

Abstract - ID: 8

Author(s): Salman Altimyat (**Presenter**), Prince Sultan Military Medical City
Khaled Soliman, Canada

Title: Measurements of peak surface dose using radiochromic films during helical computed tomography scan of the sinus with pitch factor of less than one.

Abstract:**Abstract:****Purpose:**

During computed tomography (CT) helical scanning mode the patient surface dose distribution is assumed to be non-uniform, therefore point dose measurement methods may lead to imprecise estimation of the radiation dose received by the patient skin in particular. We have used XRQA2 radiochromic films to measure peak surface dose (PSD).

Materials and Methods:

The films were placed under the patient head rest in order to sample the entrance surface dose in-vivo. We have performed in-vivo film irradiation on 23 patients in this study in order to verify the suitability of the method clinically. We have calculated the ratio of: PSD/CTDI_(vol) and ESD/CTDI_(vol).

Results:

The measured average ESD in the sinus exam was 11.7 ± 1.0 mGy, the PSD was 15.7 ± 1.7 mGy and the scanner calculated CTDI_(vol) was 13.3 ± 0.1 mGy. The calculated ratios of ESD/CTDI_(vol) and PSD/CTDI_(vol) were 0.88 and 1.18 respectively.

These results seem to indicate that the CTDI_(vol) underestimates the PSD by 18%. On the other hand the CTDI_(vol) was found to be a conservative estimator of the average ESD in terms of radiation protection.

Conclusion:

The use of radiochromic film as In-vivo dosimeter does not interfere with the clinical radiological exam and does not produce any image artifacts. The method can be used to study other CT examinations specially the ones with large beam width and high pitch factor. The method allows measurement of the peak skin dose, examination of the CT dose profile and the radiation dose distribution.

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Abstract - ID: 9

Author(s): Turki Alruwaili (**Presenter**), Prince Sultan Military Medical City
Khaled Soliman, Canada

Title: Five years review of occupational dosimetry program in Medicine at a tertiary care hospital and comparison with internationally reported values

Abstract:

Objectives:

According to the UNSCEAR 2008 report, physicians, technicians, nurses and others involved in the medical field with a total number of monitored staff exceeding 7.5 million workers constitute the largest single group of occupationally exposed to man-made sources of radiation. The objective of this work was to compare our tertiary care medical Centre occupational radiation dose levels to the

ones published in the UNSCEAR report 2008.

Materials and Methods:

Examination of the personal dosimetry records of the past five years from 2012 to 2016 is conducted and average radiation doses received by the staff are calculated including the total accumulated last 5 years doses. The radiation doses were measured using thermo luminescence dosimeters (TLD). The total number of monitored staff was 538 and 274 from our medical center and from the other centers that we cover respectively.

Results:

The levels of occupational exposures in our hospital and other medical institutions compares very well with the internationally and nationally reported results. The annual average for the five years period under examination in this work was 0.4, 0.8 and 0.5 mSv for the diagnostic radiology, nuclear medicine and radiation therapy groups respectively. Our minimal detection limit for personal dosimetry reporting is 0.1 mSv.

Conclusions:

The results of the measured annual doses were well below the ICRP recommended annual dose limit of 20 mSv. Our results compare very well with the UNSCEAR report 2008. In general the application of ionizing radiation in Medicine is a safe practice for the occupationally exposed workers.

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Abstract - ID: 14

Author(s): Humara Noreen, PINUM Cancer Hospital
MUHAMMAD SHAHBAZ (**Presenter**), Punjab Institute of Nuclear Medicine (PINUM)

Title: Risk assessment of radiation exposure to general public from the patients of Ca thyroid and benign thyroid disease patients

Abstract:

Present research work was related to the therapeutic use of radioactive iodine at Punjab Institute of Nuclear Medicine (PINUM), Faisalabad, Pakistan and associative radiation protection measured. Hyperthyroid and Ca thyroid patients were treated with the radioactive I-131 were internal and external exposure's potential source for others and family members in the close contact with radioactive patients. Total 200 patients treated at PIUNM were evaluated suffering thyrotoxicosis and Ca (Carcinoma) thyroid disease. Patient's information performas were designed to get information about the socioeconomic status and different parameters like way of transportation, presence of children under 12 and pregnant female at home, separate room, etc. Generally, patients were discharged on the assumption that he/she carried (I-131) less than 30 mCi in his/her body according to IAEA (International Atomic Energy Agency) guidelines and basic International safety standards against protection from ionizing radiation. Radiation exposure measured from paient's body at various distances (0.5 meter, 1.0 meter, 1.5 meter, 2.0 meter). The data thus generated were statistically analyzed for 5 mCi, 10 mCi, 15 mCi, 20 mCi, 25 mCi, 28 mCi, 29 mCi, 30 mCi, 100 mCi, 150 mCi, 200 mCi and 250 mCi. Results of the study were statistically analyzed and resulted of radiation exposure decrement was observed at different parameters.

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Abstract - ID: 16

Author(s): Enas Moustafa (**Presenter**), Department of Radiation Biology, National Centre for Radiation Research and Technology, Atomic Energy Authority

Title: Suppression of Elevated Serum Inflammatory Markers in Ovariectomized Irradiated Rats by Soybean

Abstract:

This study aimed at evaluating the effect of soy oil on inflammatory factors investigated in the ovariectomized (OVZ) inflammatory model that are accelerated by exposure to gamma irradiation. 200 mg/kg/day (orally) of soy isoflavones was administrated to female rats ovariectomized and exposed to the whole body fractionated doses of gamma radiation (2 Gy) at 6th, 7th and 8th time week of experimental up to a total dose of (6 Gy). Data analysis found that soy oil substantially inhibits a series of inflammatory markers, including (IL-6, TNF, CRP, PGE-2) production and enhance Estrogens and TGF- β . Also, A significant improvements were observed in the MMP-3 and TIMP-1 gene expression. It could be concluded that soybean isoflavones interfering with radical-mediated cytotoxicity and inflammation may contribute to their anti-inflammatory activity and potential role in reducing the formation and progression of the proinflammatory effects.

Keywords: γ -irradiation; ovariectomy; inflammation; Soy isoflavones

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Abstract - ID: 20

Author(s): Abdalla Abdalla (**Presenter**), University of Gezira
Mutaman Kehail, University of Gezira

Title: The Effect of X–Rays in Reducing Malaria Disease in Gezira State, Sudan

Abstract:

In Sudan, notable progress had been achieved in recent years in the field of mosquito control through genetic manipulation techniques. The objective of this work was to study the effects of X–ray radiation on female *Anopheles arabiensis* mosquitoes (the principal malaria vector) in Gezira State, Sudan. Some larvae and adults of *A. arabiensis*, were submitted for different doses of X-ray using, then the insects were reared and monitored of fecundity, fertility and sterility. The results revealed that, the average fecundity was obviously decreased whereas the sterility was increased in the *A. arabiensis* species. In the control group the fertility was 99-90%. The fertility of the *A. arabiensis* females was significantly higher (93-49%) than the other groups, and the lowest fertility recorded for the females irradiated with 5000 rays (9.82%). The fertility shown a positive correlation with the dose of irradiation. Thus 68.28% eggs hatched into larvae after a dose of 50 rays and only 1.42% eggs after 5000 rays. In the control group the fertility was 97.65%. It can be concluded that, the use of X-ray on *A. arabiensis* resulted in clear and significant sterility in females, thus it will reduces the population density of this vector and thus contributed in control of malaria disease. X-ray techniques should be adopted to control *Anopheles* mosquito's population at field level since it highly affected the fecundity and sterility and also, it is obviously environmentally safe technique.

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Abstract - ID: 26

Author(s): Ali Elmahdi (**Presenter**), Sudan Atomic Energy Commission (SAEC)
Abdelmoneim Sulieman, Sudanese

Title: Survey of patients' radiation exposure from Percutaneous Coronary Intervention

Abstract:

Introduction: Medical radiation is utilized widely in the diagnosis and treatment of certain clinical conditions. In recent years, many tissue reaction were reported from cardiac catheterization procedures, few studies were published from developing countries in recent years.

