# PLENARY SESSION

Plenary Session-I

## 2.Controversies of radionuclide therapy for thyroid cancer

Prof. Henry Hee-Seung Bom

*President, Asia Oceania Federation of Nuclear Medicine and Biology ( AOFNMB)*

Incidence of thyroid cancer is increasing in many countries in the world. It is particularly true in Korea as the incidence of thyroid papillary cancer becomes more than ten times in recent two decades. The main reason can be the over diagnosis by widespread thyroid cancer screening. However other genetic and environmental factors can be identified. Changing characteristics of differentiated thyroid cancer (DTC) evoked many issues in the radioionuclide theraoy of postoperative DTC patients. Although the macroscopic extra thyroidal invasion is a significant risk factor it is not true for the microscopic extrathyroidal invasion. Although the therapy dose of radioiodine for the low to intermediate risk group of patients is decreasing there is no consensus for the most preferable dose in this groups. Use of recombinant human TSH is increasing. Wheather we can use rhTSH for metastatic thyroid cancer patients is not clear. The current dosing of radioiodine therapy is usually empirical. To verify wheather the dosimetry before therapy can improve the outcome of the patients we need more clinical data. It is also true for the prediction of radioiodine therapy for DTC. Finally we need more data to identify factors related to patient refractory to radioiodine therapy.

**2. Innovation of Nuclear Medicine from Asia**

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Innovation of nuclear medicine is always an integration of clinical needs/research motivation, radionuclides, tracers, instruments, and analytical methods. In the very beginning of PET, $^{18}$FDG was produced by $^{18}F_2$ (Ido T, et al., 1978) which provided only 100~200MBq of $^{18}$FDG for a few patients, and later by H$^{18}$F (Hamacher K, et al., 1986). Whole body PET scan within tolerable data acquisition time became possible by use of block scintillator (Casey ME and Nutt R. 1986). PET combined with CT further improved cancer diagnosis (Beyer T, et al., 2000). of radionuclide therapy for thyroid cancer

Nowadays, several small budding of nuclear medicine for the next generation occurred in Osaka University. PET/MRI for small animals (Yamamoto S, et al., 2010) enabled integrated analysis of metabolic, morphological, and histopathological background of diseases in small animals. Cerebral blood flow and oxygen metabolism in rats model with use of $H_2{}^{15}O$, $C^{15}O$, and $^{15}O_2$ was established (Watabe T, et al., 2013).

Neuroinflammation was tested in ischemic model of rat brain in relation to histopathological reference of autopsied specimen. “Molecular Biology” based on the specimen is now shifting to “Imaging Biology” based on the living organism.

The PET has been applied to new drug development in the GLP-based PET Molecular Imaging Center of Osaka University Graduate School of Medicine for preclinical study of candidate compound. After screening, the most appropriate candidate was tested in the GMP-based PET Microdose Package for

first-in-human study in Osaka University Hospital. All these facilities are open for other institution and companies.

Innovation of cyclotron technology is leading from nuclear reactor based-nuclear medicine to accelerator-based nuclear medicine. It includes a production of $^{99}$Mo for SPECT and □-emitting $^{211}$At (Ikeda H, et al., 2014 presented in SNMMI annual Meeting, St. Louis) and other radionuclides for therapy. Boron neutron capture therapy by accelerator is under clinical trial in Japan.

### 3.18F-DOPA PET/CT and 131I-MIBG planar scintigraphy in patients with pheochromocytoma

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**Objectives** The aim of this retrospective study was to evaluate role of 18F-DOPA PET/CT and 131I-MIBG planar scintigraphy in patients with pheochromocytoma

**Methods** 25 patients with diagnosis of pheochromocytoma based on radiological and biochemical markers were retrospectively selected for the study. These patients had undergone both 131I-MIBG scintigraphy and 18F-DOPA PET/CT. The imaging findings were compared to patient histopathology reports, biochemical markers and clinical follow up whenever available to establish the diagnosis.

**Results** 131I-MIBG showed a sensitivity of 68 % and specificity of 100%. 18F-DOPA PET/CT showed a sensitivity of 82 % and specificity of 100%. 18F-DOPA was better at localizing and finding more no of lesions as compared to 131I-MIBG scintigraphy. 18F – DOPA also is a better study in evaluation of paragangliomas.

**Conclusions :** 18F-DOPA PET/CT seems to be a better modality in comparison to 131I-MIBG scintigraphy in the evaluation of pheochromocytoma / paraganglioma. At this point both these tracers seem to have mutually additive role in these patients and essential investigations with diagnosis and follow-up of this disease.

## PLENARY SESSION-II

### Radiation Safety Infrastructure In The Regulatory Contexts For Medical Facilities In Bangladesh

Prof. Dr. Shahana Afroz
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The use of ionizing radiation is widespread and virtually indispensible to the modern society. Since the discovery of X-ray in 1885, radiation had been utilized in different areas including medical, industrial, agricultural, research and educational institutes all over the world. For example, over 2.5 billion X-ray examinations are conducted annually in the world. About 7000 electron accelerators are used for medical applications, hundreds of ion accelerators are used for applications, such as medical isotope production & medical therapy and more than 10000 medical radiotherapy units are in use. In Bangladesh, the application of radiation started in the medical sector primarily in the diagnostic radiology effective from 1920s.

In addition to the many benefits afforded by the beneficial uses of radiation, there are also associated hazards, such as industrial accidents, medical overexposures, disposal of radioactive waste, environmental radioactivity and accidents from ‘orphan’ sources. Therefore, it is essential for every country to have adequate infrastructures to ensure the safety and security of all radiation sources, including X-ray machines, accelerators, sealed radioactive

sources, radioactive waste and environmental radioactivity. A balance needs to be achieved whereby the hazards of radiation are controlled without severely reducing the benefits. With all these needs an independent regulatory body was established with the vision of protecting people and environment in Bangladesh.

According to the regulatory inventory, presently around 4,500 diagnostic X-ray, 20 nuclear medicine, 13 radiotherapy, 69 industry, 8 research and educational installations are functional across the country. Among the stated facilities, so far 3054 diagnostic X-ray, 20 nuclear medicine, 13 radiotherapy, 62 industrial and 8 research/educational institutes have been brought under the framework of the regulatory authority. Notably, a wide range of radiation generating equipment and radioactive sources are being employed in the above stated facilities. A number of specific regulatory guidelines need to be incorporated to develop the physical infrastructure of medical radiation facilities. In fact, many radiation facilities are currently in operation had been established well before the implementation of the first Regulatory Act (Nuclear Safety & Radiation Control Act-1993).

