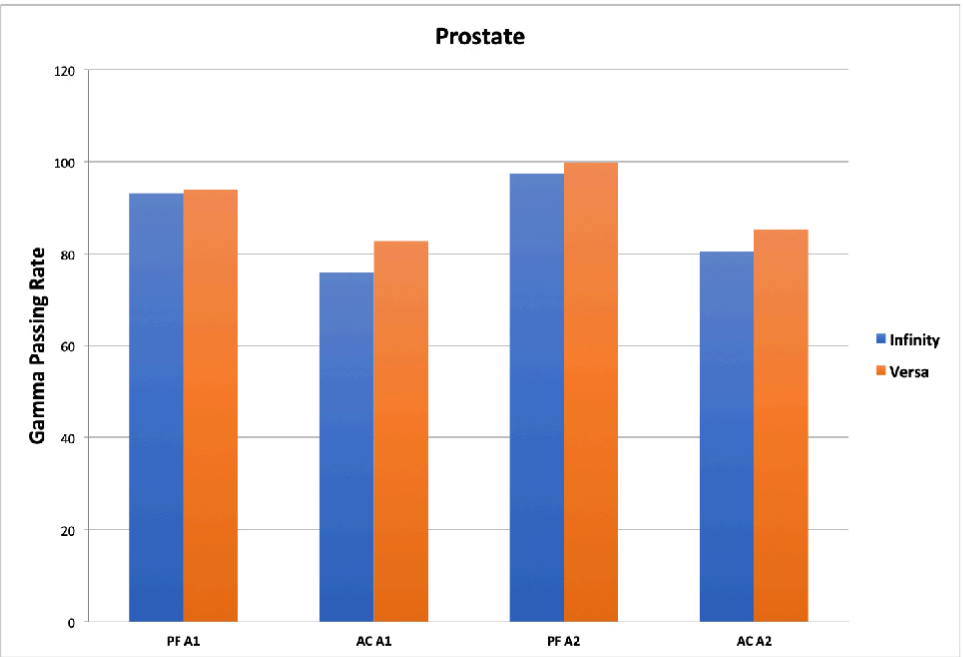
3D DoseCHECK Results

cases	Beams	Planned MU/Fx	Calculated MU/Fx (DoseCheck)	%difference(Planned-DoseCheck)	Calculated MU/Fx (RADCALC)	%difference(planned-RADCALC)
Whole Brain	A1	171.6	173.5	1.1	170.81	0.5
	A2	171.7	173.1	0.8	170.84	0.5
Breast	A1	167.0	165.8	0.7	159.03	4.8
	A2	156.8	153.6	2.0	154.51	1.5
Spine	B1	137.0	137.3	0.2	137.0	0
	B2	228.0	226.8	0.5	230.0	0.9

IMRT DoseCHECK Results

cases	Beams	Planned MU/Fx	Calculated MU/Fx (DoseCheck)	%difference(Planned-DoseCheck)	Calculated MU/Fx (RADCALC)	%difference(planned-RADCALC)
Prostate	A1	305.70	308.5	0.9	320.59	4.9
	A2	296.40	300.2	1.2	308.94	4.2
Lung	A1	488.40	487.8	2.3	466.64	4.85
	A2	449.50	456.8	0.4	438.38	2.5
H & N	A1	205.80	201.6	0.2	196.27	4.6
	A2	197.00	198.8	0.9	194.53	1.3
	A3	121.00	121.7	0.7	122.34	1.1

PerFraction Results



- The planned and measured dose using AC and PerFRACTION™ had close agreement when compared using gamma analysis for both LINACs.
- The calculated MU for RADCALC® and DoseCHECK™ closely matched the planned MU. For 3D cases the average percent difference between the planned MU/Fraction (MU/Fx) and the calculated MU/Fx using DoseCHECK™ was 1.31% and for RADCALC® was 1.14% .
- For IMRT it was 1.27% for DoseCHECK™ and 2.78% RADCALC®.

CONCLUSIONS

- SunCHECK™ PerFRACTION™ and DoseCHECK™ software have been validated since they gave very similar results to the well-known RADCALC® software and AC pretreatment QA.
- The system is automated making it very realistic to perform daily in-vivo dosimetric QA on every field for every patient for every fraction using exit dose images.
- This feature makes using the EPID panel very convenient for per fraction QA to account for patient set up errors and changes to patient anatomy.
- Our Institution is ready to incorporate the software into clinical workflow.

ACKNOWLEDGEMENTS

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REFERENCES

- SNC white paper – On DoseCHECK™ & P PerFRACTIONS On the Accuracy of the SNC Dose Calculator Algorithm
- SNC white paper – Measurement VS Calculation What You Need to Know for QA and Patient Safety

CONTACT INFORMATION

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