

# ICRT-2009

## ABSTRACTS

The October 2009 issue of the World Journal of Nuclear Medicine contains most of the abstracts of the scientific papers and invited lectures to be presented at ICRT-2009. As usual this is a free service being provided by the World Journal of Nuclear Medicine to World Radiopharmaceutical Therapy Council. Dr. Emerita Barrenechea, The Regional Editor (Asia) of WJNM has very kindly agreed to edit the abstracts published in this issue. I would like to thank Dr. Barrenechea for her help. The abstracts have been edited and formatted to the extent considered necessary for readers' assistance. The views expressed/ implied and the general style adopted remains however, the responsibility of the authors.

**Prof. A.K. Padhy**  
Editor in Chief

## Abstracts of 3<sup>rd</sup> International Conference on Radiopharmaceutical Therapy (ICRT-2009), Cartagena, Colombia, 3-7 November 2009

### Scientific Session-1 Thyroid – 1

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001

#### **Creativity and motivation: A Necessity for Advancing Research and Healthier Life .**

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Nuclear medicine is widely open for innovations and expansions. Although these innovations are not limited to certain country, some contribute much more than others. The specialty needs continuous innovations that are culture based given the culture diversity of the world which negates making importing research a rule. Hence there is a need to understand what makes certain individuals, teams, institutions and societies creative. Exploration of creativity with talks, articles and other resources is important to awaken creativity in daily life.

Creativity is an idea, response or product that is novel (different from what has come before) and appropriate to the problem (useful or valuable in some sense). It consists largely of re-arranging what we know in order to find out what we do not know. There are no individual forms of creativity for artists, musicians, poets or scientists.

Creativity is dependent on the task whether algorithmic or heuristic. An algorithmic task is straight-forward in which there is little or no room for creativity. On the other hand heuristic task is open ended and non straight forward which requires problem solving by experimental methods especially trial and error. Creativity requires three components: domain relevant skills, creativity relevant skills and task motivation. All the three must be present for creativity to emerge. Several factors are known to affect creativity relevant skills. These include training, experience in generating ideas and personality characteristics. Beyond a certain level (120-125), being highly intelligent does not make a difference in creativity as far as more positive personality characteristics are present. Overall task motivation depends on both the individual's initial attitude towards the task and presence or absence of social constraints. Task motivation may be intrinsic (doing task for its own sake because of intrinsic interest) or extrinsic (doing the task as a means to some extrinsic goal). Intrinsic is more conducive to creativity. Creativity and innovation are significantly affected by certain social constraints such as atmosphere which is the single most important factor for conducting or killing creativity,

expecting reward, expecting evaluations and restriction of choice. These parameters should be understood and modified for creativity to happen...

Creativity goes through phases starting with observation & preparation followed by incubation & imagination, illumination, verification, self assessments and ending with joy & passion. The outcome of creativity is always a combination of simplicity and joy.

The value of understanding creativity and awareness what conducts and what undermines it lies on motivating others such as employees, colleagues, children and leaders. It allows also evaluating work places to determine whether the atmosphere and practices are suitable for a creative individual. This may lead to changing our practice when dealing with each other in the family, at work and at the society at large and using different methods based on the type of task. Creative people should try to avoid society practices that inhibit creativity and keep moving creatively for a better outcome and happier life. Creative individuals can be identified and care for them as they are asset for societies.

002

#### **<sup>131</sup>I Therapy of Thyroid Carcinoma**

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This communication deals with technical aspects of determination of <sup>131</sup>I doses administered for the purpose of ablating remnant tissue and the treatment of residual or recurrent papillary or follicular thyroid carcinoma. The use of radioactive iodine-131 [<sup>131</sup>I] to treat and eliminate normal residual, as well as malignant thyroid tissue, is the earliest application of targeted radionuclide therapy. It is based on the trapping and subsequent organification of iodine by differentiated thyroid tissue.

Current application includes:

1. ablation [elimination of residual normal thyroid tissue following thyroidectomy]
2. treatment of patients at risk for recurrence [based on surgical or pathologic findings]
3. treatment of known metastases

Ablation: For many years in the United States, administration of  $^{131}\text{I}$  in doses of 30 mCi [1110 MBq] or greater required hospitalization for purposes of radiation isolation. Although many regulatory jurisdictions in Europe and elsewhere had even more stringent limits requiring isolation, there is a considerable literature evaluating the efficacy of 30 mCi [1110 MBq] for purposes of ablation. In the early 1990's, Maxon et al [Univ. of Cincinnati] evaluated this issue and, not surprisingly observed that the frequency of successful ablation correlated better with the calculated radiation absorbed dose, rather than the dose administered. Maxon observed that 30,000 rads [cGy] were required to ablate normal tissue.<sup>[Maxon]</sup> To determine a dose to be administered to deliver a desired radiation absorbed dose to a specific remnant depends on the % uptake in the remnant, the weight [mass] of the remnant and the  $T_{1/2\text{ effective}}$  [a measure of the time the tissue is exposed to the radiation]. It is inappropriate to treat patients with an administered dose of  $^{131}\text{I}$  less than likely to eliminate the thyroid remnant. Likewise it is inappropriate to admit patients to the hospital for doses greater 1110 MBq unless it is necessary to administer more than the regulatory limit [at that time in the US] to achieve ablation.

