ABSTRACTS OF

29th National Conference of

Society of Nuclear Medicine, Bangladesh

24th April, 2026

Radisson Blu Water Garden Hotel, Dhaka

DOI: https://doi.org/10.3329/bjnm.v29i1.89306

Bangladesh J. Nucl. Med. Vol. 29, No. 1, January 2026

DOI: https://doi.org/10.3329/bjnm.v29i1.89306

ABSTRACTS

29th National Conference of
Society of Nuclear Medicine, Bangladesh

Plenary Session

1. Testicular Cancer and FDG PET-CT - An overview

Prof. Dr. Raihan Hussain (Senior Consultant, Evercare Hospital, Dhaka)

ABSTRACT

Testicular cancer is a rare disease and accounts for only about 1% of all cancers in men. But the most important issue is that they are among the most common cancers in younger men between the ages of 15 and 40. Incidence is also steadily increasing. There are various risk factors, e.g., cryptorchidism, positive family history, cancer on the contralateral testis, and ethnical background.

Most of the testicular tumors arise from the germ cells (about 90%); the rest are from stromal cells or lymphoma and extremely rarely metastases. Among the germ cell tumors (GCT), seminoma is the predominant type. Meta-analysis data for FDG PET-CT in the detection of GCT has shown the sensitivity of 78%, specificity of 86%, and accuracy of 84% for seminoma. However, in patients with nonseminomatous GCTs, the sensitivity is much less.

FDG PET-CT helps to differentiate between benign and malignant lesions in primary evaluation of scrotal masses. In case of uncertain CT results in the primary staging of GCT, it can provide further information with a good negative predictive value. FDG PET-CT is also essential to check the distant metastases and evaluate the progress of the disease and therapeutic responses.

In our institutional experience at Evercare Hospital Dhaka (EHD), a total of 23 ^18F-FDG PET-CT studies were performed in 18 patients over an 8-year period from 2017 to 2025. Among these cases, the histopathological diagnoses included seminoma (n = 7), mixed germ cell tumor (n = 6), embryonal carcinoma (n = 2), and lymphoma (n = 3). The mean age of patients with germ cell tumors was 36 years, with subgroup analysis showing a mean age of 33 years in seminoma and 64 years in lymphoma.

In this presentation, an overview of testicular tumors, their types and classification, and the role of FDG PET-CT in their evaluation are being discussed along with our experience at the EHD. The pros & cons and the limitations are also discussed.

Keywords: Testicular Cancer, FDG PET-CT, germ cell tumors, seminoma

2. Caring Thyroid Eyes: Preventing Blindness

Prof. Dr. A. H. M Roquibul Hoque (Former Director, INMAS, Chattogram)

ABSTRACT

Thyroid Eye Disease (TED), also known as Graves' orbitopathy, is an autoimmune inflammatory disorder of the orbit commonly associated with Graves' hyperthyroidism. It is characterized by inflammation and expansion of extraocular muscles and orbital fat, leading to clinical manifestations such as lid retraction, proptosis, diplopia, pain, and, in severe cases, corneal breakdown and dysthyroid optic neuropathy with potential vision loss. Smoking is a major modifiable risk factor associated with disease progression. TED can be disfiguring and sight-threatening, significantly impairing quality of life.

Early detection and timely intervention are crucial to improving both visual and cosmetic outcomes. This review aims to update current understanding of the pathophysiology and management of TED, with emphasis on enabling non-specialist clinicians to recognize early warning signs and initiate appropriate referral and management to minimize long-term morbidity. A targeted literature review was conducted using PubMed, Google Scholar, and Web of Science, incorporating relevant original articles, guidelines

(EUGOGO, ATA, ETA, and the Royal College of Ophthalmologists), and clinical reports. In addition, professional experiences from thyroid and ophthalmology centers across Bangladesh were considered.

Adoption of simple clinical measures for early diagnosis and prevention is strongly recommended, in line with the Amsterdam Declaration on Graves' Orbitopathy (2009). The Clinical Activity Score (CAS), based on EUGOGO recommendations, provides a practical tool for identifying active inflammatory disease. Disease severity assessment includes evaluation of lid aperture, exophthalmos, ocular motility, corneal status, and optic nerve function, with classification into mild, moderate-to-severe, and sight-threatening disease.

TED progression can be prevented or mitigated through early diagnosis, risk factor modification, and multidisciplinary management. A proactive, patient-centered approach initiated at the primary care level is essential to reduce disease burden and improve outcomes.

Keywords: Thyroid Eye Disease; Graves' orbitopathy; Clinical Activity Score; Proptosis; Multidisciplinary care; Early diagnosis; Risk factors.

Prof. Dr. Kamaluddin Ahmed Oration

1. **Simple Things are not always Simple in Nuclear Medicine**

Prof. Dr. Lutfun Nisa (Former Professor, NINMAS)

ABSTRACT

Nuclear Medicine is often perceived as a straightforward specialty, relying on well-established radiotracers and standardized imaging protocols. However, in clinical practice, seemingly simple procedures frequently present complex diagnostic and interpretative challenges. The principle that "simple things are not always simple" is particularly relevant in Nuclear Medicine, where physiological variations, technical factors, and overlapping imaging patterns can significantly influence diagnostic accuracy.

Commonly used tracers such as ^{18}F-fluorodeoxyglucose (FDG) are highly sensitive but lack absolute specificity, as increased uptake may be observed in both malignant and benign conditions, including inflammation and infection. This overlap often complicates interpretation and may lead to false-positive or false-negative findings if not carefully correlated with clinical and laboratory data. Additionally, physiological tracer distribution and normal variants can mimic pathology, further emphasizing the need for thorough understanding and experience.

Technical aspects, including patient preparation, timing of imaging, motion artifacts, and attenuation correction, also play a crucial role in image quality and interpretation. Minor deviations from protocol can significantly alter findings, leading to potential diagnostic pitfalls. Moreover, hybrid imaging modalities such as PET-CT and SPECT-CT, while enhancing anatomical localization, introduce additional layers of complexity that require multidisciplinary expertise.

Through selected examples and clinical insights, this presentation highlights how routine Nuclear Medicine studies may harbor hidden complexities. It underscores the importance of a comprehensive approach that integrates imaging findings with clinical context, biochemical parameters, and complementary imaging modalities. Recognizing these nuances is essential to avoid misinterpretation and optimize patient management.

In conclusion, Nuclear Medicine, despite its apparent simplicity, demands a high level of expertise and critical thinking. Awareness of potential pitfalls and limitations is key to harnessing its full diagnostic and therapeutic potential.

Keywords: Nuclear Medicine; FDG PET-CT; Diagnostic pitfalls; Radiotracer uptake; Imaging interpretation; Hybrid imaging; False-positive findings; Clinical correlation.

Thematic session

1. Title: Updating the SNMB Protocol for the Management of Differentiated Thyroid Carcinoma

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Background: Management of differentiated thyroid carcinoma (DTC) in the Nuclear Medicine (NM) institutes of Bangladesh follows protocols prepared by the Society of Nuclear Medicine Bangladesh (SNMB) with a strong emphasis on radioactive iodine (RAI)-based theranostics and is influenced predominantly by the American Thyroid Association (ATA) guidelines. The recently updated ATA 2025 guidelines introduce a paradigm shift toward individualized, risk-adapted, and less aggressive treatment strategies. As the SNMB protocol was last revised in 2015, there is a clear and compelling need for its revision to align with the updated 2025 ATA guidelines for the management of DTC.

Objective: To evaluate key updates in the ATA 2025 guidelines and propose context-appropriate modifications of 2015 DTC management protocol of SNMB for maintaining the homogeneity of clinical practice in all the NM institutes of Bangladesh.

Methods: A narrative comparative review was conducted between current SNMB practices and ATA 2025 recommendations, focusing on risk stratification, RAI treatment and ablation, surgical extent, and management of RAI-refractory disease.

Results: A major update in the 2025 guidelines is the refinement of the risk stratification framework into four categories—**low, low–intermediate, intermediate–high, and high risk**—representing an evolution from the three-tiered system proposed in the 2015 guidelines. This revised model is more comprehensive, incorporating histopathological characteristics, imaging findings, and dynamic response-to-therapy assessments. It offers greater granularity in defining prognostic variables, including multifocality, extent of vascular invasion, and newly emphasized features such as microscopically positive surgical margins.

With respect to RAI therapy, the 2025 guidelines advocate a more selective, risk-adapted approach, particularly recommending restraint in low-risk patients to reduce unnecessary exposure and associated adverse effects. In intermediate-risk patients, RAI therapy is generally favored; however, the recommendations allow for individualized decision-making based on clinicopathological context, reflecting a degree of interpretive flexibility. Though the use of recombinant human thyroid-stimulating hormone (rhTSH) is now preferred over thyroid hormone withdrawal for patient preparation prior to RAI administration, its unavailability in Bangladesh is a major limitation. The indications for 18F-FDG PET-CT have been broadened, particularly in cases of suspected dedifferentiated or RAI-refractory disease.

Finally, the updated guidelines provide a more nuanced, albeit still complex, definition of RAI-refractory disease, offering clearer criteria to identify patients unlikely to benefit from further RAI therapy and thereby guiding timely transition to alternative therapeutic strategies.

Conclusion: Alignment of SNMB guidelines with ATA 2025 recommendations requires a transition toward **personalized, risk-adapted management**. Adoption of selective RAI use, optimized imaging strategies, and multidisciplinary decision-making will help reduce overtreatment while maintaining effective disease control in the local context.

Keywords: Differentiated thyroid carcinoma, ATA 2025, SNMB, management guideline, radioactive iodine, PET-CT, Bangladesh, nuclear medicine

2. Title: Protocol for management of Thyrotoxicosis: an update

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ABSTRACT

The management Guidelines for treating hyperthyroidism in Nuclear Medicine (specifically with Radioactive Iodine - ^{131}I) are essential to standardize patient care, optimize radioactivity dosing, manage radiation safety, and improve success rates for Graves' disease, toxic nodular goiters, and cancer. These guidelines, developed by professional bodies such as the American Thyroid Association (ATA), European Association of Nuclear Medicine (EANM), provide evidence-based recommendations for patient selection,

dose optimization, preparation, safety measures, and complication management. However, international protocols (e.g., ATA, ETA) may not fully address the country's socio-economic, infrastructural, and epidemiological context and a little modification may guide clinicians through dosage, preparation, and follow-up to minimize risks and manage the sequel of therapy in our own context.

The Society of Nuclear Medicine, Bangladesh (SNMB) published a national protocol for the management of hyperthyroidism in 2015. However, with evolving evidence and clinical practice, there is a growing need to update the guideline. Particular attention is required for special clinical scenarios, including pediatric hyperthyroidism, management of hyperthyroidism during pregnancy, and cases with antithyroid drug intolerance or allergy. Optimizing therapeutic radioiodine dosing for hyperthyroidism is of critical importance in the Bangladeshi population, considering regional variations in disease patterns, iodine status, and healthcare resources.

Early diagnosis, accurate etiological classification, and individualized management remain essential to prevent complications such as atrial fibrillation, heart failure, osteoporosis, and thyroid storm. Continuous updates of national protocols in line with global advancements are crucial for optimizing patient outcomes.

Keywords: Thyrotoxicosis; Hyperthyroidism; Graves' disease; Antithyroid drugs; Radioactive iodine; Thyroid scintigraphy; SNMB guidelines; Personalized management.