A look at the prevailing scenario and consequent upon scanning the prevailing situation, it becomes evident that the existing facility warrants substantial modification of its infrastructure in respect of proper implementation of the newly emerging Act (Bangladesh Atomic Energy Regulatory Act-2012). In the context of ensuring radiation safety in the occupational purview as well as the public in the co vicinity of the facilities especially encompassing radiotherapy and nuclear medicine, a considerable expanse of works will need to be performed. This is because occupational individuals who remain involved in radiotherapy and nuclear medicine are being constantly vis a vis routinely exposed to radiation of which the level is somewhat higher than the diagnostic X -ray facilities. Eyeing to evolve a pragmatic legal and regulatory framework and to make it more rational and practicable in line with national and international standards, the Government of the People's Republic of Bangladesh promulgated a new act titled BAER Act-2012 and eventually Bangladesh Atomic Energy Regulatory Authority (BAERA) has been established on 12th February, 2013. The entity started working forthwith to enhance present regulatory functions and to make them more focused which essentially include motivation, licensing, inspection and enforcement programs. In order to ensure proper enforcement of the present act across the facilities, so far 10 regulations have already been drafted. Apart from these legal tools, regulatory guides, posters, leaflets for different category of radiological practices have been put in place to create awareness among the radiation users and beneficiaries. In addition, the authority also organizes training courses to build up competencies among the personnel working in radiation facilities. Till today approximately 8000 radiation workers have already received training on radiation protection. Furthermore, with the collaboration of national and international organizations, the employees of the authority are also being trained on different nuclear and radiation safety issues.

In conclusion, it can be said that BAERA has the intention to establish a sustainable, accurate, responsible and excellent regulatory system in the vicinity of medical imaging and radiation therapy for benefiting patients and occupational.

## PROFFERED ORAL PRESENTATION

Abstract No .OP-1

### Introduction of PET/CT in NINMAS: Initial experience with 13 cases

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Positron Emission Tomography integrated with Computed Tomography (PET/CT) is a molecular imaging technology that combines cross-sectional functional and anatomic imaging and is a combination of PET scan and a CT image. In Bangladesh, first PET/CT was inaugurated in a private owned hospital back in the year 2010 in Dhaka but in public sector the first PET / CT scanner (GE Discovery 710) was installed in 2014 at National Institute of Nuclear Medicine & Allied Sciences (NINMAS), Bangladesh Atomic Energy Commission. It opened a new horizon and our journey began with this inauguration and successful study of 13 cases using 18F-Fluorodeoxyglucose (FDG).

Out of the 13 patients (mean age 41± 12.94 years) 61.5% was male and 38.5% female. 10 (76.9%) patients were diagnosed cancer cases, 5 (38.5 %) patients had disease related surgery, 6 (46.2%) had history of chemotherapy and 3 (23%) received radiotherapy. One patient had history of radio-iodine ablation for papillary thyroid cancer. All medical records were reviewed before preparing the patients with thorough history, relevant laboratory tests and ensured proper fasting.

PET/CT system software enabled the visualization of PET, CT, and PET+CT fusion images in the axial, coronal, and sagittal planes as well as maximum intensity projections in a 3D cine mode. Visual inspection and measurement of standardized uptake value (SUV) were used for semi quantification of FDG uptake while reporting. Our aim is to share the initial experience of performing PET/CT in this institute in this context.

Abstract No .OP-2

### Development of Novel SPECT & PET Radiotracer for Imaging Vesicular acetylcholine Transporter for the Early Diagnosis of Alzheimer's Disease.

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**Introduction:** Alzheimer's disease (AD) is a neurodegenerative condition associated with loss of cholinergic neurons and synapses due to deficiencies in cholinergic neurotransmission. A specific glycoprotein called the vesicular acetylcholine transporter (VAChT) is required in cholinergic neurotransmission for loading acetylcholine into pre-synaptic vesicules of cholinergic neurons. Depletion of VAChT leading to decreased cholinergic innervations is a hallmark of early stages of AD. Hence, the expression of VAChT is consideredas a significant diagnostic target for AD. To this end numerous radioligands based on the vesamicol scaffold have been developed for imaging the VAChT using positron emission tomography (PET).

**Objective:** The purpose of the study was to develop potent vesamicol analogues tagged to $^{125}$I and$^{77}$Brfor VAChT imaging in Single-Photon Emission Computed Tomography (SPECT) and Positron Emission Tomography (PET).

**Method:** The VAChT analogues were developed within the framework of decalinvesamicol (DV) with en (-I, -Br) at the *ortho*-position of the

4-phenylpiperidine. We synthesized two new decalinvesamicol (DV) analogues, *o*-iodo-*trans*-decalinvesamicol (OIDV)and *o*-bromo-*trans*-decalinvesamicol (OBDV) and their affinities to VAChT and sigma σ receptor (σ -1, σ -2) were evaluated by *in vitro* binding assays using rat cerebral or liver membranes.The radio-isotopes $^{125}$I and $^{77}$Br with longer half lives suitable for in-vitro studies were used here instead of SPECT [$^{123}$I ] and PET [$^{76}$ Br] radiotracers. The results obtained with $^{125}$ I and $^{77}$Br are representative of $^{123}$ I and $^{76}$ Br used in SPECT and PET.

Both [$^{125}$I]OIDV and [$^{77}$Br]OBDV were radiosynthesized by tin-iodine and tin-bromine exchange reactions from the corresponding *o*-trimethylstannyl-*trans*-decalinvesamicol (OTDV) with no-carrier-added [$^{125}$I]NaI, HCl, $H_2O_2$ and [$^{77}$Br]Br$^-$, HCl, Chloramine-T respectively.

The synthesized compounds, [$^{125}$I]OIDV and [$^{77}$Br]OBDV were separately injected intravenously into rats and these rats were sacrificed at different intervals. The blood, the brain, which was divided into four parts (cerebral cortex, striatum, cerebellum, and the remainder), and the organs of interest (heart, lung, liver, spleen, pancreas, stomach, small intestine, kidney, and thigh muscle) were harvested and weighed. The radioactivity of each part was measured with an auto-well gamma system. Data were calculatedas percent of injected dose per gram of tissue (%ID/g).

*In vivo* blocking studies were performed to check the binding selectivity of [$^{125}$I]OIDV and [$^{77}$Br]OBDV for VAChT. *Ex vivo* autoradiography was performed to reveal the regional brain distribution of [$^{125}$I]OIDV and [$^{77}$Br]OBDV in rat's brain.

**Results:** *In -vitro* competitivebindingstudiesrevealed that OIDV and OBDV had greater binding affinity to VAChT than vesamicol and low affinity to σ receptors.Following intravenous injection, both the [$^{125}$I]OIDV and the[$^{77}$Br]OBDV passed freely across the blood–brain barrier (BBB) and specific brain regional accumulation in rat brain was observed in *in- vivo*biodistribution studies. The specific brain regional accumulation of [$^{125}$I]OIDVwas significantly reduced (42.5%) by co-administration of (+/-)-vesamicol (0.125 μmol). In case of [$^{77}$Br]OBDV, the regional accumulation was inhibited by about 41% by co-administration of 0.250 μmol(+/-)-vesamicol. In contrast, the co-administration of σ -receptor ligands, such as(+)-pentazocine (selective σ-1 receptor agonist) and (+)-3-(3-hydroxyphenyl)-N-propylpiperidine, [(+)-3-PPP] (σ -1 and σ -2 receptor agonist), barely affected the accumulationof [$^{125}$I]OIDV and [$^{77}$Br]OBDV in rat brain. Accumulation of [$^{125}$I]OIDV and [$^{77}$Br]OBDVin VAChT-rich brain regions were observed in *ex-vivo* autoradiography.