The concept of considering the Radiation Absorbed Dose is basic to radionuclide therapy and nuclear medicine physicians should become quite comfortable with this calculation:

$$\text{Radiation Absorbed Dose} = \frac{\text{Administered Activity} \times \% \text{ uptake} \times T_{1/2\text{ effective}} \times \text{Constant}}{\text{mass of tissue}}$$

Although there is imprecision in the determination of several of the variables, it is possible to assign boundaries to these values and thus determine an estimate of the radiation absorbed dose.

Approximately 10 years ago, however, in the United States, the Nuclear Regulatory Commission relaxed the "30 mCi" limit and permitted licensees to amend their licenses to allow treatment with larger amounts of  $^{131}\text{I}$  [and other radionuclides] provided it had been determined that no individual other than the patient would receive more than the 5.0 mSv as a consequence of the treatment and release of the treated patient. This has resulted in a change in practice in many Centers in the United States. Quite frequently, the minimal dose administered is 50 mCi [1850 MBq] as this was demonstrated to be an effective ablative dose in approximately 80% of the patients.<sup>[Maxon; Bal]</sup> Higher success rates were not obtained with further increases in the dose administered.

Risk of Recurrence: While 50 mCi [1850 MBq] has been established therefore as a minimal ablative dose in patients independent of the risk of recurrence, larger doses [100-150 mCi; 3700-5550 MBq] are administered when there are

factors that increase the likelihood of disease recurrence. These factors include gender, age, tumor size, multifocality, tumor histopathology [viz tall cell Ca], extra-thyroidal extension, lymph node involvement. In instances where there are multiple risk factors or residual soft tissue involvement, doses as high as 250 mCi [0.9-1.0 GBq] may be administered.

Treatment of Known Metastases: When there is evidence of distal metastases [viz. lung, bone, extra-cervical lymph node involvement], doses in excess of 250 mCi are administered depending upon patient's renal function. For patients over 40-45 years old, it is worthwhile to assess body iodine clearance to determine the red marrow radiation absorbed dose<sup>[Tuttle & Robbins]</sup>. In order to avoid prolonged bone marrow suppression, the bone marrow radiation absorbed dose should be limited (in most cases) to 200 cGy. This estimate can be readily determined by a simple calculation based on blood sampling and whole body counting at 4, 24 and 48 hours after administration. The calculation can be performed using either the MIRD formulation or the older Quimby-Marinelli calculation.

Regardless of the dose selected, in order to maximize uptake by the thyroid tissue or tumor, an elevated TSH environment is necessary. At this time, it has been abundantly demonstrated that injections of recombinant TSH [rTSH] are at least equivalent to thyroid hormone withdrawal for diagnosis of residual tissue or recurrent tumor and for ablation. rTSH preparation is much preferred by patients. Recently, it has been shown that the body radiation absorbed dose following  $^{131}\text{I}$  treatment is lower in patients prepared with rTSH as opposed to thyroid hormone withdrawal as renal function and other physiologic processes are better in the euthyroid state than when patients are hypothyroid.

### 003

#### **A Randomized Equivalence Clinical Trial to Determine the Optimum Dose of Radioiodine for Remnant Ablation in Differentiated Thyroid Cancer**

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Background: Total or near-total thyroidectomy followed by radioiodine ( $^{131}\text{I}$ ) ablation of residual thyroid tissue and thyroxine at suppressive doses is considered to be the treatment of choice in differentiated thyroid carcinoma (DTC). Unfortunately, the optimal  $^{131}\text{I}$  activity required to achieve remnant ablation with a single administration remains controversial. Several meta-analyses have not

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concluded 100 mCi is superior to lesser doses of radioiodine. The argument is not how large an activity of  $^{131}\text{I}$  one may/can administer for remnant ablation but rather how small an effective activity of  $^{131}\text{I}$  one can administer to get similar ablation. Equivalence trials are, therefore, more appropriate and required than superiority trials when comparing small activity of  $^{131}\text{I}$  with higher activities.

**Objectives:** We planned a stratified (stratified according to papillary and follicular sub-types to obviate any effect of histopathology on remnant ablation) randomized controlled clinical trial as an equivalence trial to determine the optimum dose of radioiodine for remnant ablation in DTC patients, using three different discrete administered activities [small (25 mCi), intermediate (50 mCi) and large (100 mCi)] of radioiodine.

