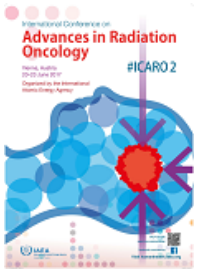

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Establishment of National Radiotherapy audit program at NMISA.

Wednesday, 21 June 2017 15:45 (5 minutes)

Introduction

Morden radiotherapy treatment of cancer involves different modalities. Some of these modalities have limited number of referral literatures. These modalities include advanced treatment like IMRT, Stereotactic, RapidArc, Gamma knife etc. Radiotherapy dosimetry audits play an important role in verifying the treatment chain of all these techniques. The National Metrology Institute of South Africa (NMISA) has embarked on establishing a national audit programme for radiotherapy. Five pilot centres were identified for performing on site audit measurements with procedures and protocols drafted and tested during measurements. For postal dosimetry audits, a Dose Ace system using radiophotoluminescent (RPL) glass dosimeters has been purchased by NMISA. This system will replace the Thermoluminescent dosimetry (TLD) system currently used by IAEA/WHO for audits.

Methodology

On site Audit measurements were carried out for reference conditions, non-reference conditions and end to end using a CIRS phantom. For reference conditions, the IAEA TRS 398 protocol for absorbed dose to water was followed. Measurement were carried out using a Farmer type chamber for photons and an Advanced Markus chamber for electrons. A water phantom was used for photon beam measurements and a Perspex phantom for electron. Non-reference measurements were carried out for Wedge factors and Output factors.

The auditing procedure for end to end entailed using a CIRS thorax phantom. The phantom was scanned using a CT scanner on site and data transferred to the treatment planning system (TPS) for verification. The planning staff were requested to create a plan per procedure provided and plan was transferred to treatment system upon completion. Staff members responsible for treatment were requested to execute the plan using the CIRS phantom. Farmer type ionization chamber was placed on different positions and the delivered dose was measured and compared with measured dose from TPS.

Results

The action limits for reference conditions was 2% and for non-reference conditions it was 3%. For reference conditions measured doses were within 2% and for end to end dosimetry audit the maximum deviation was observed on areas with low electron density. However total contribution to a selected reference point was within 5% for most pilot centres. Commissioning of the RPL glass dosimeter system is still an ongoing project and the results will be presented in the conference.

Conclusions

The establishment of onsite dose audit methodology for radiotherapy centres in South Africa using the ionization chamber was successful. All protocols were drafted and tested for consistency and reproducibility. Some of the challenges encountered during pilot study was the breakdown of the units, unwilling cooperation from some staff members and less understanding of the objectives of dosimetry audit by some staff members.

A steering committee consisting of representatives from Oncologists, Radiation Therapists, Medical Physicists and regulatory has been formed. They regularly meet to discuss the progress for the establishment of the project and evaluate the procedures. They will also be responsible for any unresolved discrepancies in measurement results.

Country

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