**Conclusion:** On the basis of observed high affinity and selectivity of [$^{125}$I]OIDV and [$^{77}$Br]OBDV for VAChTthrough *in-vivo* evaluations and *ex- vivo* autoradiography, it can be concluded that radio iodinated OIDV and [$^{76}$Br]OBDV has the potential to be prospective VAChTradioligandsfor the early diagnosis of AD in SPECT and PET imaging.

Abstract No .OP-3

**Treatment Related Morbidity in Thyroid Cancer Patients after Radioiodine Therapy: A 15 years Follow- up Study at the Institute of Nuclear Medicine & Allied Sciences, Chittagong.**

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**Introduction:** Well differentiated thyroid cancer (DTC) when treated with combined surgery and radio-iodine ablation therapy and thyroid stimulating hormone (TSH) suppression, shows excellent

prognosis. Long term treatment related morbidity that includes post- thyroidectomy hypocalcaemia, effects of TSH suppression therapy and significant voice changes are not uncommon but may not be well characterized.

**Objective:** The aim of this study is to summarize the common complications presented by thyroid cancer patients after treatment at the Institute of Nuclear Medicine & Allied Sciences (INMAS), Chittagong.

**Method:** We retrospectively analyzed the medical records of patients with DTC who were referred for treatment at INMAS, Chittagong within the last 15 years. The study included 621 DTC patients who received treatment with radioiodine after total or near total thyroidectomy.

**Results:** Radioactive $^{131}$I was used to ablate the residual normal thyroid remnant after thyroidectomy and as adjuvant therapy to treat thyroid cancer metastases. Thyroid cancer treatment guideline was followed and patients were scheduled for periodic follow-up according to the protocol.Follow-up included serial measurements of serum thyroglobulin (Tg) level besides other biochemical investigations and at least one $^{131}$ I whole body scan. Documentation of side-effects showed a good number of patients with treatment related morbidity like temporary hypocalcaemia, long term hypocalcaemia, significant voice changes, symptoms and poor quality of life (QOL) from TSH suppression, bone and/or cardiovascular complications for TSH suppression, psychogenic problems, continuous and unexplained tiredness, weight loss, myopathy, tremor, restlessness, osteoporosis, decreased professional efficiency etc. First dose of Levothyroxine for TSH suppression was given according to patient's weight, then after first follow up, dose was adjusted depending on FT3, TSH result and severity of disease .

Abstract No .OP-4

## Dosimetric Characteristics of Flattened Photon Beams of two Elektra Linear Accelerators

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**Introduction:** Two linear accelerators manufactured by Elekta were installed at KhwajaYunus Ali Medical College Hospital Cancer Center to produce 4-MV, 6-MV and 15-MV photon beams for treatment of cancer patients.In radiotherapy with high energetic photon beams, different experimental photonbeam data are essential for commissioning and verification of treatment planning system (TPS). The main aim of this study is to determine beam data of megavoltage photon from Elekta linear accelerator.The objective of this article is to present a systematic description ofdosimetric characteristics of flattened 6 MV and 15 MV photon beams provided by two Elektalinacs.

**Materials and Method:** Different dosimetric data such as depth dose, beam profiles, output factors, penumbra, flatness, symmetry etc. were measured. Additional measurements of leaf transmission, leakage radiation and surface dose were examined. The photon energies studied were 6 MV and 15 MV at LINAC1 and LINAC2. Both accelerators were equipped with a MLC consisting of 40 leaf pairs and backup jaws allowing a maximum field size of 40x40 $cm^2$.Percentage depth doses (PDDs) and profiles were acquired witha PTW MP3 Water-Tank (PTW Freiburg, Germany). PDDswere measured with a PTW Semiflex ionization chamber (type31010, volume 0.125 $cm^3$) and lateral profiles were acquired with a PTW Farmer type ion chamber (type 30106, volume 0.6 $cm^3$).For the acquisition of PDDs the chamber position was automatically corrected to the effective measurement point. In both departments, water phantom measurements were performed at 90

cmsource-to-surface distance (SSD) for square field sizes of 5x 5,10x10, 15x15 and 20x20 $cm^2$ with a step size of 0.1 cm.
PDDswere normalized to 100% at 10 cm depth. A PTW Roos chamber (type 34001, volume0.35 $cm^3$) was employed in a solid water phantom(30x30x15 $cm^3$) for surface dose measurements. One phantomplate had a special insert to place the chamber directly at the surface,resulting in an effective measuring depth of 0.1 cm. Data werecollected at 90 cm SSD for square fields with 5–30 cm side length.All values were determined in relation to the depth at the dosemaximum ($d_{max}$). EDR2 and ion chamber were used for leaf transmission.
**Results:** Depths of dose maxima for flattened beams of two LINACs did not deviate by more than 2 mmand penumbral widths agreed within 1 mm. Phantom scatter factors for flattened filter beams differed up to 3% from the published reference data.For field sizes smaller than 15 cm, surface doses relative to the dose at $d_{max}$ increased for flattened beams with maximum differences of 6% at 6 MV and 9% at 15 MV for a 5 x 5 $cm^2$ field. Leaf transmission on the central axis was 0.2% and 0.5% lower for 6 and 15 MV beams of LINAC2, respectively. All the results of point dose measurements are mean values from at least three repeated measurements. The standard deviations were less than 0.4%. Relative dose ratios (e.g. output factors, depth dose surface dose values) were partly cross-checkedon different days and confirmed to the initial results at least within ±0.5%.Using EDR2-films the mean inter-leaf leakage was 1.4 ± 0.24% and 1.1 ± 0.10% for 6 MV beams of LINAC1 and LINAC2 respectively. For 15 MV beams, the inter-leaf leakage was1.8 ± 0.3% and 2.15 ± 0.4% for LINAC1 and LINAC2 respectively. Mean transmission through central parts of the leaves were 1.1 ± 0.1% and 0.9 ± 0.1% for 6 MV of LINAC1 and LINAC2 respectively. The respective values for 15 MV were 1.4 ± 0.1% and 1.2 ± 0.1%.

**Conclusions:** A comprehensive dosimetric characterization of two Elekta LINACs was performed for 6 and 15 MV beams.Qualitatively, the differences of the dosimetric characteristics offlattened beams of two LINACs studied in this work were found to be consistent with the vendor's specifications.
Abstract No .OP-5

## Acceptance Tests of PET/CT imaging system at NINMAS

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**Objective:** A set of acceptance tests were carried out during the installation of PET/CT Discovery 710 of GE (crystal-LYSO and 128 CT slice) at the National Institute of Nuclear Medicine and Allied Sciences (NINMAS) to set reference values for the new imaging system.

**Materials and Method:** The quality control of the PET imaging system was performed by employing a WCC phantom and Hemotocrit capillary tubes and the quality control of the CT was performed byusing CT-Phantom,model no 5128754 Rev7, both supplied by the manufacturer. Th e CT phantom,with6sets of transparent lineslits(5 slits each) at separation of 1.6mm, 1.3mm, 1.0mm, 0.8mm, 0.6mm, 0.5mm was attenuated by the CT scanner.A Deluxe Jaszczak Phantom (Model ECT/DLX/P) was used to check fused PET/CT image.This phantom was prepared with water mixed with 16.3 MBq of F-18.The WCC phantom,model no 5312567 REV3, supplied by the manufacturer, was filled with water mixed with 14.8 MBq of F-18 and mounted under PET camera in a fixed geometry.Three capillary tubes each were filled with a fine drop of F-18 with negligible activity. All the tests were carried out according to NEMA NU 2-2007 standard.