**Patients and Methods:** The following inputs were used to calculate the sample size: level of significance ( $\alpha$ ) = 5%, power of the test 80%, ablation rate in standard treatment group i.e., in 100mCi group ( $p_0$ ) = 0.8 and the maximum clinically allowable difference or non-inferiority /equivalence margin ( $\delta$ ) was considered to be 0.15. Substituting all the above inputs in equation the sample size was found to be approximately 450. We decided to use an unequal allocation ratio of 2:2:1 for 25, 50 and 100 mCi treatment group, respectively, as it has been shown that as long as an allocation ratio of 2:2:1 is maintained, reduction in the power of the test is minimal. 'Randomization with concealment' procedure was used for the allocation of patients into different treatment groups. All patients underwent radioiodine WBS with 2-3 mCi of radioiodine along with 48-hour radioiodine neck uptake (RAIU) estimation after keeping patients off L-thyroxine for 4-6 weeks. Although no special low-iodine diet was prescribed to the patients, they were advised not to take known rich iodine-containing foods and drugs. After receiving the first dose of radioiodine for remnant ablation, post therapy whole body scan (PTS) was done in all patients to look for any nodal/distant metastases, missed on low dose pre-therapy WBS. The patients were then advised to take levothyroxine (2  $\mu\text{g}/\text{kg}$  body weight) daily on an empty stomach as suppressive therapy. They had to continue this treatment until 4-6 weeks prior to the repeat diagnostic studies 6 months later. The repeat diagnostic studies consisted of 2-3 mCi radioiodine WBS, 48-h RAIU, thyroglobulin (Tg) and anti-Tg antibody assay. The criteria for ablation were as follows: major criterion of negative  $^{131}\text{I}$  WBS and minor criteria of 48-h RAIU  $\leq 0.2\%$  and Tg  $\leq 10$  ng/ml.

**Results:** A total of 734 patients were evaluated for their possible inclusion in the RCT. Of these, 312 could not participate in this study due to various reasons. Finally, 422 patients (360 with papillary thyroid cancer; 62 with follicular thyroid cancer) could be recruited within the stipulated period of time. The main reason for the incomplete coverage of patients with follicular thyroid cancer was less-availability of these patients. In summary,

94% (422/450) coverage of the planned target and 98% (412/422) follow-up were achieved under this study. The equivalence testing of the hypothesis was performed between 25 and 100 mCi groups, 50 and 100 mCi groups and 25 and 50 mCi groups. Results showed that at the significance level of 5%, null hypothesis was rejected, for each pair. Therefore, it can be concluded that ablation rates with 25 mCi, 50 mCi and 100 mCi of  $^{131}\text{I}$  are equivalent with pre-specified clinically acceptable non-inferiority margin ( $\delta$ ) of 0.15.

**Conclusion:** The main exposure variable, first dose of  $^{131}\text{I}$ , was not found to be significantly associated with remnant ablation; i.e., chance of ablation among patients receiving 100mCi was not significantly different compared to those receiving 50mCi or 25mCi of radioiodine.

## 004

#### Anti-thyroglobulin antibodies and treatment of differentiated thyroid carcinoma patients.

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Differentiated thyroid carcinoma (DTC) is the most common malignancy of the endocrine system and requires a long-term follow-up. Since 1975, it was confirmed that thyroglobulin measurement could be used as a marker for recurrent or metastatic thyroid carcinoma. According to the recommendation given by the American Thyroid Association, serum thyroglobulin should be measured every 6 to 12 months by an immunometric assay ideally in the same laboratory and using the same assay, during follow-up of DTC patients. Anti-thyroglobulin antibodies should be quantitatively assessed with every measurement of serum thyroglobulin. Approximately 25% of DTC patients have TgAb detected in their circulation (as compared with 11% in the general circulation) which can affect the accuracy of serum thyroglobulin level. However, its role in these patients is not clear. These antibodies may play a useful role in the follow-up of DTC patients, as persistent antibody titers are associated with persistence of the disease. When TgAb-positive patients become athyreotic (after thyroidectomy), serum TgAb concentrations progressively decline and typically become undetectable within the first postoperative years. This is supported by the concept that continued antibody production depends on the persistence of autoantigen in the body. The presence of circulating TgAb during the follow-up of DTC patients may be associated with the persistence or recurrence of disease. Patients with persistent disease maintain detectable, or exhibit rising serum TgAb concentrations. A rise in serum TgAb is often the first indication of recurrence. A transient rise in TgAb should be expected as a response to increased thyroglobulin antigen released by radiolytic destruction of tumor during the first few months after radioiodine treatment. When TgAb is