3. Standardized Ultrasound Reporting of Thyroid Nodules

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ABSTRACT

A standardized report should systematically document nodule location, size in three orthogonal dimensions, and detailed sonographic characteristics aligned with TIRADS scoring criteria. Based on cumulative points, nodules are categorized into risk levels, guiding recommendations for fine-needle aspiration (FNA) or surveillance. Integration of TIRADS into routine reporting facilitates evidence-based management, reduces unnecessary biopsies in low-risk nodules, and ensures timely intervention for higher-risk lesions. Additionally, clear communication of risk categories and management recommendations enhances collaboration between radiologists, endocrinologists, and surgeons.

Despite its advantages, challenges remain, including variability in interpretation and the need for training to ensure consistent application. Ongoing refinements and incorporation of emerging techniques such as elastography and artificial intelligence may further enhance risk stratification. In conclusion, a structured thyroid ultrasound reporting format utilizing TIRADS is essential for optimizing the evaluation and management of thyroid nodules, promoting precision medicine, and improving patient outcomes.

Keywords: Thyroid nodules; Ultrasound; TIRADS; Risk stratification; Fine-needle aspiration; Structured reporting

Proffered Paper Session I

1. Molecular imaging of head and neck cancer by FDG PET- CT

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ABSTRACT

Background: Head and neck cancer (HNC) is highly prevalent in Bangladesh, particularly among males. Larynx and oral cavity are the most common sites. PET-CT is highly effective in assessing nodal (N) disease and detecting distant metastases (M1). It is superior to conventional imaging (CT/MRI) in identifying the source of cancers found in neck lymph nodes.

Objective: To determine the diagnostic & prognostic value of FDG PET-CT in patients with head and neck cancer.

Patients and Method: This prospective analytical study was conducted for five years' in a well-equipped private PET-CT center of the Dhaka city. A total 320 patients with histopathology proven different type of HNC were included by purposive sampling. Whole body FDG PET CT scan was acquired from vertex to mid-thigh in a whole-body PET-CT scanner after administration of 5 to 10 mCi of 18-F FDG.

Results: The most affected age group is 60–70 years of age, with a higher incidence in men. The most affected site is the oral cavity and oropharynx and most prevalent histological subtype was squamous cell carcinoma. During initial PET scan 40% had locoregional nodal metastases in case of oropharyngeal cancer. FDG PET reported high sensitivity (98%) and specificity (94%) in the detection of distant metastases in patients with HNC. Patients with poor baseline prognostic indicators are at risk of having disease non responsive to treatment or of having a recurrence soon after completing therapy.

Conclusion: In HNC patients, FDG PET is essential for initial disease staging in both localized and metastatic settings. It is also useful for assessing treatment response.

***Keywords**:* Head & Neck cancer, molecular imaging, FDG PET-CT.

2. Extensive cutaneous and extranodal dissemination of follicular lymphoma mapped by PET-CT

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ABSTRACT

Background: Follicular lymphoma is a common subtype of indolent B-cell non-Hodgkin lymphoma, typically presenting with painless peripheral lymphadenopathy. Diffuse cutaneous and other extranodal manifestations are uncommon and indicate advanced disease, making whole-body comprehensive metabolic imaging important for staging and metabolic mapping.

Case Description: We report the case of a 65-year-old woman with biopsy-proven B-cell follicular lymphoma underwent PET-CT for disease assessment. A surveillance PET-CT scan was performed to evaluate the extent of the disease. The scan revealed extensive nodal and extranodal sites of involvements throughout the body. Notable findings included hypermetablic enlarged submental, right supraclavicular, bilateral parasternal, bilateral axillary, left cubital, and extensive abdomino-pelvic lymphadenopathy. The scan demonstrated numerous hypermetabolic (SUVmax up to 11.0) subcutaneous soft tissue nodules scattered from the face to the legs, consistent with diffuse cutaneous lymphomatous infiltrations. Additionally, a focal

hypermetabolic skeletal lesion was identified in the acromion process of the left scapula suggesting osseous involvement.

Conclusion: This case demonstrates the value of PET-CT in comprehensive staging of advanced follicular lymphoma by delineating both nodal disease and unusual extranodal spread, including widespread cutaneous and skeletal involvement, which may influence prognosis and treatment planning.

3. Assessment of PET-CT findings in breast cancer patients: Experience at INMAS, Mitford with 22 cases

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ABSTRACT

Background: Positron emission tomography/computed tomography (PET-CT) has become an indispensable tool in modern oncologic imaging, enabling comprehensive assessment of tumor metabolism and anatomical extent for staging, treatment response evaluation, and surveillance. This study aims to describe the initial experience and clinical utility of PET-CT in a cohort of oncology patients.

Patients & Methods: This observational study included a total of 22 patients who underwent PET-CT evaluation at Institute of Nuclear Medicine and Allied Sciences-INMAS, Mitford from April 2025 to February 2026. Clinical and imaging variables were analyzed, including treatment status, therapeutic response, presence of lesions, and follow-up findings.

Results: The mean age was 48.55 ± 9.5 years (range: 30–68 years). The majority of patients demonstrated minimal metabolic activity on PET-CT, with low standardized uptake values (SUV) and absence of significant pathological findings in most cases (63.6%) indicating low disease burden or favorable treatment response. A small proportion of patients showed evidence of residual or metabolically active disease (27.2%). Notably, PET-CT detected unexpected second primary malignancies including one lung lesion (4.6%) and one contralateral breast lesion (4.6%).

Conclusion: This initial institutional experience highlights that most patients exhibited low disease burden or minimal residual metabolic activity on PET-CT imaging. While PET-CT remains a valuable tool for oncologic assessment, larger studies with comprehensive datasets are required to evaluate its diagnostic and prognostic significance in this population.

Keywords: PET-CT, Carcinoma of breast, standardized uptake values (SUV)

4. Association Between Depression Severity and Regional Brain Glucose Metabolism on ^{18}F FDG PET-CT in Cancer Patients

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ABSTRACT

Background: Depression is a common comorbidity in cancer patients and is associated with functional alterations in brain regions involved in emotional regulation. Neuroimaging studies have demonstrated reduced metabolic activity in the prefrontal cortex, hippocampus, amygdala, and cingulate cortex in depressive disorders. This study aimed to evaluate the relationship between depression severity and regional brain glucose metabolism using 18F-FDG PET-CT .in cancer patients.

Methods: This prospective observational study included 97 cancer patients undergoing routine 18F-FDG PET-CT . Depression severity was assessed using the Hamilton Depression Rating Scale (HDRS). Regional brain glucose metabolism was quantified using standardized uptake values (SUVmax) in predefined regions, including the frontal, temporal, parietal, occipital cortices, hippocampus, thalamus and cingulate gyrus. Pearson correlation analysis was performed to assess the association between HDRS scores and regional metabolic activity.

Result: The study population exhibited mild depressive symptoms overall (mean HDRS score: 7.5 ± 5.3). A weak but consistent negative correlation was observed between depression severity and metabolic activity in multiple brain regions implicated in mood regulation. The strongest correlations were identified in the right frontal cortex ($r = -0.14$), right temporal cortex ($r = -0.12$), and hippocampus ($r = -0.09$). Although these correlations did not reach statistical significance ($p > 0.05$), patients with higher HDRS scores showed a trend toward reduced FDG uptake in the frontal cortex, hippocampus and cingulate gyrus compared with those with lower scores.

Conclusion: Depression severity in cancer patients is associated with reduced glucose metabolism in brain regions involved in emotional regulation, particularly the frontal cortex, hippocampus, and cingulate gyrus. These findings suggest that FDG PET-CT may provide insights into the neurobiological correlates of depression in oncology patients. Further large-scale studies are needed to confirm these findings and their clinical significance.

Keywords: Depression, Glucose metabolism, FDG PET-CT

5. Clinical Utility of ^{18}F-PSMA PET-CT in prostate cancer: Initial Experience at INMAS, Dhaka

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ABSTRACT

Introduction: Accurate staging and monitoring of prostate cancer are essential for selecting appropriate therapy. 18F-PSMA PET-CT has emerged as a sensitive molecular imaging modality targeting prostate-specific membrane antigen (PSMA) and forms the basis of a theragnostic pathway linking imaging with targeted radionuclide therapy such as ^{177}Lu-PSMA. This study evaluated the diagnostic findings of 18F-PSMA PET-CT in different clinical settings at INMAS Dhaka.

Methods: This retrospective study included 50 prostate cancer patients who underwent 18F-PSMA PET-CT from June 2025 to March 2026. Clinical, pathological, and imaging data were reviewed, and scans were assessed for primary, nodal, and distant metastases.

Results: Patients ranged in age from 51 to 80 years. At imaging, 14 patients (28%) were treatment-naive and 36 (72%) were post-treatment. Previous treatment included surgery in 22 patients (44%), hormone therapy in 26 (52%), and radiotherapy in 16 (32%). 18F-PSMA PET-CT identified prostatic lesions in 36 patients (72%), lymph node metastases in 27 (54%), bone metastases in 20 (40%), and lung metastasis in 1 patient (2%). Higher PSA values and higher-Grade Groups correlated with more extensive disease on PET-CT . Among patients with PSA >100 ng/mL, 75% had nodal and/or bone metastases, and approximately 93.3% of those with Grade Group 4–5 tumors demonstrated metastatic disease. In contrast, patients with low PSA levels (<20 ng/mL) and Grade Group 1–2 tumors had localized or negative findings.

Conclusion: ^{18}F-PSMA PET-CT proved to be a valuable imaging modality for staging, restaging, and treatment assessment in prostate cancer. Our initial experience highlights its role in improving disease characterization and its potential for future PSMA-based theragnostic development in Bangladesh.

Keywords: Prostate cancer; ^{18}F-PSMA PET-CT ; Staging; Restaging; Theragnostic.

6. ^{18}F-FDG PET-CT in ovarian malignancy: Diagnostic utility and imaging patterns: A retrospective analysis

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ABSTRACT

Introduction: Widely used imaging modalities for ovarian malignancies are ultrasound, CT and MRI. Recently fluorine-18-fluoro-2-deoxy-D-glucose (18F-FDG PET CT) scan shows increasing clinical application to supplement conventional imaging modalities to asses ovarian malignancies. This study was done to see the clinical use of 18F-FDG PET CT in evaluation of ovarian malignancies.

Materials and methods: Women with ovarian malignancies referred to the PET-CT division of NINMAS for 18F-FDG PET-CT between January and December 2025 were included. This retrospective study evaluated primary disease, staging, metastases, recurrence, and therapy response, analyzing patient age, tumor site, metastatic sites, and SUVmax.

Results: A total of 36 patients with ovarian carcinoma were included. Age ranged from 39–74 years, with a mean of 52.07 ± 11.8 years; the most common age group was 51–60 years (36.11%). Histopathology showed serous adenocarcinoma (21), mucinous (5), clear cell (5), endometrioid (3), and germ cell tumors (2). Most patients presented postoperatively: 19 for follow-up, 15 for therapy response, and 2 for baseline evaluation. Imaging detected primary malignancy in 2 cases, residual disease in 1, recurrence in 1, and metastases in 13 cases. The remaining 19 showed good therapeutic response without suspicious FDG uptake. The most frequent metastatic site was abdominopelvic lymph nodes (10), followed by peritoneal seeding (4), liver (2), lungs (2), and bone (1). No individual clinical or pathological factor was independently associated with metastatic distribution.