**Results:** The sensitivity of PET, measured with WCC phantom was 7.5cps/kBq with an activity correction factor of 4.10. The spatial resolution of PET system in transverse measurement(FWHM)was4.71mm and axial measurement (FWHM)was 4.8mm.The CT Phantom test providesa visual inspection of resolution, contrastibility, noise and uniformity of CT system.Thesystem uniformity and resolution by visual inspection was done with Jaszczak Phantom for PET/CT fused imaging.All the visual images were satisfactory.

**Conclusion:** During PET/CT installation, a set of acceptance tests should be carried out to judge the system's proper functional capability.These tests will be considered as baseline study of the PET/CT hybrid imaging system. All the results were satisfactory and as per the specification.

Abstract No .OP-6

**Role of $^{18}$F-FDG PET-CT Scan for evaluating newly diagnosed lung cancer-Initial experience**

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**Background:** Proper diagnosis and staging is very important in the management of lung cancer. Initial staging is usually performed with computed tomography (CT) but increasingly functional imaging using integrated positron emission tomography and CT (PET-CT) is being used to provide more accurate staging, guide biopsies, access response to therapy and identify recurrent disease. This study was designed to unravel the impact of PET-CT scan for evaluating newly diagnosed primary lung cancer.

**Subjects & Methods:** Seventeen patients (age 63±8 yrs, male 13) were enrolled for this study during the period of September 2012 through September 2014. All of them underwent CT guided FNAC (fine needle aspiration cytology) for diagnosing lung cancer. Whole body FDG PET-CT scan was performed from vertex to mid thigh in a whole body PET-CT scanner (128 Slice GE Discovery VCT) one hour after intravenous injection. High resolution contrast CT was obtained of the same area. Oral contrast was administered for bowel opacification 90 min before the scan. Images were reconstructed using VUE point HD algorithm and slices were reformatted into transaxial, coronal and sagittal views. Semiquantitative estimation of FDG uptake was performed by calculating SUV max value, corrected for dose administered and body weight (g/ml).

**Results & Observations:** Aspiration cytology reveals 6 cases of adenocarcinoma, 5 squmous cell carcinoma, 3 nonsmall cell carcinoma (NSCLC) and rest 3 cases showed features of small cell carcinoma. Mean diameter of the primary lung lesion was 6.5 ± 3 cm with a SUV max of 15.79 ± 6.59. Thirteen cases showed locoregional lymph node metasatsis with a SUV max of 10 ± 4.87. Four cases showed distant lymph node metastasis (cervical & axillary) with a SUV max of 10.12 ± 4.69. Distant bone metastasis was observed in 3 cases (ribs, vertebrae & ischium) and malignant pleural effusion was detected in 2 cases only. Besides this one case showed pericardial disease involvement and rest one case showed metasatsis in the pharyngeal wall. More interestingly one case showed contralateral FDG avid metastatic nodule without any morphological change in CT.

**Conclusion:** $^{18}$F-FDG PET-CT scan is a well established method for staging lung cancer and this sophisticated modality provided additional information compared to conventional X-ray or CT imaging. PET-CT scan played pivotal role for treatment planning and also provided prognostic information in a newly diagnosed case of lung cancer in Bangladesh.

Abstract No .OP-7

**Radio-Iodine Therapy in Differentiated Thyroid**

**Cancer: An Institutional Based Study**

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**Introduction:** Differentiated Thyroid Cancer (DTC) is the most common endocrine malignancy which accounts for ~10% of all malignant tumors. Radioiodine therapy following surgery is an effective means of treatment and has been used for more than 60 years**.**

**Objectives:** This prospective study was done to evaluate the status and effectiveness of radio-iodine therapy after surgery in patients with DTC.

**Method:** A total 176 patients with histopathologically proven DTC were included in this study. These patients were referred after surgery to the National Institute of Nuclear Medicine & Allied Sciences, Khulna for radioiodine therapy between June 2006 to July 2014

Following therapy with $^{131}I$ radioiodine these patients were regularly followed up at the Institute. Radioiodine ablation was done after minimum one month interval period of thyroid surgery and when the TSH level reached >30 mIU/L. We used 75-100 mCi$^{131}I$ for non-metastatic patients and 150 mCi for the patients with metastasis. Then regular follow -up was done at every three months interval for the first year. In case of negative findings the patients were followed-up at one year interval and then at five years interval. Clinical evaluation and laboratory investigations were done at all follow- up visits. Serum TSH, TG and calcium levels are routine procedures. Whole body iodine scan were done after one year, two years and five years of radioablation to detect any recurrence or metastasis.

**Results:** Among the 176 patients studied, the male:female ratio was a 1: 4.3 and age range was 13-68 yrs. Higher incidence of DTC were found in 80 patients ( 35.7%) between the ages of 20-30 yrs. Of the 176 patients in this study, 145 (80.4%) patients had near total thyroidectomy, 24 (13.6%) had near total thyroidectomy with modified neck resection and seven (4.0%) patients had subtotal thyroidectomy. Papillary carcinoma was found in 170 (96.6%) cases and follicular variety in six (3.4 %) cases. All 176 patients were followed up for 1-5 yrs. Among these patients, 44 (25.0 %) were followed up for one year and only one recurrence was found, 42 (23.8%) were followed up for two years and in this group three patients showed recurrence. Rest of the 90 (51.2%) patients were followed up for five years and among these patients, eight had evidence of recurrence.

A total of only 12 (6.8%) patients were found with local recurrence or metastasis and these patients were treated with a further dose of 150 mCi RAI capsule as a second dose. No further recurrence was seen in these patients after the second dose within the following three years. In the rest 164 (93.2%) patients, one patient showed positive WBS for recurrence at three year follow up and this patient was treated with 200mCi of radioiodine.

**Conclusion:** Radioiodine therapy after surgery is a highly effective method for the treatment of DTC. Reevaluation, good communication with patients and regular follow up is essential for good therapeutic outcome.

Abstract No .OP-8

**Investigation on adsorption position of Mo-99 on chromatographic $Al_2O_3$ column of the**

**Mo-99/Tc-99m Generator at RIPD**

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**Background:** It is generally believed that Mo-99 is adsorbed on $Al_2O_3$ column. In such case there is little

possibility of shifting the adsorbed Mo-99 activity within the column during elution if the pHs of the respective solutions are kept within the range set by the SOP. It was experienced in Syria that all of the Mo-99 eluted together with Tc-99m after 20$^{th}$ elution. It could happen if the Mo-99 is absorbed on $Al_2O_3$ instead of adsorption. This study was conducted to ascertain the fixing of Mo-99 on $Al_2O_3$ whether by adsorption or absorption.