Objectives: The objectives of this study were to determine patient radiation doses for Percutaneous Coronary Intervention (PCI), to identify procedures associated with high irradiation doses, and to determine the effects of various parameters on patient doses.

Materials and Methods: All cardiac catheterization procedures were performed in Wad Madani Heart Center (WMHC), Sudan. The X-ray machine (Philips (Allura X per FD 10) had passed quality control tests performed by Sudan Atomic Energy Commission (SAEC).A total of 59 PCI were evaluated using a calibrated X-ray machine were used to perform all the procedures. Patient

dose measurements were performed using Kerma Area Product (KAP) meter.

Results: The mean and range exposure parameters were 80.9 (67-106.5) kVp, 730.9 (448.6-851.7) mA and 7.47 (1.25-20.13) min for tube potential, tube current and fluoroscopy time, respectively. The mean cumulative air kerma (CAK) was 1149.4 (117.45-4222.6) mGy. 34.08 (32.8-35.9).

Conclusions: Considerable variations were observed among patient populations in terms of radiation dose, and fluoroscopic time. These variations are due to the different indications, patient characteristics and pathological findings. Also, a remarkable difference between the therapeutic and the diagnostic doses was observed. This can be attributed to the prolonged exposure times in therapeutic procedures.

Keywords: Cardiac catheterization; radiation exposure; Tissue reaction; PCI dosimetry

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Abstract - ID: 36

Author(s): Khaled Al-hadyan (**Presenter**), Academic Unit of Clinical Oncology, University of Nottingham, School of Medicine
Sarah Storr, 1Academic Unit of Clinical Oncology, University of Nottingham, School of Medicine
Martyn Inman, 4School of Chemistry
Chris Moody, School of Chemistry
Stewart Martin, Academic Unit of Clinical Oncology, University of Nottingham, School of Medicine

Are you an invited speaker/presenter to ICRM2018?: No

Title: Targeting Redox Proteins to Increase Radiotherapeutic Efficacy in Pancreatic Cancer

Abstract:

Treatments for pancreatic cancer have failed to improve 5-year survival above ~4%. Redox proteins are key members of cellular antioxidant systems, required to maintain redox homeostasis, with the thioredoxin system being an important component – up-regulation causes radioresistance in various cancer types. We have developed novel thioredoxin reductase (TrxR) inhibitors (indolequinones (IQs)) and are assessing them in pancreatic cancer models.

Western blotting and enzyme assays assessed protein and activity levels, +/- drug, respectively. *In vitro* efficacy was assessed in PANC-1, MIAPaCa-2 and BxPc-3 pancreatic cancer cell lines. For radiosensitivity evaluations cells were treated with an IC50 dose for 4 hours, irradiated with 1, 2, 4, 6 or 8Gy of X-rays and plated for clonogenic survival. Cellular ability to cope with oxidative stress was evaluated by measuring ROS levels by DCHFDA flow cytometry, following drug treatment +/- H₂O₂ exposure.

IQ's caused reduced TrxR activity without notable changes in expression. Clonogenic IC50 values were in the low nM range (~90nM at 72h). IC50 doses combined with subsequent hydrogen peroxide (H₂O₂) exposure increased oxidative stress ~2 fold. Data suggest radiosensitisation of

PANC-1 cells, with a 58% and 63% decrease in surviving fraction at 6 and 8Gy respectively, with no significant effects on BxPc-3 and MiaPaca2's.

TrxR represents a potential novel target in pancreatic cancer. Indolequinone's are highly effective in pancreatic cancer cell lines as single agents and enhance radiotherapeutic efficacy in certain lines.

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Author(s): Maged ABDO (**Presenter**), Faculty of Sciences, Chouaïb Doukkali University
Mohammed Fahad, Laboratory of Nuclear, Atomic and Molecular Physics

Are you an invited speaker/presenter to ICRM2018?: No

Title: DEVELOPMENT AND CALIBRATION OF EYEWEAR FOR ALPHA DOSIMETRY

Abstract:

In the context of passive dosimetry based on the use of Solid State Nuclear Track Detectors SSNTD and its applications in radioprotection, we have developed methods of measuring alpha particles and neutrons with glasses of different corrections. Eyeglass lenses can be either Polycarbonate, CR39, Trivex, MR8, or Organic 1.67 or 1.74.