Conclusion: In this study, most ovarian carcinoma patients were referred for therapy response evaluation. A significant number demonstrated metastases on 18F-FDG PET-CT after standard treatment. PET-CT significantly impacts management by improving staging, detecting early metastases or recurrence, and guiding patient selection for further treatment.

Keywords: 18F-FDG PET-CT , ovarian malignancy.

Proffered Paper Session II

1. Evaluation of skeletal metastasis & bone mineral density in breast cancer patients: A study using bone scintigraphy and DEXA scan

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ABSTRACT

Introduction: Bone health problem is one of the important concomitant diseases of breast cancer. Breast cancer patients, particularly survivors and those with metastatic disease, face a higher risk of abnormal bone mass, including osteopenia and osteoporosis, compared to the general population, study found a 68% increased risk of these conditions.

Objective: To evaluate bone metastasis and BMD status in breast cancer patients.

Material and methods: This prospective study was carried out at Institute of nuclear medicine & allied sciences (INMAS), cumilla from January to December 2025. A total of 190 diagnosed female breast cancer patients (ductal cell carcinoma) were included in the study. Bone mineral density (BMD) by DEXA scan and Tc99m MDP bone scan were done to evaluate abnormal bone mass (low bone mass- osteopenia, osteoporosis) and bone metastasis of the patients.

Results: Out of 190, most of the patients (40%) were > 50 years of age. 41.1% had locally advanced and 40% had metastatic cancer. 52.1% had ductal cell carcinoma grade II. Among 190 patients, 114 (60%) had abnormal bone mass (osteoporosis-23.2% & osteopenia-36.8%); 59 (31%) had bone metastasis (solitary-8.4% & multiple-22.6%); 53 (27.9%) had normal BMD & bone scan. Out of 131 normal bone scan patients, 47 (35.9%) had osteopenia and 31 (23.7%) had osteoporosis. 30.5% had osteoporosis/ osteopenia at/under the age of 50 years. Bone metastasis was higher (7 out of 11 patients, 63.6%) in the age group of ≤ 30 years; present in 9.2% of early stage of breast cancer; most common (43.6%) in grade III carcinoma and bone metastasis was relatively low (12.5%) in TNBC.

Conclusion: DEXA scan and Tc99m Bone scan both plays different role in determining bone health in breast cancer patients irrespective of age of the patient & stage of the cancer.

2. Changes of thyroid function in relation to chronic kidney disease

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ABSTRACT

Background: The kidney normally plays an important role in the metabolism, degradation and excretion of thyroid hormones. Therefore, impairment in kidney function leads to disturbed thyroid physiology. All levels of the hypothalamic-pituitary-thyroid axis may be involved, including alterations in hormone production, distribution and excretion. As a result, abnormalities in thyroid function tests are common in chronic kidney disease.

Objectives: This study was done to find out the effect of chronic kidney disease on thyroid functional status.

Material and Methods: This was a cross sectional type of prospective study conducted in the Nephrology Department of Rajshahi Medical College Hospital (RMCH) and Institute of Nuclear Medicine & Allied Sciences (INMAS) Rajshahi. A total of 200 patients suffering from different stages of chronic kidney disease were included in this study during the period of January 2018 to June 2022.

Results: This study showed high prevalence of primary hypothyroidism (11 %), low T3 syndrome (45%) and subclinical hypothyroidism (5%) in chronic kidney disease patients. Furthermore, there is an increasing trend of decreased thyroid functional status along with decrease of estimated GFR (eGFR).

Conclusion: Chronic kidney disease impairs thyroid function in different ways. So thyroid functional status should be evaluated in each and every patient of CKD. That can reduce the morbidity and mortality rate of CKD patients as well as reduce the social burden and health expenditure.

3. Factors associated with delayed gastric emptying in dyspeptic patients evaluated by gastric emptying scintigraphy

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ABSTRACT

Background: Dyspepsia is a common gastrointestinal disorder worldwide, with delayed gastric emptying representing an important underlying mechanism in a subset of patients. Gastric Emptying Scintigraphy (GES) is the gold standard for evaluating gastric motility

disorders. This study aimed to assess gastric emptying status and identify factors associated with delayed gastric emptying among patients presenting with dyspepsia.

Materials and Methods: This observational cross-sectional study was conducted at the National Institute of Nuclear Medicine & Allied Sciences over an 18-month period (December 2022 to June 2024). A total of 27 patients with dyspeptic symptoms underwent gastric emptying scintigraphy. Demographic and clinical variables—including age, gender, diabetes status, smoking, body mass index (BMI), symptom severity, socioeconomic status, and drug history (iron and NSAIDs)—were analyzed to evaluate their association with delayed gastric emptying. Appropriate statistical tests were applied, and a p-value <0.05 was considered significant.

Results: Among the 27 patients, 15 (55.6%) were female and 12 (44.4%) were male, with a mean age of 36.63 ± 12.13 years. Delayed gastric emptying was observed in 33.3% of patients. It was most frequently noted in the 21–30 year age group (n = 6), followed by the 51–60 year group (n = 2), and one patient each in the 31–40 and 41–50 year groups. The most common presenting symptoms were nausea, abdominal discomfort, and postprandial fullness. No statistically significant association was found between symptom severity and delayed gastric emptying. However, Younger age (p = 0.0001) and diabetes mellitus (p = 0.0001) were identified as significant risk factors.

Conclusion: Delayed gastric emptying is present in a considerable proportion of dyspeptic patients, with younger age and diabetes mellitus showing significant associations.

Keywords: Dyspepsia, Functional Dyspepsia, Delayed gastric emptying.

4. Accessory spleen diagnosed by nuclear imaging- A rare case report

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ABSTRACT

Background: Accessory spleen is a congenital anomaly resulting from incomplete fusion of splenic primordia during embryogenesis, leading to ectopic splenic tissue separate from the native spleen. It is reported in approximately 10–15% of the population. Accessory spleens may occur in various anatomical locations and typically measure less than 4 cm in diameter. Larger accessory spleens are uncommon and may mimic abdominal masses or lymphadenopathy. We report a rare case of a giant accessory spleen incidentally detected during imaging evaluation.

Case Report: An 18-year-old female was referred to the Institute of Nuclear Medicine and Allied Sciences, Mymensingh for abdominal ultrasonography with complaints of abdominal pain and discomfort for three weeks and a palpable lump in the left upper abdomen. Ultrasonography revealed an oval, well-defined, homogeneous isoechoic soft tissue mass measuring approximately 10.0 × 4.7 cm located between the spleen and the left kidney, medially related to the pancreatic tail. Color Doppler study demonstrated a vascular hilum within the lesion. Contrast-enhanced CT showed homogeneous enhancement similar to the native spleen. Subsequently, Tc-99m nanocolloid scintigraphy demonstrated radiotracer uptake within the lesion corresponding to the ultrasonographic mass, confirming the presence of ectopic splenic tissue. Physical examination and laboratory investigations were unremarkable. Fine-needle aspiration cytology also revealed splenic tissue.

Conclusion: Recognition of accessory spleen is important to avoid misdiagnosis as abdominal lymphadenopathy or neoplastic lesions. Tc-99m

nanocolloid scintigraphy, particularly when combined with SPECT/CT, provides reliable functional confirmation of ectopic splenic tissue and helps prevent unnecessary invasive procedures.

Keywords: Accessory spleen, Tc-99m nanocolloid scintigraphy, ectopic splenic tissue.

5. Crossed fused renal ectopia along with situs inversus and dextrocardia: a rarest case report

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ABSTRACT

Background: Crossed fused renal ectopia is a rare congenital anomaly characterized by migration of one kidney to the opposite side with fusion to the contralateral kidney. The estimated incidence is approximately 1 in 1000 live births, with a male predominance of 2:1. In more than 90% of cases, the ectopic kidney is fused. Although often asymptomatic, it may be associated with other congenital anomalies and may present incidentally or with renal dysfunction.

Case Report: A 15-year-old boy presented with progressive generalized edema, initially involving the bilateral pre-tibial regions and extending over one week, accompanied by oliguria and hypertension. Laboratory evaluation demonstrated massive proteinuria, mild hypoalbuminemia, and mildly elevated serum creatinine and urea levels, raising suspicion of nephrotic syndrome or acute glomerulonephritis. Further evaluation at INMAS, Dhaka revealed situs inversus with dextrocardia on abdominal ultrasonography. Both kidneys were absent from their normal lumbar locations. Instead, a lobulated, enlarged, echogenic renal structure was identified in the right pelvic cavity adjacent to the urinary bladder, with loss of corticomedullary differentiation, suggestive of ectopic kidney with acute parenchymal involvement. Tc-99m DMSA renal scintigraphy demonstrated absent tracer uptake in the renal fossae and a single large globular area of uptake in the right pelvis, consistent with fused, malrotated kidneys. Differential cortical function showed reduced activity in the upper moiety with relatively preserved function in the lower moiety. Computed tomography confirmed crossed fused renal ectopia in the right pelvic cavity.

Conclusion: This case represents a rare coexistence of situs inversus with dextrocardia and crossed fused renal ectopia. Multimodality imaging plays a pivotal role in accurate anatomical localization and functional assessment, thereby guiding appropriate clinical management and treatment planning.

6. Nutritional deficiency among head and neck carcinoma patients during radiotherapy: A preliminary observational study

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ABSTRACT

Background : Patients with head and neck carcinoma undergoing radiotherapy frequently develop acute toxicities that significantly impair oral intake and lead to nutritional deficiency. Fatigue, anorexia, mucositis, and pharyngeal ulceration are particularly important, as they reduce treatment tolerance and adversely affect quality of life. In more severe cases, these complications may result in progressive deterioration of body composition, including the development of sarcopenia, which is often underrecognized in routine clinical practice, especially in resource-limited settings.

Patients & Methods: This preliminary observational study aimed to evaluate early nutritional and mucosal toxicities in patients with head and neck carcinoma during radiotherapy, with particular emphasis on weight loss, appetite reduction, oral intake difficulty, and the pattern of supportive nutritional interventions.

Result: A total of 30 patients undergoing radiotherapy were prospectively observed throughout their treatment course. The main variables assessed included fatigue, degree of weight loss, anorexia, severity of oral and pharyngeal ulceration, and the type of nutritional support provided. Descriptive analysis was performed to identify common patterns of treatment-related complications.

All patients experienced marked fatigue and generalized weakness during radiotherapy. The mean weight loss was approximately 5 kg. Severe oral and pharyngeal ulceration was observed in all patients, with extensive lesions present in the majority of cases. Appetite loss was reported in 80% of patients and was associated with reduced oral intake and progressive nutritional decline. Injectable nutritional support was provided to 10 patients, while only 4 patients received nasogastric tube feeding, largely due to sociocultural reluctance. Notably, patients who received tube feeding demonstrated better nutritional maintenance and clinical tolerance.

Conclusion: These findings highlight the importance of routine nutritional, functional, and body composition assessment during radiotherapy to enable early supportive interventions and improve overall patient care outcomes.