**Method:** The experiments were done in three batches (batch no. 482, 484 and 486) of the RIPD-TEC $^{99}Mo/^{99m}Tc$ chromatographic column generator. Heights of the glass column and height of the Alumina ($Al_2O_3$) packed beds inside the column were 7cm and 3.7cmrespectably. The Alumina ($Al_2O_3$) was conditioned by pH3-4 nitric acid. After loading thechemically processed aliquot of $^{99}Mo$ solution into the acid conditioned alumina column, it was eluted with 80 to 100 portions of 10mL physiological (isotonic) saline (0.9% NaCl)within a 3 week period. Total ~1000mL of eluent was passed through total 5.70cm$^3$ (5.7mL) of $Al_2O_3$bed in the column. After 5 to 10 elutions, the external radiation doses of each millimeter position of the unshielded column were measured by the Morgan- British made (Series-100, Serial No: 002945) survey meter. A special lead shielded experimental setup was designed for measuring the radiation doses at different column positions. Mo-99 loaded unshielded column with attached 10mm long scale was placed in front of the 5cm thick, 30cm long and10cm high lead shielding and there was a 1mm hole made in the middle of the 30 cm long lead shielding. In order to measure the radiation dose the survey meter was placed behind the lead shielding where the hole existed. The column was moved from left to right and positioned on the hole for measuring dose at particular position.

**Result and Discussion:** The detected radiation doses (µSv/hr unit)in various positions of the columns on the production day, after 1 week, after 2 weeks,after 3 weeks are given below:

Radiation doses during production date: [upper first 2mm position: >1000, middle (3 to 24) mm: 900±100 to 300±50 and lower (25 to 37) mm 270±30 to 220±10],
Radiation doses after 1 week: [upper first 2mm position: 650±50, middle (3 to 24) mm: 250±50 to 80±5 and lower (25 to 37) mm 80±5 to 50±5],
Radiation doses after 2 weeks: [upper first 2mm position: 100±5, middle (3 to 24) mm: 60±5 to 20±5 and lower (25 to 37) mm 20±3 to 15±3],
Radiation doses after 3 weeks: [upper first 2mm position: 15±2, middle (3 to 24) mm: 7±2 to 4±1and lower (25 to 37) mm 3±1 to 2±1].
The radiation doses were detected by the survey meter after each 5 to 10 elutions and the radioactivity of the eluted $^{99m}Tc$ and $^{99}Mo$ breakthrough were also measured. It was observed that the maximum radiation doses were found in the upper 2 millimeter position of the column. Almost half of the maximum radiation dose was found in the next 2 mm position of the column. The dose gradually decreased towards the bottom of the column. Due to the adsorption by a strong attractive force between positively polarized the acidic conditioned Alumina ($Al_2O_3$) surface as adsorbent and Molybdate ion $(^{99}MoO_4)^{2-}$ as adsorbate, no significant migration/shifting of the adsorbed Mo-99 activity along the columns was detected even after 80 to 100 elutions taken during three weeks.
**Conclusion:** Most of the Molybdate ions $(^{99}MoO_4)^{2-}$ are adsorbed in a particular position (upper first 2 mm) of the acidic conditioned Alumina column without any significant migration/shifting of Molybdate ion $(^{99}MoO_4)^{2-}$ along the column during elution. Considering this fact it could be concluded that the Molybdate ion $(^{99}MoO_4)^{2-}$ adsorbed on the acidic alumina with strong attractive force (Van der Waals force) rather than absorption. The experience

in Syria when all of the Mo-99 washed out with Tc-99m after 20th elution was mere an accident. It could be happened if the Mo-99 absorbed on $Al_2O_3$ instead of adsorption due to improper conditioning of the alumina, bulk Mo-99 and saline eluate.

Abstract No .OP-9

**PULMONARY ASPERGILLOMA-A case report**

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Pulmonary aspergilloma is a rare however life threatening disease usually presenting as secondary invasion of pre-existing lung cavities particularly the tubercular cavity. When a pre-existing lung cavity is colonized by Aspergillus fumigatus it forms a fungal ball (pulmonary aspergilloma). Presenting symptoms are usually cough and haemoptysis. The CT findings are a ball like soft tissue structure within pre-existing lung cavity with crescent of surrounding air. We report a case of pulmonary aspergilloma in a 24-year young man with past history of tuberculosis presented with the complaint of cough and haemoptysis for last 2 years, 2-3 times daily. It was diagnosed on computed tomography as pulmonary aspergilloma in right upper lobe.

Abstract No .OP-10

**Biologically Effective Dose: An Important Aspect of Radionuclide Therapy**

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**Introduction:** Dosimetry is an important aspect of radiotherapy treatment planning and is based on the concept of extrapolated response dose developed in early 1980's to quantify the biological effect of any radiotherapy treatment. The term, Biologically Effective Dose (BED) was introduced later in 1989. The BED represents the dose required for a given biological effect when delivered by infinitely small doses per fraction or at very low dose rates and is typically used to compare the response implications of total absorbed doses delivered at different dose rates. Thus BED has an equally important role in therapeutic Nuclear Medicine as well as in radiotherapy, for dose rate consideration in dosimetry.

**Objective:** The aim of this presentation is to address the importance of BED in the light of current and future radionuclide therapy planning in Bangladesh.

**Discussion:** The objective of dosimetry based treatment planning protocols in radionuclide therapy is to prescribe a clinically useful absorbed dose to the tumor while at the same time avoiding organ toxicity. Therapeutic use of I-131 for thyroid malignancy has been in clinical practice since 1940s and Bangladesh joined that legacy in 1960s. The world has observed the evolution of theragnosis while the ammunitions of radionuclide therapy are being enriched by radiolabelling of peptide, chemotherapeutic agent, antibody and nanoparticles. In addition, the traditional use of beta and gamma emitting nuclides is being complemented by alpha emitters. Nuclear Medicine in Bangladesh is also moving forward with plans to expand in the field of theragnosis by inclusion of novel targeted radionuclide therapy. In this context, the concept of BED that relates to absorbed dose and dose rate has important relevance. BED was derived from the linear quadratic cell survival concept in radiobiology. Its use for isoeffective dose fractionation calculations is extended from every field of radiotherapy to chemo-radiotherapy and targeted radionuclide therapy. In most radionuclide therapies, the common dose limiting normal tissues are the bone marrow and the kidneys. To protect these organs, patient specific adjustment of radio-activity can be obtained by applying different fractionated regimens with BED formalism. Consequently, the achievement of tumor control without normal tissue complication is possible through (1) adoption of dose fractionation,

(2) identification of dose limiting organs, (3) compliance to safety limit of absorbed dose and (4) adherence to nuclide specific safety measures to avoid organ toxicity.

**Conclusion:** BED based approach can determine the largest safe dose to the critical organs that are susceptible to high levels of administered radioactivity. BED, a component of the sprawling scope of dosimetry, thus allows the prediction of clinical outcome of radionuclide therapy.

Abstract No .OP-11

### Evaluation of Thyroid Hormone Status in Clinical and Subclinical Thyrotoxicosis

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Thyroid hormone status in patients with clinical thyrotoxicosis were evaluated. Biochemical confirmation of thyrotoxicosis was based on the finding of a suppressed TSH in combination with elevated serum total or free T4 and T3 levels. In total, 239 assays were performed in 83 thyrotoxicosis patients. The participants in this study were from different districts of Rajshahi division, a region among the iodine deficient zones in Bangladesh. The laboratory assessments used in the present study were carried out at the Institute of Nuclear Medicine & Allied Sciences (INMAS), Rajshahi. TSH was measured with a highly sensitive immunoradiometric assay (IRMA) kits (Beijing Atom Hightech Co. Ltd., Beijing) and serum T3 & T4 were determined with commercially available radioimmunoassay (RIA) kits (Beijing Atom Hightech Co. Ltd., Beijing).