Firstly, a study of the response of these glasses to alpha particles from the salt uranium

$\text{UO}_2(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ was carried out to determine the calibration factor K which allow to transform the density D of observable traces into a volume activity A ($D = K.A$). Measurements of the detector efficiencies have been compared to model calculations by a patented calculation code. The results allow to develop the use of these glasses to qualify and quantify Radon and its Descendants in the laboratory and in situ. The process of detecting Radon and its descendants (free and attached) by glasses has been simulated to evaluate the impact of different factors on the efficiency detection especially cell geometry. The proposed theoretical models and experiments were used to calculate the deposition rate of radon progeny in order to consider these glasses as a metrology tool of alpha particles. The quality of these glasses is numerous and will satisfy in all situations. The use of these glasses is recommended for the practice of all the activities exposing to the ionizing radiations thus for the measures and protections against the radiations.

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Abstract - ID: 55

Author(s): ABIR DARSALIH (**Presenter**), RADIATION SAFETY INSTITUT

Are you an invited speaker/presenter to ICRM2018?: Yes

Title: PATIENT RADIATION DOSE ASSESSMENT DURING FLUOROSCOPY TESTES WITH CONTRAST MEDIUM

Abstract:

The purpose of this study was to assess the patient radiation dose received in fluoroscopy examinations during contrast medium

The cumulative air kerma (CK), kerma area product (KAP) and fluoroscopy time were measured for sixty (male and female) patients undergoing five fluoroscopy examinations KAP metre which was installed for the purpose of this study.

The mean kerma area product were found to be 2.681 , 5.1561 , 9.8529 , 5.7974 .and 13.09 Gy. cm² for HSG ,A.S ,AS.&D.S ,GI Track and Sinogram tests, respectively . The obtained mean cumulative dose was were 6.31 , 13.88 ,24.61 , 22.56 and 32.14 m Gy for HSG , A.S A.S&D.S , GI Track , respectively . the mean fluoroscopy time were.0.18 , 0.51 , 0.89 , 1.57 and 1.75 min, for HSG ,A.S ,AS.&D.S ,GI Track and Sinogram tests, respectively.

Patient dose is mainly dependent on the patient size, procedure, equipment used, exposure factor and user experience.

As KV and mA were controlled by the AEC and it was found to be well calibrated, possible optimization could be achieved by radiologist by decreasing the exposure time if possible.

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Abstract - ID: 58

Author(s): Ashraf Almahwasi (**Presenter**), General Administration of Medical Services, Ministry of Interior

Are you an invited speaker/presenter to ICRM2018?: No

Title: Analysis of morphological alterations of healthy human cells following proton irradiations

Abstract:

Giant-nucleated cells (GCs) have been observed to occur within survivors of irradiated cancerous and healthy cells. The expression of such morphological abnormalities is associated with genomic instability.

Objective: This study was designed to investigate the fate of GCs induced in a normal human fibroblast cell cultures after exposure to 0.2, 1 or 2 Gy of proton beam irradiations.

Methods: The total of 39 individual giant cells present at 7, 14 or 21 days after each dose point were identified from fluorescence microscopy images. The area of cell nucleus was measured (μm^2) using a cell-recognition MATLAB code.

Results: The live cell microscopy results suggest that a small fraction of GCs could continue to proliferate and form a progeny, ultimately contributing to the development of cancer risk.

Conclusion: This method is valuable to assess delayed effects of ionising radiation in healthy tissues and could act as a potential radioprotective assay for a dose-limiting parameter when applying radiotherapy treatment.