Proffered Paper Session III

1. Resistant hypothyroidism in thyroid cancer survivors: Unveiling thyroid hormone resistance syndromes

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ABSTRACT

Background: Differentiated thyroid carcinoma (DTC), including papillary (PTC) and follicular thyroid carcinoma (FTC), is the most common endocrine malignancy. Standard management consists of total thyroidectomy, radioactive iodine therapy (RAIT), and thyroid-stimulating hormone (TSH) suppression using levothyroxine (LT4). Persistent TSH elevation despite high-dose LT4 therapy represents a significant clinical challenge. Thyroid hormone resistance syndrome (THRS), a rare genetic disorder caused by mutations in thyroid hormone receptor genes, is an uncommon but important cause. However, it remains under recognized, particularly in resource-limited settings specially where absence of adequate genetic testing facilities.

Case Presentations: We report three cases of DTC (one FTC and two PTC) referred to NINMAS after failure to achieve biochemical TSH suppression despite unusually high LT4 doses (500, 600 and 800 mcg/day). Mean body weight ranged from 50–70 kg. Despite these doses, TSH levels remained persistently elevated. The FTC case showed elevated thyroglobulin (Tg), while both PTC cases had normal Tg. A systematic evaluation excluded common causes of LT4 resistance, including gastrointestinal mal-absorption syndromes (coeliac disease, inflammatory bowel disease, Helicobacter pylori), drug interference (calcium, iron, proton pump inhibitors), and dietary factors. Heterophilic antibody interference could not be assessed due to lack of assay availability in Bangladesh.

Conclusion: These case series highlights the diagnostic complexity encountered in DTC survivors who require disproportionately high LT4 doses without achieving landmark TSH levels. Following systematic exclusion of common reversible causes, THRS, non-adherence, and laboratory interference are to be considered. A structured, stepwise diagnostic approach and improved access to genetic and specialized laboratory testing are essential, particularly in low-resource settings.

Keywords: Thyroid hormone resistance syndrome, differentiated thyroid carcinoma, levothyroxine, TSH suppression, radioactive iodine therapy

2. Indolent but not innocent: Recurrence in papillary thyroid microcarcinoma

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ABSTRACT

Background: Papillary thyroid microcarcinoma (PTMC), defined as a tumor ≤1 cm in diameter, is increasingly identified owing to the widespread use of high-resolution imaging and fine-needle aspiration cytology. Despite its generally indolent behavior and excellent prognosis, the risk of disease recurrence remains a clinically significant consideration that may influence long-term management and follow-up strategies.

Methods: In this retrospective study, 103 patients diagnosed with PTMC between 2022 and 2024 were analyzed. Radioiodine therapy (RAIT) was administered in accordance with American Thyroid Association (ATA) guidelines. Patients with incomplete clinical data or a follow-up duration of less than 12 months were excluded. Collected variables included demographic characteristics, tumor pathology, surgical treatment, RAIT details, biochemical markers, comorbid conditions, and patterns of recurrence.

Results: Out of the 103 patients, 91 (88.4%) were female and 12 (11.6%) were male, yielding a female-to-male ratio of 7.5:1. The mean age was 38 ± 1 years (range: 17–69 years). All patients underwent total thyroidectomy. Lymph node metastasis at presentation was identified in 15 patients (14.5%). RAIT was administered with doses ranging from 50 to 150 mCi. During follow-up, 7 patients (6.7%) developed recurrence. Of these, 6 patients (5.8%) demonstrated positive findings on post-therapy whole-body scintigraphy at one year, while 1 patient presented with cervical lymph node metastasis detected on follow-up ultrasonography and confirmed cytologically. No mortality was observed.

Conclusion: Although PTMC is widely regarded as a low-risk malignancy, recurrence is not uncommon. These findings reinforce that "low risk" does not equate to "no risk," highlighting the necessity for individualized risk assessment and sustained long-term surveillance.

4. Cross-sectional assessment of clinical profile at diagnosis and thyroid function at six months in subacute thyroiditis

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ABSTRACT

Background: Subacute thyroiditis (SAT) is a self-limiting inflammatory disorder of the thyroid gland, most commonly linked to viral infections. Although the associated thyroid dysfunction is generally transient, a subset of patients may develop persistent abnormalities requiring ongoing surveillance. This study aimed to assess the clinical characteristics at presentation and evaluate thyroid functional status six months after diagnosis.

Methods: This cross-sectional follow-up study included 50 patients diagnosed with SAT based on clinical presentation and thyroid scintigraphy findings. Of these, 26 patients completed six months of follow-up. Baseline demographic and clinical characteristics were documented at diagnosis. Thyroid function tests—thyroid-stimulating hormone (TSH), free thyroxine (FT4), and free triiodothyronine (FT3)—were measured at diagnosis, three months, and six months. Descriptive statistical methods were applied to

summarize clinical features and biochemical outcomes.

Results: Females were more frequently affected than males (58% vs. 42%). The predominant presenting symptoms were neck pain (100%), palpitations (74%), weight loss (72%), and fever (62%). Clinical examination commonly revealed thyroid tenderness (100%), tachycardia (74%), and thyromegaly (54%). At six months, 65% of patients demonstrated normalization of TSH levels. However, 27% exhibited elevated TSH levels consistent with hypothyroidism, while 8% had suppressed TSH, indicating persistent thyrotoxicosis.

Conclusion: A notable proportion of SAT patients exhibit persistent thyroid dysfunction at six months, particularly hypothyroidism. These findings underscore the importance of structured follow-up and long-term monitoring to facilitate early detection and appropriate management of sustained thyroid abnormalities.

5. Diagnosis of thyroid neoplasm: Thyroid Scan Vs Elastography

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ABSTRACT

Introduction: Thyroid nodules are common in clinical practice, with a small but clinically significant proportion being malignant. Accurate differentiation between benign and malignant nodules is essential for appropriate management and to minimize unnecessary invasive procedures. Thyroid scintigraphy provides functional characterization of nodules, whereas ultrasound elastography assesses tissue stiffness. This study aimed to compare the diagnostic performance of these two modalities in detecting thyroid neoplasms.

Patients and Methods: This retrospective observational study included 253 patients who attended the Institute of Nuclear Medicine and Allied Sciences (INMAS), Rajshahi, between January 2022 and December 2025. All patients underwent thyroid scintigraphy using Tc-99m pertechnetate and ultrasound elastography. Nodules were categorized as hot, warm, or cold on scintigraphy and graded according to stiffness on elastography. The final diagnosis was established by fine-needle aspiration cytology (FNAC) and/or histopathological examination.

Result: Out of 253 patients, 51 were confirmed malignant. Among these, 14 (27.4%) were male and 37 (72.6%) were female. Scintigraphy showed 202 (79.8%) cold nodules, 48 (19.0%) warm nodules, and 3 (1.2%) hot nodules. Most malignant nodules (43; 84.3%) were cold; however, a considerable number of cold nodules (10; 19.6%) were benign, indicating low specificity. Elastography demonstrated increased stiffness in most malignant nodules (46; 86.8%), suggesting higher sensitivity and specificity. The combined use of both modalities improved diagnostic accuracy and reduced unnecessary FNAC procedures.

Conclusion: Thyroid scintigraphy and elastography are complementary techniques in evaluation of thyroid nodules. Scintigraphy provides functional insight, while elastography improve structural assessment. Their combined use enhances diagnostic confidence and supports better clinical decision-making in detecting thyroid neoplasms.

Keywords: Thyroid neoplasm, Thyroid scan, elastography, cold nodule, warm nodule, hot nodule.

6. The triple-modality approach to thyroid assessment: Correlating serum biochemistry, radioisotope uptake and shear wave elastography

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ABSTRACT

Background: Assessment of thyroid disorder depends on serum hormone levels and radioisotope imaging. These modalities provide no information regarding the structural condition of the gland. This study aimed to evaluate the correlation among biochemical markers, isotope scans and shear wave elastography (SWE).

Patients & Methods: A group of 30 patients (Hypothyroid, Hyperthyroid, and Euthyroid) was examined. for shear wave elastography among the patients of thyroid disorders attended at INMAS Gopalganj. Blood reports (TSH, FT4), thyroid scans (uptake %), and SWE (stiffness in kPa) data was collected accordingly and analyzed.

Results: Patients with hyperthyroidism (mean TSH < 0.05 mIU/L) exhibited a broad spectrum of scan uptake (0.1% to 18.9%). Notably, high functional uptake did not always align with high mechanical stiffness, as some hot nodule remained quite soft (< 40 kPa). In contrast, patients with hypothyroidism showed more localized stiffness (average of 62.38 kPa in the left lobe) even with low functional uptake, indicating that SWE better reflects chronic inflammation and fibrosis than isotope scans.

Conclusion: A multimodal approach is essential. Blood tests and imaging reveal function of the thyroid, whereas elastography assesses structural integrity. The difference between uptake and stiffness indicates that SWE delivers the state of disorder (acute or chronic inflammation) essential for defining thyroid conditions.

Proffered Paper Session IV

1. Enhancing nuclear medicine capacity through large-scale radioisotope production infrastructure

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ABSTRACT

The establishment of a large-scale medical radioisotope production facility under the Ministry of Science and Technology, implemented by the Bangladesh Atomic Energy Commission, represents a strategic initiative to strengthen the country's nuclear medicine infrastructure and healthcare services. This project aims to ensure the reliable and regular supply of essential medical radioisotopes to approximately 70–80 nuclear medicine centers and hospitals across the country through local production, thereby reducing dependence on imports and enhancing service continuity.

A key component of the project includes the construction of a new building and the development of Good Manufacturing Practice (GMP)-compliant hot-cell and hot-lab facilities. These upgrades will enable uninterrupted production and distribution while elevating product quality to international standards. In addition, the renovation of existing aging infrastructure and laboratories within the radioisotope production division will expand research capabilities and improve operational efficiency.

The project also emphasizes human resource development by providing specialized training for scientists and creating advanced research and training opportunities for university students. This initiative is expected to foster a skilled workforce in nuclear science and technology, contributing significantly to the country's socio-economic development.

Overall, the project will play a critical role in improving access to diagnostic and therapeutic nuclear medicine services, enhancing healthcare outcomes, and positioning Bangladesh as a capable producer of high-quality medical radioisotopes in the region.

2. Radiological challenges during preventive maintenance of a medical cyclotron: Experience from a IBA Cyclone 18/9 MeV facility

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ABSTRACT

Background: Medical cyclotrons are essential for the production of short-lived positron-emitting radionuclides, particularly fluorine-18 used in PET imaging. Routine preventive maintenance inspection (PMI) is required for sustained operation; however, neutron-induced activation of cyclotron components results in residual radiation, posing occupational exposure risks.

Objective: To evaluate radiological hazards for personnel, quantify residual dose rates, and assess radiation protection practices during routine PMI of an 18/9 MeV medical cyclotron.

Methods: PMI was conducted following a routine shutdown with a three-day cooling period. Dose rate measurements were performed using a calibrated Automess 6150 AD 5/H survey meter at a standardized distance of 1m from key components. Measurements were taken at the integrated target position both before and after the target assembly was removed.

Results: Basically the cyclotron vault is equipped with a real time radiation dose monitoring system. During the PMI dose rate were measured at various components and for personal dose measurement all worn individual pocket dosimeter. The dose rate at the target position prior to separation from the cyclotron was measured at 68 µSv/h, indicating significant residual activation. After removal, the isolated target exhibited a dose rate of 180 µSv/h at 1 m without additional lead shielding, with shielding it reduces to 43.7 **µSv/h** . The target, stripper foil, cathode and associated beam-line components were identified as the primary contributors to residual radiation. Despite a three-day cooling period, measurable radiation persisted, demonstrating the influence of medium- and long-lived activation products. For each PMI the average absorbed dose for workers was recorded around 1mSv on their pocket dosimeters.

