

THE 21ST ASIA-OCEANIA CONGRESS OF MEDICAL PHYSICS

“Science for Radiation Medicine”

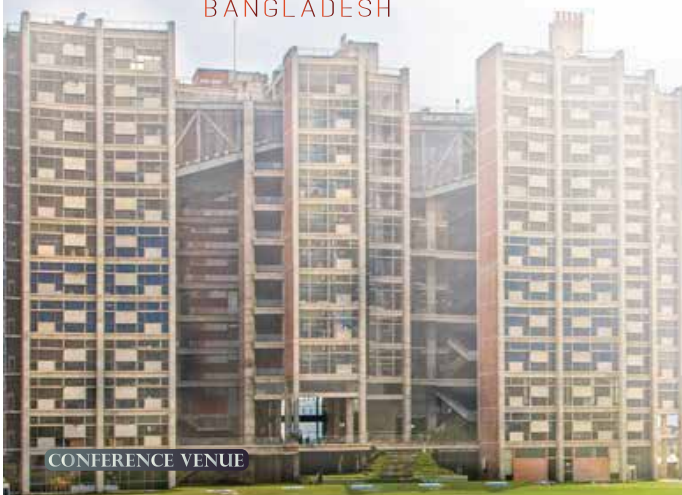
10-12 DECEMBER 2021

VENUE

UNITED INTERNATIONAL UNIVERSITY (UIU)
DHAKA, BANGLADESH



50th
ANNIVERSARY
1971-2021
BANGLADESH



CONFERENCE VENUE

Organizers



Co-Organizers



Endorsed by



Sponsors



correlation between netOD and dose was calculated for each LET. Then, in order to obtain beam profiles, the three films were irradiated using SOBP carbon-ion beams with a bolus. The number of irradiated particles was 20,000, 40,000, and 60,000, respectively. These films were analyzed to determine LET and dose along the profiles. The results were compared with the dose measured with the ion chamber and simulated LETs.

Results & Discussion: The most dose profiles obtained from the film measurements agreed with the ionization chamber measurements within 5%. However, in the low dose range, there was a large difference. Since the LET result correlates with the dose, the difference in LET is also large when the difference in dose errors is large. We believe that the differences are caused by the errors in the approximate equations of the calibration curves and the optimum solution.

Conclusions: We obtained dose profiles from film measurements for SOBP carbon ion beam. In the future, we would like to apply this method to patient specific quality assurance to shorten the time for quality assurance.

Parallel Session- VI(A): Radiobiology & Radio Protection

OP-59

Computed Tomography Dose Reference Levels for head, chest and abdomen regions: A nationwide survey

T Amalraj¹, DM Satharasinghe¹, AS Pallewatte² and J Jeyasugiththan¹

1. Department of Nuclear Science, Faculty of Science, University of Colombo, Sri Lanka.
2. Department of Radiology, National Hospital of Sri Lanka, Colombo, Sri Lanka.

Introduction: The computed tomography (CT) is identified as the highest contributor of the population radiation dose among medical radiation examinations. Therefore, routine monitoring of the delivered radiation dose is critical. The Diagnostic Reference Levels (DRL) are identified as a form of investigation level that can be used as a tool in identifying the abnormally high radiation doses which cannot be justified based on the image quality requirements. Therefore, many countries now attempt to define their own DRL which reflect their own practice. However, to date no formal effort has been taken in establishing a National DRL (NDRL). Therefore, the present study is aimed to establish NDRLs for commonly performed CT examinations which include brain, chest and abdomen.

Methodology: A nationwide survey was conducted covering more than 40% (25 CT units) of the CT units in the country. The patient morphometric (age and gender) together with dosimetric data (Volume CT dose index: $CTDI_{vol}$ and dose length product: DLP) were recorded for non-contrast studies of head, chest and abdomen regions belonging to 2982 patients. The median doses for each CT units were calculated initially and the third quartile of the distribution of the medians were considered as the NDRL. The obtained NDRLs were compared with the internationally published NDRLs of Japan, Canada and France to determine the degree of optimization requirements.

Results and Discussion: The NDRLs based on $CTDI_{vol}$ and DLP for head, chest and abdomen regions were 82.2 mGy/1556 mGy.cm, 7.4 mGy/350 mGy.cm and 10.5 mGy/721 mGy.cm respectively.

Conclusion: The majority of the NDRLs were well below the internationally published values. However, further dose reductions can be achieved through implementing dose optimization strategies.

Results comparison with Japan, France and Canada

The head NDRL was comparable with the NDRL of Japan (85.5 mGy) and Canada (79.1 mGy) but double the value of France (46 mGy). The chest NDRL was lower than the NDRL of France (10 mGy) and half the values reported in Japan and Canada (14.3 mGy and 14.1 mGy). The abdomen NDRL was considerably lower than the values reported for Japan, Canada and France (18.2 mGy, 18.1 mGy and 13 mGy). The NDRL based on DLP for head region was higher than all compared countries while for chest and abdomen region the obtained values were lower than that of Japan (543 mGy.cm and 870 mGy.cm) and Canada (483 mGy.cm and 806 mGy.cm). Nevertheless, the NDRL for chest and abdomen regions were comparable with that of France (350mGy.cm and 690 mGy.cm).

OP-60

Gadolinium Oxide in Polyamide Substrate: A New Composite for Protection Against Neutron Radiation

Azadeh N¹, Javad M², MohammadHossein C-D², Mohammad Amin H³

1. Department of Nuclear Engineering, Islamic Azad University, Arsanjan Branch, Arsanjan, Iran
2. Reactor and Nuclear Safety Research School, Nuclear Science and Technology Research Institute, AEOI, Isfahan, Iran
3. Ionizing and Non-Ionizing Radiation Protection Research Center (INIRPRC), Paramedical School, Shiraz University of Medical Sciences, Shiraz-Iran

Background: Gadolinium is one of the known elements in nature with unique properties in terms of neutron absorption. It has also been used as a contrast agent in MRI imaging for many years due to its paramagnetic properties. This study focused on the use of new gadolinium oxide/polyamide compounds as neutron shields.

Materials and Methods: Seven different compounds of gadolinium-oxide micro powder (as filler) with different weight percentages (0-50%) in polyamide-6 (as matrix) were synthesized and molded by melting method. Then, characterization tests such as scanning electron microscope (SEM), as X-ray powder diffraction (XRD), and Thermogravimetric Analysis (TGA) were performed on the samples. Subsequently, the samples were irradiated using output of the dry channel in the Miniature Neutron Source Reactor (MNSR), and quantities such as total absorption cross-section and mean free path were measured.

Results: After characterization, it was found that there is a symmetrical distribution of the filler in the matrix and this uniformity was well seen up to 30% of the weight percentage of the filler. Analysis of the XRD pattern of the samples, especially in the characteristic peaks, showed the