The present study observed that the most common cause of thyrotoxicosis was Grave's disease (64%), followed by thyroiditis (20%), toxic adenoma (9%), and multinodular goiter (2%). The pattern was inconclusive in 5% of all patients. Serum T3, T4 and TSH patterns were further analyzed stratifying the patients into two subgroups, with clinical (88%) and subclinical (12%) thyrotoxicosis. Grave's disease was found to be approximately three times common in women than in men. It was also noticeable that majority of the patients with Grave's disease were predominantly in the younger age groups. The present results were also compared with the reported series and found to be in excellent agreement with some cases. We, therefore, expect our study will contribute some useful data in literature and provide a guideline for the diagnosis and management of clinical and subclinical thyrotoxicosis in Rajshahi.

## POSTER PRESENTATION

Abstract No .PP-1

### Differential Renal Function as a Prognostic Indicator for Surgical Management of UPJO in Paediatric Patient

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**Introduction:** Congenital ureteropelvic junction obstruction (UPJO) is a common cause of hydronephrosis in children that often requires surgical treatment. Before definitive surgery these patients undergo preoperative percutaneous nephrostomy (PCN) procedure to relieve pressure to the affected renal parenchyma. Initial evaluation of hydronephrosis is commonly done with ultrasonography and radioisotope scintigraphy in our country. Diuretic renography with Tc99m tagged radiotracers areoften used to detect the functional significance of an obstruction. The parameters derived from renographycan be used to determine the outcome of a surgical procedure in selected cases and thereby help the surgeon in appropriate decision making.

**Objective:** The study was undertaken to assess whether the differential renal function (DRF) obtained from 99mTc-DTPA diuretic renography can be used as a selection criteria for surgical procedures (either pyeloplasty or nephrectomy) after the PCN intervention in selected patients with UPJO.

**Patients and Method:** This is a retrospective study done at the Institute of Nuclear Medicine and Allied Sciences, Sylhet. The study population included 26 selected pediatric patients who were referred to the institute for DTPA renal study between January 2008 and July 2011. The complete record files of these 26 patients were examined and relevant findings pertaining to the study objectives were recorded and analyzed. Among the total patients selected, 18 (69%) were boys and 08 ( 31%) were girls and their age ranged from 35 days to 15 years (average 6.8 years ). All patients had documented unilateral severe hydronephrosis due to uretero-pelvic junction obstruction (UPJO) with poor function in the affected kidney. Each patient had a Tc-99m-DTPA renal scintigraphy with calculation of DRF both as a baseline study and four weeks after preoperative percutaneous nephrostomy (PCN) procedure. The standard protocol for Tc99m-DTPA scintigraphy was followed. Proper hydration was maintained before the procedure. A bolus dose ( approximately 0.1 mCi per kg body weight ) between 5 to 10 mCi of Tc-99m DTPA was administered intravenously. Images were acquired simultaneously both by anterior and posterior detectors. Furosemide was injected intravenously at a dose of 1 mg/kg body weight up to a maximum of 40 mg at 12-15 minutes after radiopharmaceutical administration or when the entire collecting system was believed to be full. Drainage half-times were calculated using computer generated curves, and the DRF was calculated by the accumulated tracer in the kidney between 1 and 3 minutes after radiopharmaceutical injection. A subtraction of the activity of the background was also done. The normal values of DRF were considered from 45% to 55% with fluctuation within 05%.

**Results:** All 26 patients with severe unilateral hydronephrosis andDRF less than 10 % (range 0 - 10 %) after the baseline Tc-99m DTPA renogram, underwent PCN procedure. Left sided PUJO was found in 21 (81%) while right sided PUJO was found in 5(19%) patients. Nine
( 34.62%) out of the 26 kidneys with unilateral uteropelvic junction obstruction improved after percutaneous nephrostomy, the DRF increased up to 25.7% ± 12.8% from the baseline study. Based on the improvement of DRF, pyeloplasty was performedin these patients. The remaining 17 kidneys (65.38%) showed negligible improvement in DRF to less than 5% and in these patients nephrectomy was the surgical procedure of choice.

**Conclusion:** The differential renal function obtained from diuretic Tc99m-DTPA study before and after PCN intervention in UPJOcan be a prognostic indicator of which kidneys will improve with pyeloplasty procedure and thus it can be used as an important selection criteria for surgical intervention in UPJO.

Abstract No .PP-2

## Overview of the Activities of *In-vitro* Division of National Institute of Nuclear Medicine & Allied Science ( NINMAS)

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*National Institute of Nuclear Medicine and Allied Sciences, Dhaka*

**Introduction:** The In-vitro division of National Institute of Nuclear Medicine & Allied Science (NINMAS) is located on 9$^{th}$ floor of the 18 storied Block-D building of Bangabandhu Sheikh Mujib Medical University (BSMMU) former IPGMR (Institute of Post Graduate Medicine & Research). The man power consists of 18 scientific and support staff. The department is equipped with following

instruments: Gamma counter, Centrifuge, Magnetic separators, Vortex mixture, Micro pipettes, Incubator/Water bath, Stirrers, Deep freezer, Refrigerator, PH Meter, Analytical balance, Test tubes and Laboratory glass ware etc.

This laboratory is designed to provide clinical diagnostic services (through radio-immunoassays) and to engage in activities related to research and academics. Within the larger framework of the imaging activities of NINMAS, the function of the in-vitro laboratory appears currently overshadowed especially with the recent addition of PET-CT to the Institute. Many nuclear medicine doctors, scientists and technologists who work in other divisions of NINMAS are not aware of the activities of the In-Vitro division. Hence it appears important to draw attention to the function of the in-vivo division at NINMAS, in order to create awareness and revive interest in this subject.

**Objective:** The purpose of this presentation is to highlight the activities of the in-vitro laboratory at NINMAS and to emphasize the important role it plays as an indispensible tool in diagnostic Nuclear Medicine.

**Discussion:** Radioimmunoassay (RIA) forms the main bulk of in-vitro activity at the laboratory. A fair number of samples are analyzed by RIA each week and thyroid hormone testing accounts for more than half of all these procedures. Circulating levels of steroid hormones (e.g., testosterone, estradiol, corticosterone) in blood plasma are also analyzed here by RIA method.In the year 2013 - 2014 (1st July 2013 – 30th June 2014), 100 assays were done. A total of 25135 samples were assayed by RIA/IRMA in the In-vitro lab. As a routine, four, three and single assays are done for various hormones in a week. Results are reported on Mondays and Thursdays of every week. The patient's blood samples are collected every day. The collection made on Sunday and Monday are analyzed and the results reported on the following Monday while the collection made on Tuesday to Thursday are analyzed and reported on the following Thursday.