present, thyroglobulin protein molecules circulate as free thyroglobulin or complexed with the endogenous TgAb. The magnitude and direction of TgAb interference with a serum thyroglobulin measurement depends both on the affinity and capacity of the endogenous TgAb and the class of thyroglobulin method used, resulting in either over or underestimated thyroglobulin values (immunometric assay-IMA or radioimmuno assay-RIA). IMA method has the potential to underestimate serum thyroglobulin, even if TgAb levels are very low or below the cut-off for positivity. The presence of heterophilic anti-mouse antibodies (HAMA) in the circulation can cause overestimation of serum thyroglobulin measured by IMA methodology. RIA measurements are less prone to TgAb interference and not affected by the presence of HAMA. Since IMA methods underestimate serum thyroglobulin in the presence of TgAb, an undetectable serum thyroglobulin IMA value reported for a thyroidectomized TgAb-positive DTC patient has no clinical value. The importance of the guideline published by the National Academy of Clinical Biochemistry (NACB) is based on suggestion that laboratories show the presence of TgAb and second due to lymphocytic memory cells (responsible for the TgAb synthesis) which maintain their ability to produce antibodies for a prolonged period. Conclusion: Interference caused by TgAb remains the most serious problem limiting the clinical utility of thyroglobulin measurements. Measurement of TgAb should be done in the same laboratory by same method sequentially over time. In DTC patients after total thyroidectomy and remnant ablation comparative TgAb measurements may accurately predict prognosis: declining TgAb predicts an absence of tumor recurrence, while rising serum TgAb levels may be a prognostic indicator of recurrence if thyroglobulin and whole body scintigraphy are negative.

005

#### **Clinical experience with recombinant human thyrotropin in the radioiodine treatment of patients with differentiated thyroid cancer on L-thyroxine**

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Background: Ablation applications of (131) I in patients with differentiated thyroid cancer (DTC) have required withdrawal of thyroid hormones, L-thyroxine, for several weeks. The resultant hypothyroidism, however, is poorly tolerated. Administration of recombinant human thyrotropin (rhTSH) stimulates thyroid tissue without requiring the discontinuation of thyroid hormone therapy. The aim of this study is to describe the clinical experience with using rhTSH in conjunction with ablative radioiodine treatment in patients with DTC on L-thyroxine. Materials

and methods: The study included 24 patients (mean ages of 45,4 years, range 21 - 69 years) with DTC divided in 2 groups. Group 1 included 12 patients with differentiated thyroid cancer (9 papillary cancers and 3 follicular cancer, stages II), who were treated after near-total thyroidectomy with ablative radioiodine treatment using rhTSH; and group 2 included 12 patients with the same features (histology and stage) of disease treated with ablative radioiodine treatment in the hypothyroid state after L-thyroxine withdrawal. Thyrogen was administered i.m. according to the suggested protocol: 0.9 mg i.m. on days 1 and 2, radioiodine on day 3. All of patients underwent whole body scan after (131) I treatment and serum thyroglobulin (Tg) and TSH measurement. Laboratory investigations included serum concentrations of cholesterol, triglycerides, uric acid and creatinine. Each patient's clinical status was assessed by the Billewicz Scale and the short-form Profile of Mood States. Results: In both groups, serum TSH reached a very good stimulation level, between 78-217.7 microIU/mL after rhTSH administration and 36.8-85.6 microIU/mL after conventional withdrawal of L-thyroxine treatment. RhTSH-stimulated Tg was negative (<0.9 ng/mL) in six patients from group 1 and five for group 2; low positive (1-5 ng/mL) in four patients from group 1 and six for group 2; high positive (> 5 ng/mL) in two patients from group 1 and one for group 2. At the whole-body scanning after (131) I treatment, all patients showed thyroid remnants. Furthermore, two patients of the first group and one patients of the second group showed lymph node metastases. The mean heart rate was slower after withdrawal of thyroid hormone than after administration of thyrotropin. The patients had significantly higher mean serum concentrations of cholesterol, uric acid and creatinine after withdrawal of thyroid hormone than after administration of rhTSH. The rhTSH was well tolerated, with nausea occurring in only one patient. There were statistically significant differences between both groups for all 14 symptoms and signs of hypothyroidism on the Billewicz Scale and all 6 states of the Profile of Mood States. Conclusion: Administration of rhTSH is a safe, effective tool for ablative radioiodine treatment and avoids L-thyroxine withdrawal preserving metabolic homeostasis and preventing the debilitating effects of hypothyroidism.