Conclusion: Preventive maintenance of medical cyclotrons presents notable radiological challenges due to induced radioactivity. Even after extended cooling periods, significant residual dose rates persist, particularly around the target assembly, havar foil, beam line. Although the average absorbed dose received by workers during each PMI is noticeable, it does not exceed the international dose limits. Careful planning, proper shielding and optimized work procedures are essential to minimize radiation exposure. These findings provide practical insights for PMI of cyclotron facilities. Application of ALARA principles, including time optimization and justification, ensured that occupational exposure remained within permissible limits.

Keywords: PMI, Medical Cyclotron, PET, Neutron-induced activation etc.

3. Biomarker-based assessment of low-Dose ionizing radiation exposure: Biochemical, hematological, and GADD45A gene expression analysis

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ABSTRACT

Background: Individuals occupationally exposed to ionizing radiation (IR) over prolonged periods are at potential risk of adverse health effects.

Materials and methods:

Biochemical (alanine aminotransferase (ALT), alkaline phosphatase (ALP) and creatinine), hematological (complete blood cells (CBC) count) and genetic study (relative gene expression analysis of growth arrest and DNA damage inducible alpha; *gadd45a*, determined by real-time quantitative PCR (RT-qPCR) using the $2^{-\Delta\Delta Ct}$ method with Glyceraldehyde 3-phosphate dehydrogenase (*GAPDH*) as the reference gene) were done using blood samples.

Results: The study included 15 radiation workers (mean age: 40.13 ± 9.24 years) chronically exposed to low-dose IR and 10 healthy controls (mean age: 40.70 ± 10.19 years). However, the mean differences were not significant (p>0.05) but ALT (mean difference: 8.3) and ALP (3.5) levels were higher, while creatinine was slightly lower (0.04) in exposed individuals. The white blood cells (WBC) (mean difference: .48 x10^9/L, p>0.05) and platelets (mean difference: 4.4 x10^9/L, p>0.05) count were found higher in case population than control but in case of red blood cells (RBC) it was opposite (mean difference: .09 mi/cumm, p>0.05). Correlation analysis with daily radiation exposure showed positive relationships for ALT (r = 0.330), creatinine (r = 0.234), and RBC (r = 0.245), while ALP (r = −0.428), WBC (r = −0.064), and platelets (r = −0.135) showed negative correlations; p>0.05). Creatinine levels were significantly higher in males than females (mean difference: 0.19; 95% CI: 0.04–0.34; p = 0.02). Notably, *gadd45a* expression was significantly upregulated (1.44-fold; p = 0.0029).

Conclusion: Despite no significant changes in biochemical and hematological parameters, genetic analysis revealed a notable upregulation of a DNA damage inducible gene, warranting further research on genetic biomarkers.

Keywords: Ionizing radiation, alanine aminotransferase, alkaline phosphatase, creatinine, CBC, *gadd45a*

4. Comparative evaluation of continuous bed motion and step-and-shoot PET acquisition protocol using SUV-based noise and signal metrics

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ABSTRACT

Purpose: Standardized uptake value (SUV)-based quantitative assessment was performed to compare image noise and signal-to-noise ratio (SNR) between continuous bed motion (CBM) and step-and-shoot (SS) acquisition protocol-based PET-CT imaging techniques.

Methods: A total of 30 adult patients undergoing PET-CT imaging were retrospectively analyzed, with 15 scanned using the CBM protocol and 15 using the SS protocol. Quantitative assessment of image quality was performed by placing spherical volumes of interest (VOIs) in the liver parenchyma and descending aorta. Liver noise percentage was calculated based on SUV variability within the hepatic VOI, while blood pool noise was derived similarly from the aortic VOI. All the data underwent statistical analysis after confirmation of normality.

Results: The CBM protocol yields lower image noise 14.52±2.29 % than SS protocol 18.66±2.39 % resulting in higher SNR for CBM protocol than SS. However, the SUVmean of liver remains consistent in both protocol (CBM: 2.14 ±0.33g/mL vs SS: 2.08 ±0.47 g/mL) confirming that CBM protocol enhances the image quality without introducing quantitative bias. Additionally, CBM protocol needs a shorter mean scan duration compared to SS protocol.

Conclusion: CBM acquisition provides better image quality compared to SS, with less image noise and higher SNR for both liver and blood pool assessments. This suggests that the CBM acquisition protocol provides better PET-CT image enhancement and diagnostic accuracy.

Keywords: SUV Metrics, Signal-to-Noise Ratio, Continuous bed Motion, Image Noise

5. Somatic mutation profiling in papillary thyroid carcinoma using NGS and Sanger Sequencing in a Bangladeshi cohort

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ABSTRACT

Background and objectives: Papillary thyroid carcinoma (PTC) is driven by a spectrum of genetic alterations, including both somatic and germline mutations that contribute to tumor initiation and progression. Despite advances in genomic profiling, data from underrepresented populations remain scarce. This study aimed to identify and characterize potential somatic variants in key thyroid cancer-associated genes using next-generation sequencing (NGS) and Sanger sequencing in a Bangladeshi PTC cohort.

Methods: A cross-sectional study was conducted involving patients diagnosed with PTC. In the initial phase, targeted next-generation sequencing (NGS) was performed on 10 paired blood and tumor tissue samples to screen for mutations in key oncogenes and tumor suppressor genes. Based on these findings, the most frequently mutated genes were selected for further analysis. In the second phase, an additional 100 PTC patients were recruited, and tumor tissue samples were collected. Genomic DNA extracted from these tissues was analyzed using Sanger sequencing to validate and identify novel somatic variants across the study population.

Results: NGS analysis identified multiple somatic variants in the studied genes, among which three novel mutations—NRAS g.7775T>A, NRAS g.7797G>A, and RB1 c.161020T>A (p.Ile680Asn)—were consistently validated by Sanger sequencing. These variants showed significant enrichment within the PTC cohort, suggesting their potential role in tumorigenesis. The NRAS variants were predominantly observed in early-stage tumors, indicating their involvement in early tumor development, while the RB1 variant was detected across different tumor stages, suggesting a broader role in disease progression.

Conclusions: This study provides evidence of novel somatic mutations in the NRAS and RB1 genes in Bangladeshi PTC patients, identified using a tissue-based sequencing approach. The findings emphasize the predominance of somatic alterations in PTC pathogenesis and highlight the value of combined NGS and Sanger sequencing in identifying clinically relevant mutations. These results contribute to the expanding mutational spectrum of PTC and warrant further functional validation.

Keywords: PTC; FFPE; Somatic mutations; Germline mutations; NRAS; RB1; Next-generation sequencing; Sanger sequencing; Genomic profiling; Bangladeshi population.

Poster Presentation Session

Screen 1

1. Unusual presentation of lung adenocarcinoma with extensive skeletal muscle metastases detected on ^{18}F-FDG PET-CT scan

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ABSTRACT

Background: Skeletal muscle metastases from lung cancer are rare and seldom present as a prominent clinical finding. Their low incidence has been attributed to the unique physiological environment of muscle tissue.

Case Presentation: We report a case initially diagnosed as metastatic adenocarcinoma based on axillary lymph node biopsy. A whole-body 18F-FDG PET-CT scan was performed to identify the primary lesion and assess disease extent. Imaging revealed an irregular, FDG-avid soft tissue mass in the left lung, suggestive of the primary tumor. In addition, multiple intensely hypermetabolic hypodense lesions were identified in various skeletal muscles, raising suspicion for metastatic involvement. Other FDG-avid lesions were noted in axillary and mediastinal lymph nodes, bones, and adrenal glands.

Histopathological evaluation confirmed primary lung adenocarcinoma from the lung lesion, while biopsy from skeletal muscle lesions established metastatic involvement.

Discussion: Skeletal muscle metastases are uncommon and usually indicate advanced systemic disease. This case highlights the ability of 18F-FDG PET-CT to detect both typical and atypical metastatic sites, which is essential for accurate staging and management.

Conclusion: 18F-FDG PET-CT plays a crucial role in identifying rare metastatic sites such as skeletal muscles in lung adenocarcinoma. Recognition of such atypical patterns is important to avoid underestimation of disease burden and to guide appropriate clinical management.

Keywords: Lung adenocarcinoma, Skeletal muscle metastasis, 18F-FDG PET-CT , Nuclear medicine

2. Visualizing prostate cancer staging: PROMISE V2 framework in PSMA PET-CT

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ABSTRACT

Background: Standardized reporting in prostate cancer imaging is essential for accurate staging and treatment planning. Hence, the prostate cancer molecular imaging standardized evaluation (PROMISE) criteria have been proposed as a framework for whole-body staging (miTNM staging) to describe the disease extent of histologically proven cases on PSMA-PET. The inaugural PROMISE framework was introduced in 2018 and updated in 2023 (PROMISE V2), which included the PRIMARY score for prostate gland assessment and expanded recommendations for treatment response assessment. F-18 PSMA-1007 PET scan is available in Bangladesh since 2023, and only a handful of government nuclear medicine centers perform this sophisticated state of the art hybrid imaging. INMAS Suhrawardy has joined the coveted club in December 2025, meticulously following PROMISE V2 inspired structured reporting format.

Objective: The purpose of this study is to present a pictorial atlas of prostate cancer staging using PSMA PET-CT , aligned with the PROMISE V2 criteria, highlighting representative cases across T, N, and M categories.

Methods: A series of PSMA PET-CT cases were selected from institutional practice and categorized according to PROMISE V2. Each case was annotated to demonstrate key imaging features corresponding to T1–T4 primary tumor staging, N1–N2 nodal involvement, and M1a–M1c metastatic disease patterns.

Results: The pictorial journey illustrates the spectrum of disease presentation, from localized intraprostatic lesions to advanced metastatic involvement. Representative images highlighted the utility of PROMISE V2 in differentiating regional versus distant nodal disease, bone metastases, and visceral spread. Case-based summaries demonstrate integrated staging and its clinical relevance.

Conclusion: This presentation reinforces the value of PROMISE V2 in standardizing PSMA PET-CT reporting.

Keywords: Prostate cancer staging, PSMA PET-CT, PROMISE V2 criteria.

3. Metastasis or insufficiency fracture? - A diagnostic dilemma after pelvic radiotherapy

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ABSTRACT

Background: Sacral insufficiency fracture (SIF) is a late complication of pelvic radiotherapy (RT). SIF can mimic bone metastasis on different nuclear medicine techniques leading to potential diagnostic confusion.On bone scintigraphy, linear or H-shaped uptake in SIF may mistakenly lead to metastasis. Similarly, FDG uptake on PET-CT may also occur due to fracture healing and inflammation. Correlation with CT findings, clinical history of radiotherapy and follow-up imaging are essential for proper diagnosis.

Case report: A 60 years old woman with carcinoma cervix underwent chemo-radiotherapy in 2022. Later in 2023, follow-up bone scan showed linear intense uptake in the sacrum and was reported as possible metastasis. In 2024, a repeat bone scan showed persistent linear sacral uptake and was interpreted as metastasis. At the end of 2024, PET-CT demonstrated FDG-avid sclerotic lesion in the sacrum associated with fracture line and was also reported as metastatic deposits. However, follow-up PET-CT in 2025 showed metabolic regression with persistent sclerotic changes in the sacrum; findings supports post radiation SIF rather than metastasis.