Potent tools of radioactivity and immunology provides a scaffold for the development of assays to quantitate virtually every hormone and enzyme in the body. Consequently the in-vitro laboratory at NINMAS is involved in collaborative research work in the field of endocrine physiology and clinical endocrinology. In addition students of post- graduate courses in Nuclear Medicine and in Hematology at BSM Medical University are regularly placed at this department for orientation and training.

**Conclusion:** Radio immunoassay (RIA) continues to maintain a favored position among the micro- analytical procedures at this laboratory. It is likely that this methodology will remain as main workhorse of routine diagnostic services. Nuclear Medicine Physicians must be aware of the potentialities of the In-Vitro laboratory at NINMAS and plan appropriately for its future development.

Abstract No .PP-3

## Comparison of post operative $^{99m}$Tc pertechnetate scan and post ablative $^{131}$I scan for the management of differentiated thyroid carcinoma

**Shankar Kumar Biswas**, Shaila Sharmin, Fatema Sultana Haque, Mohana Hossain, Afroza Akhter, Tania Sultana, Rubina Begum, Mazharul Islam, Sadia Hossain, Farhana Rahman, Rawnak Afrin, Sanowar Hossain

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**Introduction:** Incidence of differentiated thyroid cancer is still high in the developing country with a female preponderance. Due to advancement of surgical techniques total thyroidectomy is quite possible leaving minimum residual thyroid tissue. Nuclear medicine plays a pivotal role for management and follow up of these patients after surgery. However there is some debate about the pre- therapy I-131 scanning in a fear of stunning or suboptimal therapeutic effect. Recent study also revealed that Tc-99m pertechnetate scan detect the metastatic lesion in differentiated thyroid cancer.

**Objective:** This study was designed to unravel the impact of post operativeTc- 99m pertechnetate scan in comparison with the post therapy (I-131) scan.

**Material & Method:** Fifty differentiated thyroid cancer patients (female/male:40/10) were enrolled retrospectively for this study. All patients were sent for radioiodine ablation after total thyroidectomy in a tertiary level hospital. Tc-99m pertechnetate scan ( with 2 mCi i/v) was done to evaluate any remnant in the thyroid bed and baseline TSH, Tg, thyroid antibodies and serum calcium were estimated as a routine procedure in our centre. Stimulated TSH and Tg (after 3 wks of surgery without thyroxine replacement) levels were 77 ± 19 mIU/ml and 9 ± 33 ng/ml respectively. Radioiodine therapy (I-131) was given according to the size of the nodule and histopatholgical findings according to institutional protocol (eg. if the nodule is >3cm 75 mCi and for < 3 cm nodule 50 mCi was given, in case of cervical nodal metastasis 150 mCi and for distant metastasis 250 mci was given). Post therapy whole body scan (on5$^{th}$ day during discharge those who are taking 50 mCi and on 10$^{th}$ day those who are taking ≥70 mCi) findings were recorded. Scan images were evaluated by two senior nuclear medicine physicians independently; finally pre- therapy and post- therapy scan findings were compared meticulously.

**Results:** Twenty eight (64%) patients showed focal (single/multiple) tracer uptake in the thyroid bed on post surgical scan with Tc-99m pertechnetate. On post I-131 therapy scan there was good accumulation of tracer at the thyroid bed. Out of 50 patients, one patient only showed mediastinal focal tracer uptake on whole body $^{131}$I scan. There were some nonspecific intestinal uptake on $^{131}$I scan in 3 patients.

**Conclusions:** Post operative Tc-99m pertechnetate scan may miss extra thyroidal lesion in differentiated thyroid cancer. However considering the cost effectiveness, radiation burden and socioeconomic condition Tc-99m pertechnetate scan still would be the first option for assessment of the patient before radioiodine ablation in a developing country like Bangladesh.

Abstract No .PP-4

**Spectrum of Thyroid Diseases in Children Born after Salt Iodinization Program in Bangladesh—One Year Study in a Tertiary Referral Institute.**

**Mohammad Simoon Salekin,** Fatima Begum, Mohshi-Um Mokaddema, Sadia Sultana, Nurun Nahar, Mizanul Hasan, Mohafiz Ul Hoque Khan

*National Institute of Nuclear Medicine and Allied Sciences, Bangladesh (NINMAS)*

**Background:** Thyroid diseases are common form of endocrinopathies observed among children. Developmental and neurological growth of a child depends on proper function of thyroid gland. Bangladesh initiated national salt iodinization program from 1990 by formulating a national law at 1989. After two decades of successful fortification, it was possible to reduce the burden of thyroid diseases. However, some form of thyroid disease still persists among our population particularly among children who were born after starting iodinization program. The aim of the study was to see the spectrum of thyroid disease among children who born after national salt iodinization program referred for thyroid status evaluation.

**Materials and Method:** A prospective observational study was conducted among children enrolled in Thyroid Division of National Institute of Nuclear Medicine and Allied Sciences for thyroid status evaluation during the period of January 2014 to December 2014. Thyroid status was evaluated with thyroid function tests--free tri iodothyronine ($FT_3$), free thyroxine ($FT_4$) and thyroid stimulating hormone (TSH), serum thyroglobulin (TG), anti thyroglobulin (Anti Tg), anti thyroid peroxidase (TPO) levels, radioiodine uptake; ultrasound imaging, thyroid scintigraphy (Tc99m pertechnetate scan) and cytological examination.

**Results:** A total of 235 children were referred to thyroid division to evaluate thyroid status with one or more symptoms related to thyroid disease. Among 235 children 75 (31.9%) were male and 160 (68.1%) were female with male to female ratio was 1:2.13. On basis of clinical presentation, ultrasonography, thyroid scan, uptake and cytological examination following diseases could be categorized—congenital conditions like agenesis of thyroid gland 04 (1.7%), hemiagenesis of thyroid gland 04 (1.7%), ectopic thyroid gland 04 (1.7%) and thyroglossal cyst 16 (6.8%). Acquired non malignant conditions were diffuse thyromegaly 85 (36.17%), solitary thyroid nodular goiter 13 (5.53%), multinodular goiter 04 (1.7%), thyroiditis 15 (6.38%), normal sized thyroid gland with hormone dysgenesis 06 (2.55%), thyroid abscess 01 (0.4%) and other extra thyroid neck diseases 06 (2.55%). Thyroid carcinoma was evaluated in 17 (7.25%) children. All children had papillary thyroid carcinoma. Normal sized thyroid gland was found in 55 (23.4%) study population. Thyroid hormone assay could be done in 152 children. Among them 84 (55.26%) children showed euthyroid state, 35 (23.03%) were hypothyroid and 33 (21.71%) were in hyperthyroid state.

**Conclusion:** After two decade of salt iodinization, a number of patient was found with hypothyroidism, hyperthyroidism and thyroid carcinoma which needs further study to find the causal relationship.

Abstract No .PP-5

## Regional Left Ventricular Wall Involvement in Patients with Myocardial Infarction

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**Introduction:** Myocardial infarction (MI) is a condition characterized by ischemic injury and necrosis of the cardiac muscle. Ischemic injury occurs when the blood supply is insufficient to meet the tissue demand for metabolism. More than two thirds of myocardial infarctions occur in lesions that have less than 60% occlusion. Anterior wall MI usually happen due to occlusion of left anterior descending (LAD), lateral wall MI due to blockage of left circumflex (LCX) and inferior wall MI means blockage of right coronary artery (RCA).