006

#### **Use of recombinant TSH (r-TSH) stimulation for treatment of bone metastasis**

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Thirteen evaluations post r-TSH injection was done in 9 patients of differentiated thyroid carcinoma. There were 3 males & 6 females with an average age of 47 years. r-TSH was obtained as a sterile non-pyrogenic lyophilized product reconstituted with sterile water for injection. 0.9 mg was

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injected intramuscularly on two consecutive days (24 hours interval). Two patient groups were studied. No thyroxine withdrawal was done. 8 high dose I131 treatments (250-300 mCi) were performed in 5 patients with multiple bone metastases. (Group I). 4 patients underwent follow-up evaluation (5 studies) by whole body I131 scintigraphy. (Group II) Serum TSH & thyroglobulin estimation was performed in all patients on third and fifth day post injection respectively. Adequate TSH response ( $>125$  IU/ml) was obtained on all occasions in both the groups. Excellent concentration of I131 was seen in the metastatic sites, in the post therapy scans, in all patients. The iodine avidity was maximum on seventh to eighth day post therapy in-group I. No abnormal I131 concentration was seen in patients of group II undergoing follow-up. Serum thyroglobulin levels were abnormal in the first group & normal in the second. No adverse reactions to r-TSH injection were seen. Patients with bone metastasis however reported pain flare at 48 hours which subsided by fifth day. No interventions were needed. Hypothyroid symptoms were not noted in either of the group. Our initial results show that radioiodine treatment of bone metastasis from differentiated thyroid cancer is feasible post r-TSH stimulation and the iodine avidity simulates the results of standard thyroid hormone withdrawal protocol, which is universally practiced. No morbid symptoms and signs due to prolonged thyroxine withdrawal resulted in better patient compliance and quality of life. It is foreseen that the outcome of treatment in bone metastasis should be better as the window period of TSH stimulation is short and hardly results in disease flare as happens with prolonged thyroid hormone withdrawal.

007

#### The level of carcinogenic risk after radioiodine ablation for low risk group papillary thyroid cancer

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Long-time survival in patients with very low and low risk papillary thyroid cancer (PTC) after thyroidectomy and radioiodine ablation (RIAB) raises the matter of radioiodine potential harm on survivors, presumably because of secondary carcinogenesis. Twenty years survival curve of those patients reaches normal population survival curve for similar age and sex. Methods: RAIB was prescribed to 185 pT1-3pN0Mo patients to destroy thyroid remnant after surgery. Averaged 3,1 GBq I131 was administered to 161 patients treated by one fraction and mean 6,2 GBq for 24 patients treated twice. The doses in stomach, bladder, salivary gland, bone marrow, lung, liver, breast, gonads and remaining body have been individually estimated using T. Smith and E.Edmonds model for radioiodine kinetics in human body. The simplified pessimistic model, proposed by International Commission of Radiation Protection (ICRP) was applied to predict

radiogenic cancer probability for secondary cancer (RCP) after RIAB. Results. The greatest RCP for a person (individual risk) is to develop a fatal stomach cancer (1,7-3,4 %) and fatal bladder cancer - 0,5-0,9%. Individual RCP decrease to 0,1-0,2% for malignomas of the salivary glands and for leucosis. The number of predicted fatal and non-fatal cancer cases (collective risk) in the whole 185 patients' group is 6.4 cases. Four gastric cancer cases and one bladder cancer case were predicted, but none was observed during the follow-up period of 7 to 28 years. Summarized collective risk for all other organs at risk is below one case - 0,8. Three secondary cases (two in the salivary glands and one multiple myeloma) were recorded during the follow-up and we speculate they could be radiogenic. Five metachronous breast cancers were assumed not to be radiogenic. The calculated RCPs for different target organs were compared to the spontaneous cancer rate for period 1990-2000 and for population size 105. The highest risk was calculated for salivary glands - 33 times higher than spontaneous rate, for stomach - 9 times, for urinary bladder - 4 times. For lung and breast as the most common cancer types, radiogenic cancer cases probably could not be distinguished over the higher spontaneous rate. The model estimated total number of 2671 radiogenic cancer cases in a 105 population for 10 years period. For 10 years spontaneous cancer rate in Bulgaria showed 1910 new cases for the same population size. Therefore, averaged predicted radiogenic cancer risk is 1,4 times above spontaneous cancer rate. We may regard such prediction exaggerated, assuming ICRP model as too pessimistic. To evaluate the magnitude of predicted risk we have compared it with other anthropogenic mortality risks in society. Practicing some profession (uranium miners, military pilots) and even some sports (steeple chase, alpinism, rowing) human beings are exposing themselves to 5-26 fold higher death risk. Conclusion. The predicted overall 1,4 fold higher radiogenic cancer risk over the spontaneous cancer rate is a strong argument not to use routinely RAIB in very low and low risk PTC group. Even so, being considered as middle range risk in the society, a careful pro and con evaluation should be applied by ALARA principle as a main radiotherapy philosophy.