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Abstract - ID: 270

Author(s): Ahlam Alhuiti (**Presenter**), King Saud University

Are you an invited speaker/presenter to ICRM2018?: No

Title: Optimization of HVL Measurements for Diagnostic Radiology X-ray beams

Abstract:

International Conference in Radiation Medicine

Optimization of HVL Measurements for Diagnostic Radiology X-ray beams

Authors: A. Alhuiti, M. Arib, M. Abdelhalim

Abstract

Purpose: Our work was aiming at enhancing the reference X-ray beam qualities (RQR) through optimizing the half-value layer (HVL) measurements to establish the best measurement and calibration capabilities for diagnostic radiology at the SSDL belonging to King Faisal Specialist Hospital and Research Center (KFSHRC).

Materials and methods: The RQR beam qualities were established by determining the additional filtrations using the method recommended by the IAEA code of practice, TRS 457, and the IEC 61267 standard, using an ionization chamber and high purity (99.9%) Aluminum filters. The optimal additional filtration values, giving minimal deviation to the IEC HVLs and h values, were determined using the trial and error measurements. If the ratio of the measured HVL to the IEC value (homogeneity factor h) is below 0.485 or above 0.515 (deviation more than $\pm 3\%$) then the additional filtration needs to be increased (decreased). To allow interpolate for the optimum additional filtration, at least three attenuation curves were measured for three additional filtrations around the nominal value given by the IEC standard.

Results: The results show that the optimal additional filtration for the RQR qualities ranged from 2.33 mm Al (RQR2) to 3.3 mm Al (RQR10).

Conclusion: A net improvement in the difference to the IEC 61267 standard is obtained. All values of the additional filtrations were within the range recommended by the IEC standard.

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Abstract - ID: 359

Author(s): Sara Bin judia (**Presenter**), KFSHRC
Najla Al-Harbi, King Faisal Specialist Hospital & Research Centre
Krishna Mishra, KFSHRC
Ghazi Alsbeih, KFSHRC

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Title: Genetic Predisposition to Cervical Cancer in Saudi Women and the Association with XRCC1 and TGFB1 Polymorphisms

Abstract:

Objective: Cervical cancer (CxCa), treated by multi-modalities including radiotherapy, have a host genetic predisposition that modulates its susceptibility in various population. We investigated the association between CxCa risk in Saudi women and 6 single nucleotide polymorphisms (SNPs) in hypothesis-driven candidate genes.

Methods: A total of 545 females were included, comprising 232 CxCa patients and 313 age/sex-matched normal controls. Six SNPs (*CDKN1A* C31A, *ATM* G1853A, *HDM2* T309G, *TGFBI* T10C, *XRCCI* G399A and *XRCC3* C241T) were genotyped by direct sequencing.

Results: Out of the 6 SNPs studied, *TGFBI* T10C [Odd Ratio (OR)=0.74; 95% confidence interval (CI): 0.57-0.94], and *XRCCI* G399A (OR=1.45; 95% CI: 1.11-1.90) displayed different frequencies in cancer patients and controls and showed statistically significant association in univariate ($P=0.017$, $P=0.005$; respectively) analysis. The 2 SNPs, *TGFBI* T10C and *XRCCI* G399A showed also degrees of deviation from Hardy-Weinberg Equilibrium in cancer patients ($P=0.001$ and $P=0.083$, respectively) but not in the controls. Furthermore, correction for multiple testing using multivariate logistic regression to assess the joint effect of all SNPs has sustained the significant statistical association ($P=0.025$ and $P=0.009$, respectively).

Conclusions: *TGFBI* T10C and *XRCCI* G399A SNPs were associated with CxCa risk in univariate and multivariate analysis and displayed allele-dosage effects and co-selection in cancer patients. Patients harboring the majority allele *TGFBI* T10 (Leu) or the variant allele *XRCCI* 399A (Gln) have about 1.5-fold increased risk to develop CxCa. Host SNPs genotyping may provide relevant biomarkers for CxCa risk assessment in personalized preventive medicine. Supported by NSTIP-KACST 12-MED2945-20 (RAC# 2130 025).

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Author(s): Esra abdalalim (**Presenter**), aljazeera university

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Title: university of algazeera

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radiation protection status in certain orthopedic departments in sudan

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