In Bangladesh, Gated SPECT myocardial perfusion imaging was introduced in 2001 and has been playing progressively important role in the management of coronary artery disease. Myocardial perfusion imaging (MPI) is a useful non-invasive study for the evaluation of patients following MI. MPI in patients with uncomplicated MI is safe and provides important prognostic information of the risk of subsequent cardiac events.

**Objective:** To identify the site of involvement, size of infarct, prediction of further risk and assessment of damaged myocardium from MI.

**Materials & Method:** A retrospective study of 133 patients (M=122,F=11 with a ratio of 11 : 1) age ranging between 28 to 90 years with diagnosed MI were studied for MPI in National Institute of Nuclear Medicine and Allied Sciences (NINMAS), Dhaka during the period of 2013 to 2014.

Treadmill exercise stress was done in 27 patients and pharmacological stress with dobutamine infusion in 106 patients. Bruce protocol was followed for treadmill exercise test and Mayo clinic protocol for pharmacological stress with dobutamine. 10mCi 99mTc sestamibi was injected I/ V at peak heart rate and infusion was continued for one more minute. SPECT acquisition with ECG gating was done with a double headed SPECT camera (Siemens E cam) and post stress study continued for 15-30 minutes. Rest study was done 45-50 minutes after rest injection of 25 mCi tracer on the same day. MPI results were analyzed by 4DMSPECT v 3.1 software to obtain fixed defect at stress and rest perfusion data.

**Result:** Out of 133 patients, 05 (3.7%) were found to

be normal, 110 (82.7%) patients had anterior wall MI, 69 (51.87%) patients had lateral wall MI, 74 (55.6%) patients were diagnosed with inferior MI by stress and rest MPI.

**Conclusion:** Myocardial perfusion imaging provides prognostic information essential to clinical decision-making for the most appropriate management of coronary artery disease. NINMAS study correlates with the observations of previous literature, which show more prevalence of incidence in LAD and lesser in LCX and RCA territories. So, MPI study is a reliable technique for detection and localization of MI.

Abstract No .PP-6

**Assessment of Agreement between Gated SPECT Myocardial Perfusion Imaging and Gated SPECT Blood Pool Imaging for measurement of Left Ventricular Ejection Fraction in Coronary Artery Disease**

**Azmal Kabir Sarker**, Raihan Hussain, Khokon Nath, Shamim Momtaz, Faria Nasreen, Lutfun Nisa

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**Background:** Left ventricular ejection fraction (LVEF) is an important diagnostic and prognostic parameter in coronary artery disease (CAD). Gated SPECT myocardial perfusion imaging (GSMPI) is popularly used for non invasive quantitative assessment of LVEF. Gated SPECT blood pool imaging (GSBPI) being a radionuclide ventriculography technique is gold standard as well as technically comparable to GSMPI. Good correlation of these two methods for measurement of LVEF is reported by using correlation coefficients. Bland and Altman show the inappropriateness of correlation coefficient for comparison analysis of measurement methods.

**Objective:** To assess agreement between GSMPI and GSBPI for measurement of LVEF in CAD.

**Method:** Study was done in 27 patients (24 men/ 3 women) with CAD. The mean age was 54.2 ± 6.2 years ranging from 32 to 68 years. All patients underwent GSMPI and GSBPI with a gap of three to seven days. LVEF measured in rest phase of one day stress-rest GSMPI was compared with LVEF measured by GSBPI performed at rest. Agreement analysis was done using Bland Altman plot.

**Results:** Differences between GSMPI and GSBPI for measurement of LVEF at rest in same patient fell within two standard deviation of the mean difference. Thus the apparent overall slight underestimation of LVEF by GSBPI (54.8±25.3) in comparison to GSMPI (56.9±25) was statistically insignificant.

**Conclusion:** There was significant overall agreement between GSMPI and GSBPI for measurement of LVEF in CAD.

Abstract No .PP-7

**Congenital hypothyroidism – a case report**.

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A male child (age 2.5 months) was referred to our Institute for evaluation of a swelling in the neck which he had since birth. Clinical history revealed that the baby had severe constipation and reduced interest in nursing. He cried excessively but had normal sleep pattern. On examination, his weight was 3 kg, anterior and posterior fontanelle was not bulged. An enlarged palpable swelling was found in front of the neck. His tongue and umbilicus were normal. There was no remarkable history of thyroid disorders in the family. The baby's mother appeared apparently healthy and did not give any history of medications that affect thyroid function through suppression of TSH like glucocorticoids, dopamine agonistsand somatostatin analogs etc. The baby underwent neck ultrasound, biochemical evaluation of thyroid

function with serum T3,T4,TSH and serum anti-thyroid antibody test. The results showed: T3-1.00mmol/L,T4-<26mmol/L,TSH-84.56mmol/L,TmAb-2.30%,TgAb-1.20%.
Ultrasound showed enlarged thyroid gland with non homogenous that corresponded to the swelling in front of the neck. Parenchymal echo-texture of thyroid gland is. Thyroid scan was not conclusive due to short neck of the patient. From the above findings patient was diagnosed as congenital hypothyroidism (CH). Then patient was prescribed with 50 microgram levothyroxine and advised to come after 3 weeks for further follow up.CH is a condition of thyroid hormone deficiency present at birth. Approximately 1 in 4000 newborn in western and 1 in 2300 newborn in Bangladesh has a severe deficiency of thyroid function at birth. It can lead to physical and mental disability.CH may happen due to absent (athyreosis) or underdeveloped (hypo plastic) or ectopic gland. One of the causes of CH is the presence of maternal TSH receptor suppressor antibody that temporally impair thyroid function for several weeks. It could be noted in this case as special feature that the patient has normal body weight, normal sleep pattern, crying is not coarse and umbilicus is normal.CH is detected by the newborn screening program. So, early detection of CH is the most common preventable cause of intellectual disability.

Abstract No .PP-8

**Linearity and constancy test of scintillation detector**

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**Introduction**: Scintillation detector is used for various purposes due to its high detection efficiency. It is specially used in Gamma camera and SPECT system. Linearity and constancy are two important quality control procedures of the detector. From the medical physics point of view, linearity indicates the correct activity over the range of use, whereas, constancy determines the reproducibility of measurements from day to day.

**Objective:** The main objective of this presentation is to show the precision level of measurement and the ability of the detector to measure correct radio-activity.

**Method:** In this study, the isotopes used forlinearity test were Ga-68 and Cs-137 and the isotope Co-60 was used for constancy test. The 68 minutes half life of Ga-68 was more convenient for time management.

**Results:** *For linearity:* The theoretical and experimental values were nearer to each other. Maximum percentage difference was -3.120%, whereas, minimum value was -0.271%.
*For constancy:* The activity values for Cs-137 and Co-60 were observed to be almost the same over the whole period of testing. The standard deviations among the values were $\pm 0.026$ and $\pm 0.046$ respectively. The deviations between lowest and highest activities were 0.09 μCi and 0.165 μCi for respective isotope.
**Conclusion:** From these results, it can be concluded that all results are in acceptable limits and the detector is in good working order. In other word, the precision and accuracy level of the detector is very high or satisfactory.