008

#### Effect of low dose radioiodine therapy in differentiated thyroid carcinoma

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Introduction: Management of patients with differentiated thyroid cancer with low dose radio-iodine due to significant amount of remnant of thyroid tissue, serum thyroid stimulating hormone level relatively lower and variable I-131 uptakes thyroid tissue. Objective of the study was to determine the effect of low dose radioiodine therapy to destroy the amount of thyroid tissue remaining after

surgery. To reduce the treatment cost and avoidance of hospital admission for isolation. This was a prospective study. Method: Low dose iodine-131 (29mCi-50mCi) was used to ablate post-operative thyroid remnants in 15 patients with differentiated thyroid cancer. Serum thyroid stimulating hormone (TSH), serum thyroglobulin (Tg), thyroid USG, thyroid scan and uptake test were done in all patients before radioiodine therapy. All patients were followed up with thyroxine suppression of thyroid stimulating hormone after ablation. Follow-up of patients was done by measuring serum Tg (off thyroxine) and whole body scan (WBS) after 5, 12 and 11 months of surgery. Results: Total 20 patients were studied. The surgical procedure was near-total thyroidectomy in 40.0% and 48.5% near total thyroidectomy with radical neck dissection and sub-total or hemi-thyroidectomy in 11.5%. Histology showed papillary carcinoma in 94 % of patients and 6 % follicular carcinoma of thyroid. With one low dose I-131, remnant ablation was achieved in 14 (70%). In 1 patient WBS (whole body scan) shows focally increased uptake in right lobe after two low dose therapy, 2 patients have no follow up whole body scan. In 4 patients, two subsequent 28mCi and 29 mCi doses fail to ablate. In one patient, WBS shows focally increased uptake in right lobe (positive) but thyroglobulin (Tg) less than one. Conclusions: The use of single low doses I-131 therapy can be effective as large dose therapy. Low dose therapy ensures low cost I-131 therapy in differentiated thyroid carcinoma and avoidance of hospitalization.

009

**Enhanced sensitivity of lesion detection by performing delayed I-131 whole body scanning beyond the standard 48- hr scan protocol in patients of metastatic differentiated thyroid cancer treated with rhTSH (Thyrogen) intervention**

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Recombinant human thyrotropin (rhTSH, Thyrogen) with radioactive I-131 has been used for thyroid remnant ablation, subsequent diagnosis and treatment of metastases from differentiated thyroid carcinoma following surgery since 1999. Current recommendation is for whole body scanning to be performed at 48 hours post I-131 ingestion. We present our local hospital usage of thyrogen in Singapore General Hospital from January 2008 to June 2009. Patient selection was a combination of both patient preference and nuclear medicine physician recommendation. In particular, highlight is given to patients who were found to have metastatic thyroid carcinoma on initial 48 hour post- therapy whole body scanning. Delayed whole body scanning improved initial lesion detection and in some cases revealed metastatic foci that were not detected in the initial whole body scan with minimal adverse effects

and complications. Based on the results of this pilot study, we recommend further evaluation to validate this data and recommend for carrying out delayed post- therapy whole body scanning beyond 48 hrs, preferable 72-96 hours.

010

**FRAX Assessment of Osteoporotic Fracture Probability in Patients of Differentiated Thyroid Cancer on Thyroid Hormone suppressive Therapy.**

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Not yet received

011

**Scintigraphic profile in thyroid diseases in Yaounde**

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Objectives: To present scintigraphic findings and determine the contribution of scintigraphy in the diagnosis of thyroid diseases in Yaounde. Research design and methods: We carried out a cross-sectional study over a 20 months period (December 2004 to July 2006). A total of 252 patients received at the nuclear medicine unit of the Yaounde General Hospital for investigation of thyroid diseases were included. Each patient was clinically assessed for symptoms and signs of thyroid disease. Biological investigations including thyroid hormones were collected and the thyroid radionuclide scan performed using a Siemens® gamma-counter low energy high resolution. Results: Of the 252 patients included, 140(55.6%) were euthyroid, 94(37.3%) had hyperthyroidism and 18(7.1%) hypothyroidism. The age of the study population ranged between 2 and 81 years with a mean of 40±14 years and a sex ratio of 6/1 favoring women. Solitary thyroid nodules, simple diffuse goiter and multinodular goiter were the most common types of euthyroid goiter with respective frequencies of 44.3%, 22.9% and 21.4%. Graves' disease was the most frequent type of hyperthyroidism, followed by uninodular and multinodular toxic goiters. Radionuclide scan showed abnormalities in 96% of patients. In 34.5% of cases, these were solitary nodules with 20% being hot. Other features included diffuse toxic goiter (20.6%), hetero-nodular goiter (12.7%), cold diffuse goiter (9.5%), thoracic goiters (5.6%) and white card (4.8%). Diffuse hyper fixating goiters (61.5%) were the leading findings in patients with hyperthyroidism, while hypothyroidism was mostly related to hetero-nodular goiters. Conclusion: Thyroid diseases in our setting have epidemiological and clinical features similar to those described in literature. Their radionuclide scan findings are those classically described with differences in proportions.

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Thyroid scan improves the diagnostic accuracy of thyroid diseases in our setting and is therefore worth to be integrated in the diagnostic strategy of these diseases in Cameroon.