Conclusion: Sacral uptake after pelvic RT should not be immediately labeled as metastasis. SIF must be considered, especially in postmenopausal state. Awareness of this entity and careful follow-up scan may help to prevent unnecessary treatment and improve patient management.

Keywords: Cervical cancer, radiotherapy, bone scintigraphy, PET-CT , sacral insufficiency fracture.

4. PET-CT scan evaluation in case series on atypical presentation of Non-Hodgkin's Lymphoma

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ABSTRACT

Introduction: Atypical presentation of Non-Hodgkin`s lymphoma in prostate (0.09% of all prostate malignancy), muscles and lungs are very rare. We present PET-CT findings of four cases of atypical Non-Hodgkin`s lymphoma in this report.

Case Series: Case 1: A 68 years old man presented without complaints, PSA level 1.23 ng/ml, diagnosed as Non-Hodgkin`s lymphoma by biopsy from prostate, referred to Nuclear Medicine Department of Continental Hospital for baseline PET-CT scan. The scan revealed hypermetabolic nodular lesions in both sides of prostate, extensive cervical, mediastinal, axillary, pelvic, abdominal lymphnodes, exophytic masses in both kidneys and multiple skeletal lesions.

Case 2: A 80 years old man presented with complaints of urgency, frequency and diagnosed as Non-Hodgkin`s lymphoma by biopsy from prostate. Intense hypermetabolic lesions involving entire prostate, cervical, mediastinal, axillary lymph nodes and bony lesion in sacrum were noted in baseline PET-CT scan.

Case 3: A 77 years old man presented with swelling on multiple sites of body diagnosed as Non-Hodgkin`s lymphoma by biopsy from left lateral wall of abdomen. Baseline PET-CT scan findings showed multiple hypermetabolic soft tissue lesions in multiple muscles (bilateral latissimus dorsi, right ilio costalis, left gluteus maximus) and adjacent subcutaneous tissue.

Case 4: A 55years old female presented with swelling of both cervical lymphnodes and pain on the back of chest diagnosed as Non-Hodgkin`s lymphoma by biopsy from right lung. Baseline PET-CT scan showed multiple hypermetabolic bilateral pulmonary nodules, bilateral cervical, mediastinal, abdominal lymphnodes and hepatic involvement.

Conclusion: PET-CT scan plays an important role to observe the primary lesion and the extent of atypical Non-Hodgkin's lymphoma.

5. Incidental duodenal diverticulum on hybrid PET-CT scan: A potential source of diagnostic confusion

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ABSTRACT

Background: Hybrid positron emission tomography/computed tomography (PET-CT) is integral to contemporary oncologic imaging, providing combined metabolic and anatomical assessment for accurate disease staging and restaging. Nevertheless, interpretation may be limited by benign anatomical variants and physiological processes that can simulate nodal or metastatic involvement, leading to potential false-positive findings. Duodenal diverticulum, a relatively common yet often overlooked entity, represents an important source of such diagnostic ambiguity on PET-CT .

Case Presentation: A 46-year-old male with known renal cell carcinoma who underwent 18F-fluorodeoxyglucose (FDG) PET-CT for disease evaluation. Imaging revealed a small, well-defined peri-pancreatic lesion demonstrating low-grade FDG avidity, raising initial concern for necrotic lymphadenopathy. However, detailed evaluation of the CT component identified a thin-walled, sac-like outpouching arising from the second part of the duodenum, characteristic of a duodenal diverticulum. The lesion showed no enhancing soft tissue component or significant mural thickening. Integration of metabolic and morphological findings, along with clinical correlation, confirmed its benign nature.

Conclusion : Duodenal diverticulum may closely mimic mildly FDG-avid lymph nodes on PET-CT , constituting a potential diagnostic pitfall. Careful scrutiny of CT morphology in conjunction with metabolic data is essential for accurate lesion characterization, thereby minimizing false-positive interpretations and preventing unnecessary diagnostic or therapeutic interventions.

Keywords : PET-CT , duodenal diverticulum, renal cell carcinoma, FDG uptake, lymph node mimic, diagnostic pitfall

Screen 2

1. Prevalence and demographic predictors of subclinical thyroid dysfunction in southern part of Bangladesh at INMAS, Satkhira

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ABSTRACT

Background: Subclinical thyroid dysfunction is abnormal TSH with normal FT3 and FT4. It is frequently asymptomatic and unrecognized in clinical practice yet carries risks of progression to overt disease and associated cardiovascular and metabolic complications.

Objectives: This study aimed to determine the prevalence of subclinical hypothyroidism and subclinical hyperthyroidism among the patients coming from various part of Satkhira and to identify associated demographic predictors.

Methods: A cross-sectional analysis was performed on sample of 200 patients from 252 patient. TSH, FT3, and FT4 levels were measured. Subclinical hypothyroidism was defined as elevated TSH (>5.50 μIU/ml) with normal FT3 and FT4, while subclinical hyperthyroidism was defined as suppressed TSH (<0.35 μIU/ml) with normal free hormone levels. Prevalence rates were calculated and demographic associations were assessed by age group and sex.

Results: Among 200 patients (mean age 30.8 ± 16.2 years; 77.5% female), 43 (21.5%) had subclinical thyroid dysfunction. Subclinical hypothyroidism was most prevalent (n=29, 14.5%), followed by

2. Utility of pre-radioiodine therapy scintigraphy in differentiated thyroid carcinoma: Two case reports

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ABSTRACT

Background: Pre-radioiodine therapy (pre-RIT) scintigraphy is not routinely recommended in all patients with differentiated thyroid carcinoma (DTC). However, in selected intermediate- to high-risk patients with elevated stimulated thyroglobulin (Tg), it may provide critical information that can significantly influence management decisions. We report two cases demonstrating the clinical impact of pre-RIT imaging.

Case Reports: Case 1: A 42-year-old woman with papillary thyroid carcinoma (PTC) underwent total thyroidectomy and presented with elevated stimulated Tg (164 ng/mL) and negative anti-Tg antibodies. Pre-RIT scintigraphy using 99mTc-pertechnetate revealed a focal intense uptake in the suprasternal region. Correlative contrast-enhanced CT identified a well-defined nodular lesion. Surgical excision was performed, and histopathology revealed reactive lymphadenitis with colloid goiter. Following resection, Tg levels declined markedly. Subsequent radioiodine therapy (RIT) demonstrated uptake confined to the thyroid bed without evidence of distant metastasis on post-therapy imaging.

Case 2: A 50-year-old man with follicular thyroid carcinoma, status post total thyroidectomy, had markedly elevated stimulated Tg (598 ng/mL). Pre-RIT I-131 whole-body scintigraphy demonstrated intense uptake in the right sacroiliac region with minimal residual cervical activity. MRI revealed a large expansile lesion involving the right hemisacrum and iliac bone, suggestive of metastasis. Histopathological confirmation established metastatic thyroid carcinoma. The patient underwent high-dose RIT, and post-therapy imaging showed intense iodine avidity in the metastatic lesion, with subsequent significant decline in Tg levels.

Conclusion: Selective use of pre-RIT scintigraphy in DTC patients with elevated Tg can uncover both benign mimics and clinically significant metastatic disease. This approach facilitates appropriate surgical intervention, guides RIT planning and dosing, and ultimately optimizes patient management.

Keywords: Differentiated thyroid carcinoma, Thyroid scintigraphy, Radioiodine therapy, Metastatic thyroid carcinoma, Whole body iodine scan.

3. Limitations of serum creatinine derived eGFR in detecting unilateral renal functional loss: A comparative study with DTPA renography

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ABSTRACT

Background: Serum creatinine–derived estimated glomerular filtration rate (eGFR) is widely used to assess renal function but reflects global kidney performance and may overlook unilateral impairment. Nuclear medicine guidelines (SNMMI/EANM) emphasize single-kidney GFR (SKGFR) and differential renal function for detecting side-specific abnormalities. This study compared serum creatinine–based eGFR with DTPA renogram–derived split and total GFR to evaluate concordance and clinical implications.

Methods: In this retrospective single-center study, 126 consecutive DTPA renograms (December 2025–February 2026, INMAS Satkhira) were reviewed. Serum creatinine was available in 67 patients. Unilateral dysfunction was defined as SKGFR <45 ml/min/1.73 m² in one kidney with ≥45 in the contralateral kidney; severe loss as SKGFR <15 ml/min/1.73 m²..Extracted data included

demographics, serum creatinine, eGFR, split and total DTPA GFR, and renogram findings.

Results: Among 67 patients, mean eGFR was 81.3 ± 31.4 ml/min, while mean total DTPA GFR was 102.9 ± 27.9 ml/min/1.73 m². Correlation was moderate (r = 0.40, p = 0.0007), with significant systematic difference was observed between the two methods (mean paired difference, eGFR − total DTPA GFR: −21.7 ± 32.5 ml/min/1.73 m², p < 0.001). 24 patients (35.8%) had unilateral abnormality: mean eGFR was 73.6 **± 27.4, mean total DTPA GFR 86.1 ± 23.7, and mean affected kidney DTPA GFR 22.2 ± 9.1 ml/min/1.73 m². Among them, 6 patients (25% of the unilateral group; 8.96% overall) showed marked discordance**, with preserved eGFR despite severe unilateral loss on DTPA: mean eGFR 91.2 ± 6.8 ml/min while mean affected kidney DTPA GFR 13.8 ± 6.2 ml/min/1.73 m².

Conclusion: DTPA renography provides essential split renal function data that complements eGFR. Reliance on eGFR alone may miss clinically significant unilateral renal impairment. Targeted DTPA evaluation should be considered when unilateral disease is suspected.

Keywords: DTPA renography, eGFR, split renal function, unilateral renal loss, and renal scintigraphy

4. Tc-99m pertechnetate thyroid scintigraphy in a case of lingual ectopic thyroid: A diagnostic and pre-operative planning tool

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ABSTRACT

Background: Ectopic lingual thyroid is a rare developmental anomaly due to the arrested descent of the thyroid primordium. In patients presenting with a tongue base mass, radionuclide thyroid scintigraphy is essential to confirm functioning ectopic thyroid tissue and to document the absence of an orthotopic thyroid gland before surgery.

Objective: To highlight the diagnostic value of Tc-99m pertechnetate thyroid scintigraphy and the added benefit of multi-view imaging, including SPECT/CT, in the pre-operative evaluation of lingual thyroid.

Case Presentation: A 19-year-old female presented with a painless mass at the base of the tongue. High-resolution ultrasonography of the neck demonstrated a well-circumscribed, round, solid, vascular lesion measuring approximately 20 mm at the level of the foramen cecum, corresponding to the clinically palpable mass, with no identifiable thyroid tissue in the orthotopic thyroid bed. Tc-99m pertechnetate thyroid scintigraphy (planar anterior view) revealed absent tracer uptake in the normal thyroid bed and a well-defined, homogeneous focus of radiotracer uptake at the tongue base, consistent with functioning ectopic lingual thyroid. The patient was clinically and biochemically euthyroid. She subsequently underwent transoral excision under general anesthesia with tracheostomy. Histopathological analysis confirmed thyroid tissue characterized by colloid-filled follicles within a fibrous stroma consistent with lingual thyroid tissue.

Conclusion: Radionuclide imaging is pivotal in diagnosing lingual thyroid. In addition to standard planar imaging, lateral views and preferably SPECT/CT can improve anatomical localization and facilitates surgical planning, especially when the normal thyroid gland is absent.

Keywords: Ectopic thyroid, Lingual thyroid, Tc-99m pertechnetate, Thyroid scintigraphy

5. Correlation between sonographic renal cortical thickness and individual split renal function derived from 99mTc-DTPA scintigraphy: A comparative study

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ABSTRACT

Background: Accurate assessment of individual renal function is crucial for clinical decision-making in patients with kidney disease, particularly in conditions affecting one kidney disproportionately.

Tc-99m DTPA renal scintigraphy is regarded as the gold standard for quantifying glomerular filtration rate (GFR) and split renal function (SRF). However, ultrasonography (USG) remains a widely accessible, cost-effective, and non-invasive modality frequently used for initial evaluation. This study aimed to assess the correlation between sonographic renal cortical thickness (CT), parenchymal thickness (PT), and functional parameters derived from DTPA renography.

Materials and Methods: This observational study utilized data from the DTPA patient registry at the Institute of Nuclear Medicine and Allied Sciences Gopalganj. The data set included patients who underwent Tc-99m DTPA renography using Gate's method along with corresponding USG findings. Renal cortical thickness and parenchymal thickness were measured via ultrasonography. Functional parameters, including total GFR and split renal function, were obtained from scintigraphic analysis. Statistical analysis was performed using Microsoft Excel, applying Pearson's correlation coefficient (r), with statistical significance set at $p < 0.05$.

Results: A significant positive correlation was observed between renal cortical thickness and renal function. The mean GFR for the right kidney was 42.96 ± 17.94 mL/min, with a corresponding mean cortical thickness of 6.80 ± 2.21 mm. The left kidney demonstrated higher functional parameters, with a mean GFR of 53.28 ± 11.49 mL/min and cortical thickness of 8.64 ± 3.32 mm. A strong positive correlation was identified between cortical thickness and right renal function ($r = 0.82$, $p = 0.003$). When both kidneys were analyzed collectively, a moderate to strong correlation was also observed ($r = 0.605$, $p = 0.003$).

Conclusion: Renal cortical thickness measured by ultrasonography demonstrates a significant correlation with split renal function and may serve as a reliable, non-invasive surrogate marker for preliminary renal functional assessment, particularly in resource-limited settings where nuclear imaging is not readily available.

Keywords: Tc-99m DTPA, Split Renal Function, Cortical Thickness, Ultrasonography, Renal Scintigraphy, GFR

6. Exploring post thyroidectomy hypoparathyroidism and calcium dynamic: A single center retrospective study

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ABSTRACT

Introduction: Differentiated thyroid carcinoma (DTC), arising from follicular cells, is the most common thyroid malignancy and includes papillary (85–90%) and follicular (5–10%) types. It generally has an excellent prognosis and is managed with thyroidectomy, often followed by radioactive iodine therapy. Although thyroidectomy is a safe procedure with low morbidity, complications may occur due to injury to the parathyroid glands or laryngeal nerves. Hypocalcemia, resulting from transient or permanent hypoparathyroidism, is the most common postoperative complication. This study aimed to assess its prevalence and identify associated risk factors

Patients and Methods: This retrospective study analyzed 1,860 differentiated thyroid carcinoma patients who underwent thyroidectomy between January 2023 and December 2025 at the National Institute of Nuclear Medicine and Allied Sciences (NINMAS). Postoperative hypoparathyroidism and hypocalcemia were assessed by age, sex, and disease type, excluding preoperative hypocalcemia.

Results: We enrolled 1860 patients who underwent thyroidectomy. Female patients comprised 79% (n=1426) of total patients. Most of them was having papillary carcinoma of thyroid, rests were follicular carcinoma (2.8%). Around 50 percent of total patients developed hypoparathyroidism; over those, 29% had severe hypoparathyroidism (<6 pg/ml). Hypocalcemia was evidenced in approximate 30% of patients; young age group (<40 years) were more affected (68%). However, no case mortality was reported.

Conclusion: Measurement of parathyroid hormone (PTH) has gained importance as an early predictor of post-thyroidectomy hypocalcemia. Although thyroidectomy is generally safe, especially in experienced hands, hypoparathyroidism and hypocalcemia remain the most common complications. These may require lifelong calcium supplementation, creating financial burden, and can occur despite optimal surgical expertise.

Keywords: Thyroidectomy, Post thyroidectomy complication, Hypoparathyroidism, Hypocalcemia.

Screen 3

1. Concordant and discordant patterns of skeletal metastases between 99mTc-MDP bone scintigraphy and PSMA PET-CT scan in metastatic prostate cancer: Two-case imaging series

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ABSTRACT

Introduction: In metastatic prostate cancer, 99mTc-MDP bone scintigraphy and PSMA PET-CT scan may show concordant or discordant skeletal findings due to differences in biological targets osteoblastic activity versus tumor viability. Recognizing these patterns is essential for accurate response assessment and management..We retrospectively reviewed two patients with metastatic prostate cancer who underwent 99mTc-MDP bone scintigraphy in our department. Skeletal imaging findings were correlated with available PSMA PET-CT scan to assess concordant and discordant patterns in relation to disease activity and treatment response.

Case Presentations: Case 1: A 50-year-old man with castration-resistant metastatic prostate cancer presented with a prostate-specific antigen level of 89 ng/mL despite treatment with bicalutamide, goserelin, abiraterone, and palliative radiotherapy. A prior 68Ga-PSMA PET-CT scan demonstrated intense uptake in the prostate and multiple skeletal sites. Subsequent 99mTc-MDP bone scintigraphy revealed corresponding osteoblastic lesions, demonstrating a concordant pattern consistent with active skeletal metastatic disease.

Case 2: A 60-year-old man with prostate adenocarcinoma, status post transurethral resection of the prostate, received bicalutamide, goserelin, zoledronic acid, and palliative radiotherapy. Bone scintigraphy and MRI showed metastatic involvement of the right ilium with marrow infiltration. However, ^18F-PSMA PET-CT demonstrated no significant uptake in the corresponding lesion despite persistent sclerosis on follow-up bone scintigraphy, indicating a discordant pattern suggestive of treated, inactive oligometastatic disease

Conclusion: Bone scintigraphy and PSMA PET-CT scan provide complementary information. Concordant findings support active skeletal metastatic disease whereas discordant findings may identify treated lesions and improve response assessment and management.

Keywords: Prostate Cancer, 68Ga-PSMA PET-CT , 18F-PSMA PET-CT , 99mTc-MDP Whole Body Bone scintigraphy, Concordant Findings, Discordant Findings.

2. Small nodes, big impact: How FDG-avid cardiophrenic lymphadenopathy redefines breast cancer staging

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ABSTRACT

Introduction: FDG whole body PET-CT often offers incremental and superior diagnostic value over

conventional CT in unveiling morphologically indeterminate but metabolically active metastatic lymph nodes in unusual locations. Such findings might have profound implications for disease upstaging and therapeutic decision-making in breast cancer.

Case Reports: Two cases with biopsy-proven breast carcinoma are presented who were referred for comprehensive staging and disease evaluation. In both cases, contrast-enhanced CT identified cardiophrenic lymph nodes (CPLN) that were morphologically insignificant (short-axis diameter <5mm) and lacked suspicious features. However, 18F-FDG PET-CT demonstrated intense tracer uptake (SUVmax >7) in these subcentimetric nodes. The metabolic evidence of CPLN involvement resulted in upstaging of both patients to Stage IV (M1) disease. This finding resulted in a paradigm shift in management, with treatment intent transitioning from curative surgical resection and localized radiotherapy to systemic chemotherapy within a palliative framework.

Conclusion: FDG PET-CT exhibits enhanced sensitivity relative to conventional morphological imaging for the detection of occult metastatic cardiophrenic lymph nodes. Identifying these "small but significant" nodes is crucial for accurate staging and preventing unnecessary aggressive local interventions in patients who require systemic-focused management.

Keywords: FDG PET-CT , Ca breast, Cardiophrenic lymph nodes.

3. Role of PET-CT in initial diagnostic and interim workup of a DLBCL of maxilla: A case report

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ABSTRACT

Background: Diffuse Large B-Cell Lymphoma (DLBCL) is the most common subtype of non-Hodgkin lymphoma and frequently involves extranodal sites. Primary maxillary involvement is rare and often mimics odontogenic or inflammatory lesions. Early diagnosis challenging due to nonspecific clinical presentation. FDG PET-CT scan plays an important role in staging as well as response assessment in this case.

Case report: A 65-year-old male presented with progressive upper jaw swelling, facial asymmetry, and loosening of teeth. Contrast-enhanced CT revealed an expansile lytic lesion in the left maxilla involving the alveolar sockets, initially suggestive of ameloblastoma. Incisional biopsy indicated non-Hodgkin lymphoma, and immunohistochemistry confirmed germinal center type DLBCL (LCA, CD20, CD10, BCL6 positive; PanCK, MUM1, BCL2 negative).

Baseline whole-body 18F-FDG PET-CT demonstrated an intensely hypermetabolic soft tissue mass (SUVmax 17.7) in the left maxilla with bony destruction and extension into adjacent muscles, without definite nodal involvement, consistent with primary extranodal lymphoma. The patient received R-CHOP chemotherapy. Interim PET-CT after three cycles showed marked morphometabolic regression (SUVmax 3.8) with a Deauville score of 3, indicating a favorable response.

Conclusion: Maxillary DLBCL is a rare diagnostic mimic of odontogenic lesions. ^18F-FDG PET-CT is essential for staging and early response assessment, with interim metabolic response serving as a key prognostic indicator and guide for ongoing therapy.

Keywords: Maxilla, DLBCL, lymphoma, PET-CT, case report.

4. From suspected giant cell tumor to multifocal brown tumors: MIBI-Positive skeletal lesions revealing a MIBI-Negative ectopic parathyroid adenoma

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ABSTRACT

Background: Brown tumors represent a rare skeletal manifestation of primary hyperparathyroidism and often mimic giant cell tumors or other osteolytic lesions. Accurate localization of the underlying parathyroid adenoma can be challenging, particularly in ectopic or sestamibi-negative cases.

Case presentation: A 40-year-old woman presented with an osteolytic lesion in the proximal left tibia. Laboratory evaluation revealed markedly elevated serum parathyroid hormone (471.4 pg/mL), hypercalcemia (13.2 mg/dL), low-normal phosphate (2.6 mg/dL), and significantly increased alkaline phosphatase (846 U/L). Neck ultrasonography identified a well-defined hypoechoic lesion (1.9 × 1.2 cm) in the left supraclavicular region, suggestive of an ectopic parathyroid adenoma. However, Tc-99m sestamibi planar and SPECT/CT imaging demonstrated no tracer uptake in this lesion. Conversely, whole-body imaging revealed multiple MIBI-avid expansile osteolytic lesions involving the right clavicle, right maxilla, dorsum of the left hand, and proximal left tibia. Tc-99m MDP bone scintigraphy confirmed extensive skeletal involvement, consistent with multifocal brown tumors. The patient underwent parathyroidectomy, and histopathology confirmed a benign parathyroid adenoma composed predominantly of chief cells with scattered oxyphil cells. Serum PTH normalized immediately postoperatively. The symptomatic tibial lesion was treated with curettage, bone cementation, and locking plate fixation. At 1-year follow-up, partial regression of other skeletal lesions was observed.