012

**Thyroid cancer imaging: Are we missing nodules with high resolution collimator and limiting pinholes studies to anterior view only?**

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Nodular thyroid disease carries risk of being malignant. The incidence of thyroid cancer varies according to many factors including number of nodules, sex, prior radiation and if the nodule is functioning. Thyroid scanning is a main diagnostic tool for detecting thyroid nodules. Currently, thyroid imaging with pinhole collimator is being replaced in many departments by high resolution collimator. In a study of 40 patients with both pinhole and high resolution collimators, 40 nodules of varying sizes were detected by pinhole collimator while only 10 were seen using high resolution collimator. In a review of 144 nodules in 100 patients with the diagnosis of nodular disease in whom both anterior and right and left oblique views were obtained using pinhole collimator, 30 (21%) nodules were not seen in the anterior view. Among 8 isthmus nodules, 6 were totally unrecognized in the anterior view. These two studies indicate that pinhole collimator should be used routinely in thyroid imaging with three projections (anterior and two obliques) for proper interpretation. Use of high-resolution collimator leads to missing significant number of nodules (75%). Similarly, acquiring only anterior view using pinhole collimator can lead to missing a good number (21%) of nodules. Using proper techniques will lead to detection of nodule containing cancer and consequently treating this potentially curable condition.

013

**The influence of treatment of subclinical hyperthyroidism with radioiodine on achievement of euthyroid state, thyroid volume and level of sex hormone binding globulin.**

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Introduction: Subclinical hyperthyroidism (SH) affects 0,7% – 2,2% of the population. SH comes with or without goiter. The diagnosis of this disease leans on the laboratory

criteria only: decreased of thyrotropin (TSH) and normal free - triiodothyronine (FT3) and - thyroxine (FT4) levels. During SH it's often observed, that the level of Sex Hormone Binding Globulin (SHBG) is increased. This may be responsible for infertility and gynaecomastia. What's more, there is no unequivocal procedure algorithm to manage patients with this disease. The aim of this study was to estimate the influence of treatment of SH with radioiodine (<sup>131</sup>I) on: achievement of euthyroid state (TSH, FT3, FT4); level of SHBG, and thyroid volume (ThV). Materials and methods: 44 patients (37 women, 7 men) aged 45.9±11, with 12.8±9.8 month history of only autonomous endogenous SH were examined twice: before and 5.7±4.2 months after TSH normalization due to radioiodine (<sup>131</sup>I) treatment. The diagnosis of SH was based on: suppressed TSH (<0.36 mIU/l and normal FT3 and FT4 concentrations, absence of antithyroid antibodies, suppressed TSH after TRH test, thyroid ultrasonogram and <sup>99m</sup>Tc scintigram. The indications for treatment were symptoms and the autonomous endogenous cause of subclinical hyperthyroidism. Average period between examinations was 12.5 ± 6 months. The Local Ethical Committee approval for these procedures has been obtained. Results: All patients reached euthyroidism after the radioiodine treatment with mean dose 12.1±5.7 mCi of <sup>131</sup>I. Concentration of TSH increased from 0.16±0.1 to 1.32±0.1 mIU/l (p<0.000), but the level of SHBG decreased from 63.7±51 to 44.6±32 nmol/l (p=0.001). The thyroid volume decreased from 33±19 to 22±15 ml (p<0.000). Conclusions 1. The cure of autonomous subclinical hyperthyroidism with radioiodine is very effective. It normalizes not only thyrotropine but also level of sex hormone binding globulin. 2. Subclinical hyperthyroidism treatment with radioiodine decreases thyroid volume by approximately one third.

014

**Radioiodine therapy in childhood thyroid cancer**

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In Bangladesh, iodine-deficiency and thyroid problems are common. However, thyroid cancer is curable by timely surgery and radioiodine(I-131) therapy. In Rangpur, we are treating thyroid diseases since 1990 and already treated five children with papillary carcinoma of thyroid gland--three girls of 11,14 and 15 years and two boys of 10 and 14 years. All of them received low-dose radioiodine therapy, daily thyroxine doses of 100 to 200 micrograms in empty stomach to suppress thyrotropin (TSH) and put on long-term follow-ups using 8Mega-Hertz(MHz) high-resolution ultrasonography (HRUSG), radioiodine whole-body scans (WBS) by gamma camera, and hormone estimations by radioassays.