Conclusion: This case underscores a rare diagnostic scenario in which a sestamibi-negative ectopic parathyroid adenoma was identified indirectly through MIBI-avid brown tumors, which served as the key diagnostic clue and guided appropriate management.

Key words: Primary hyperparathyroidism; Brown tumors; Ectopic parathyroid adenoma; Tc-99m MIBI; Tc-99m MDP bone scan.

5. Unmasking occult skeletal metastases in prostatic cancer: Tc MDP Bone scintigraphy vs PSMA PET-CT scan

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ABSTRACT

Background: Accurate staging of high-risk prostate cancer is crucial for optimal management and prognostication. 18F-PSMA-1007 PET-CT reveals bone metastases in one sixth of high risk prostate cancer. This case demonstrate the superiority of 18 F-PSMA-1007 PET-CT scan over bone scintigraphy in detecting occult skeletal metastases in high-risk prostate cancer.

Case Summary: A 70-year-old male presented with symptoms of lower urinary tract obstruction. Digital rectal examination(DRE) revealed a markedly enlarged prostate with multiple hard nodules involving both lobes. Serum prostate-specific antigen (PSA) was significantly elevated at 86.11 ng/mL (reference range: 0–4 ng/mL). Ultrasonography of the kidneys, ureters, and urinary bladder demonstrated a grossly enlarged prostate. Multiparametric MRI of the prostate suggested clinically

significant malignancy (PI-RADS 5). Subsequent histopathological evaluation confirmed prostatic adenocarcinoma with a Gleason score of 4+4=8 (Grade Group 4), consistent with high-risk disease. For staging evaluation, the patient was referred for skeletal assessment. Conventional 99mTc-MDP bone scintigraphy showed no evidence of skeletal metastases. However, subsequent 18 F-PSMA-1007 PET-CT demonstrated intense tracer uptake in the primary prostatic lesion, metastatic pelvic lymph nodes, and multiple PSMA-avid skeletal lesions involving the axial and appendicular skeleton, consistent with disseminated metastatic disease.

Conclusion: The discordance observed in this case led to significant disease upstaging and directly impacted clinical management, underscoring the critical role of PSMA PET-CT scan in accurate staging and therapeutic decision-making in high-risk prostate cancer.

Keywords: Prostate cancer, PSMA PET-CT , Bone scintigraphy.

Screen 4

1. Initial experience of installation, commissioning and early clinical operation of a 16.5 MeV medical cyclotron at the Institute of Nuclear Medical Physics, Bangladesh

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ABSTRACT

Background: The production of positron-emitting radiopharmaceuticals using a cyclotron is imperative for the development of positron emission tomography (PET) imaging and cancer diagnosis. Nevertheless, the settings up and commissioning of such cyclotrons are associated with planning and radiation safety assessment. This paper presents the first experience of setting up and commissioning a 16.5 MeV medical cyclotron at the Institute of Nuclear Medical Physics (INMP), Bangladesh Atomic Energy Commission, to enhance the country's capacity for PET radiopharmaceutical production.

Materials and methods: A 16.5 MeV medical cyclotron was installed in a purpose-built shielded vault designed in accordance with international radiation protection standards. The installation process included mechanical placement, electrical integration, cooling water systems, ventilation, compressed air supply, and radiation monitoring infrastructure. In addition, beam tuning, target conditioning, and radiation surveys were conducted using gamma and neutron survey meters, contamination monitors, and personal dosimeters. After commissioning, pilot-scale production of [^{18}F] FDG was performed using an automated module, and the radiopharmaceutical was used for clinical PET-CT scans.

Results: During the initial clinical operational period, 13 consecutive [^{18}F]FDG production runs were successfully completed. The mean irradiation time was 33.5 min (range: 26.6–47.2 min), with an average beam current of 63.7 μA (range: 48–74 μA) and mean charge of 35.0 μA•h (range: 30.4–45.0 μA.h). The calculated [^{18}F] activity at end of bombardment ranged from 2006 to 2891 mCi, resulting in final synthesized [^{18}F]FDG yields ranging from 1314 to 2328 mCi. The overall synthesis efficiency ranged from 59.7% to 81.5%, with a mean efficiency of 73.4% (n = 13), indicating acceptable and reproducible radiopharmaceutical production performance during early clinical operation.

Conclusion : The successful installation, commissioning, and initial clinical operation of the 16.5 MeV cyclotron at the Institute of Nuclear Medical Physics (INMP), Bangladesh Atomic Energy Commission, demonstrate its operational readiness for routine PET radiopharmaceutical production. This achievement represents a significant advancement in the national capability for nuclear medicine and supports the development of clinical PET-CT services.

2. Advancing targeted radiotheranostics in Bangladesh: Challenges and opportunities

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ABSTRACT

Radiotheranostics, which combines targeted diagnostic imaging with radionuclide therapy, is transforming the management of cancers such as neuroendocrine tumors and prostate cancer. The use of isotopes like Lutetium-177 and Gallium-68 has enabled a precision medicine approach, improving patient selection and therapeutic outcomes. While this field is rapidly expanding in developed healthcare systems, its integration in Bangladesh remains in an early developmental phase.

In recent years, Bangladesh has made notable progress in nuclear medicine infrastructure, with several centers equipped with PET-CT and SPECT imaging facilities, particularly in major public institutions. However, the availability of advanced radiotheranostic services is still limited. Key challenges include restricted access to therapeutic radionuclides, absence of local production facilities, high treatment costs, regulatory and logistical barriers, and a shortage of specialized training programs.

Despite these limitations, significant opportunities exist. The rising cancer burden, increasing awareness of precision oncology, and expanding institutional capacity provide a strong foundation for growth. Furthermore, international collaboration and support from global organizations can facilitate technology transfer, training, and resource development.

Advancing targeted radiotheranostics in Bangladesh will require coordinated national strategies focusing on infrastructure development, workforce training, regulatory support, and sustainable supply chains for radionuclides. With strategic and coordinated initiatives, Bangladesh has the potential to establish accessible and effective radiotheranostic services, improving cancer care outcomes and contributing to the global advancement of nuclear medicine.

3. Reference change value of thyroid hormones: Implications for interpreting serial laboratory results

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ABSTRACT

Background: Monitoring of successive changes in thyroid hormones such as FT3, FT4 and TSH is common in clinical practice. Small changes in consecutive results are often overinterpreted. Such changes often result from the combination of analytical imprecisions and biological variations. Reference change value (RCV) incorporates both these noises to help determine the clinical significance of changes in consecutive assays.

Objective: To evaluate the RCV of FT3, FT4, and TSH and assess their implications for interpreting serial results.

Methods: Analytical variation (CV_a) was calculated from routine internal quality control data generated on the ADVIA Centaur XPT Immunoassay System over a one-year period (January 2025 to December 2025), comprising 266, 248, and 306 multilevel QC runs for FT3, FT4, and TSH, respectively. Within-subject biological variation (CV_i) was derived from European Federation of Clinical Chemistry and Laboratory Medicine Biological Variation Database. RCV was calculated using the standard formula at a 95% confidence interval.

Results: The calculated RCV showed different values for each analyte; FT3 (~21%), FT4 (~28%), and TSH (~60%) with asymmetric increase and decrease thresholds.

Conclusion: Incorporation of RCV into clinical interpretation can improve decision making. Laboratories should consider communicating RCV based guidance to clinicians.

Keywords: Reference Change Value (RCV), Biological Variation, Analytical Variation, FT3, FT4, TSH, Laboratory Medicine

4. Dosimetric comparison of physical wedge and enhanced dynamic wedge beam profiles

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ABSTRACT

Background: Wedges are commonly used in radiotherapy to modify dose distribution. This study aims to evaluate and compare the beam profiles generated by physical wedges and enhanced dynamic wedges at different wedge angles, field sizes, and photon energies.

Materials and methods: The study was conducted using the Varian Clinac iX LINAC with different photon energies - 6MV and 15MV. The slab phantom arranged at a fixed depth (10cm depth) above the iba MatriXX device which consists of 1020 vented ion chamber 2D array detectors, arranged in a 32 × 32 grid. The physical and enhanced dynamic wedges at different angles (15°, 30°, 45° and 60°) were examined for the field sizes, 5x5cm^2, 10x10cm^2 and 15x15cm^2 by delivering 50 monitoring unit (MU).

Result: In comparison of beam profiles (without rescaling) of PW and DW obtained from 2D array measurement were compared, it was found that there was difference, but gradient of curves is almost same except some points in toe, heel and penumbral region, which is negligible. From the beam profiles, it was understood that **a.** The difference between PW and DW increased with increasing of wedge angle while filed size and energy were fixed. **b.** The difference between PW and DW increased with increasing of field sizes while energy and wedge angle were fixed. **c.** The difference between PW and DW increased with increasing of energy while field size and wedge angle were fixed.

Conclusion: Beam profiles generated by Physical Wedges (PW) and Enhanced Dynamic Wedges (EDW) are largely comparable, with only minor differences observed in the toe, heel, and penumbral regions. Although these differences increase slightly with higher wedge angles, field sizes, and photon energies, they remain clinically insignificant. Thus, EDW can be considered a suitable alternative to PW in radiotherapy practice.

Keywords: Physical Wedge (PW), Enhanced Dynamic Wedge (EDW), MatriXX, Beam profile.

5. Determinants of low yield in ^{18}F-PSMA-1007 radiosynthesis and approaches for optimization

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ABSTRACT

Background: [^{18}F]-PSMA-1007 acts as an amazing PET tracer in diagnosis, staging, and detection of biochemical

recurrence and evaluation of metastatic prostate cancer. Stable %RCY is a crucial factor in synthesis of [18F]-PSMA-1007 to maintain routine PET-CT schedule. [^{18}F]-PSMA-1007 is synthesized via a nucleophilic substitution reaction using Prostate Specific Membrane Antigen-1007 as a precursor in automated synthesizer Synthera®-3 at the cyclotron facility of NINMAS. But occasionally we have to face challenges related to low radiochemical yield during synthesis. The present study revealed some determinants which play role in low %RCY.

Methods: Multiple routine production batches of [18F]-PSMA-1007 were analyzed. Both EOB and EOS activities were recorded. % DCY were calculated based on the half-life of [^{18} F] (109.77 minutes) with a synthesis time of 46 minutes.

Results: Intermediate EOB activity levels (approximately 2800–3150 MBq) demonstrated the highest efficiency, with DCY values reaching up to ~65%. In contrast, several high EOB batches (>4000 MBq) produced significantly lower %DCY (<15%), indicating reduced synthesis efficiency at elevated activity levels. Radiolysis-induced free radical formation likely contributes to degradation of both precursor and final product, thereby reducing labeling efficiency and overall yield. Additionally, early wait elution with ethanol may contribute to low yield due to disruption of solid-phase extraction.

Conclusion: Intermediate EOB activity (~2800–3150 MBq) gives optimal [^{18}F]-PSMA-1007 yield, while higher activity (>4000 MBq) reduces efficiency due to radiolysis and precursor degradation. Again, optimization of the timing of wait elusion with ethanol can also improve yield.

Keywords: [18F]-PSMA-1007, % RCY (Radiochemical Yield), %DCY (Decay Corrected Yield)