015

**The role of high-resolution neck ultrasound in combination with thyroglobulin measurement in the washout fluid from the fine needle aspiration of neck lesions (FNAB-Tg) in patients with differentiated thyroid carcinoma and positive or negative Iodine-131 whole body scintigraphy.**

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**Objective:** The aim of the study was to examine the role of high resolution neck ultrasound in combination with thyroglobulin measurement in the wash-out fluid from the fine needle aspiration biopsy (FNAB) of suspicious neck lesions in patients with papillary thyroid carcinoma and positive or negative Iodine-131 whole body scintigraphy (WBS). **Subjects and methods:** High resolution ultrasound (U/S) and color flow Doppler sonography of the neck was performed in 18 patients (4/14 M/F; range 22-54 years) who underwent total thyroidectomy and I-131 ablative therapy and were being followed for papillary thyroid carcinoma. They all had either positive thyroglobulin or positive Iodine-131 WBS or both. Nine patients had negative WBS. Three patients had negative thyroglobulin and one patient had anti-thyroglobulin antibodies. U/S guided FNAB of one or more suspicious neck lesions were performed and the needle was rinsed with 1 ml of normal saline. Thyroglobulin levels (FNAB-Tg) were measured from the wash-out fluid. We considered the FNA-Tg as positive if the FNA-Tg level was higher than the serum Tg of the patient. Cytology of the aspirate was also performed. All patients subsequently underwent neck surgery and were found to have metastatic disease. The results of the FNA-Tg and cytology were thus compared with those of histopathology. **Results:** All of the lesions with positive cytology had a positive FNAB-Tg and all lesions with positive cytology were histopathologically confirmed to have metastatic disease. However, cytology negative lymph nodes that were FNAB-Tg positive were also confirmed to have metastatic disease. **Conclusions:** Positive FNAB-Tg after U/S guidance of suspicious neck lesions is 100% sensitive in identifying metastatic disease in patients with well differentiated thyroid carcinoma. FNAB-Tg is superior to FNAB-cytology and it should always be performed when investigating suspicious neck lesions and lymph nodes.

016

**Effect of levothyroxine suppressive therapy on bone mineral density in patients with well-differentiated thyroid carcinoma**

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**Aim:** To investigate the consequences of treatment with a supra- physiological dose of Levothyroxine (LT4) on bone mineral density (BMD) in patients with well differentiated thyroid cancer (WDTC). **Materials & Method:** A cross sectional design was contemplated for the study done in the Institute of Nuclear Medicine & Ultrasound, Dhaka. A total of 60 subjects were included in the study. Among 60 subjects 30 were cases of WDTC receiving thyroid hormone suppressive therapy for at least two years. The other 30 subjects were healthy euthyroid controls without any obvious thyroid disorders and other major illness. The age ranged from 20-40 years. Serum TSH and bone mineral density were measured in both the case and control groups. Serum TSH of each subject was measured based on IRMA principle. BMD of each subject was measured by Norland XR-46 DEXA scanner at lumbar spine and left hip. The test statistics used to analyze the data were descriptive, X2 test, Fisher's Exact Probability test, Students t test and Mann Whitney test. **Results:** The findings derived from data analysis show that out of the total 60 subjects, 38(63.3%) were female and 22(36.7%) were male. The mean age of cases and controls were 32.67 ± 1.15 and 31.83 ± 0.95 years respectively. Mean serum TSH of the cases was 0.18 ± 0.01 mIU/L (range 0.03-0.28) in comparison with 2.8 ± 0.2 mIU/L (range 1.32 – 5.20) in controls. No significant decrease was detected in bone mineral density in cases (92.24 ± 11.66% in lumbar spine and 93.84 ± 11.41% in left hip) treated with thyroxine compared with control group (91.24 ± 8.89% in lumbar spine and 92.83 ± 10.24% in left hip) at any site of measurement (p>0.05). Significant femoral osteopenia (p<0.05) was found in cases receiving thyroxine for more than 3 years (87.95 ± 7.96%) compared to those receiving the same for 3 years or less (99.74 ± 11.49%). Significant femoral osteopenia (p= 0.026) was also found in cases receiving thyroxine for more than 3 years (87.95 ± 7.46%) compared to age sex matched euthyroid controls (95.57 ± 11.27%). No statistical association was observed between duration of thyroxine intake and BMD in lumbar spine in cases (90.22 ± 10.08% in >3years group and 94.59 ± 13.29% <3years group; p>0.05). **Conclusion:** This study suggests that levothyroxine suppressive therapy for more than 3 years causes femoral osteopenia. BMD is not affected in patients receiving levothyroxine suppressive therapy for 3 years or less. However a study with larger sample size is required to substantiate the findings of the present study.

017

**Thyroid Cancer in Latvia: review of statistical data and some management problems**

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## ABSTRACTS

According to the data of Latvian Cancer Registry incidence of malignant diseases in Latvia increased by 1.48% for the past 10 years. The aim of this study was to analyze thyroid cancer incidence, mortality and histopathologic type for a period 1993-2007, and show some management problems in connection with <sup>131</sup>I therapy for stage I differentiated thyroid cancer (DTC) patients according to Management guidelines for patients with thyroid nodules and differentiated thyroid cancer (Cooper and al, Thyroid; 16(2): 109-42.) Thyroid cancer incidence (1993-2007) ranges between 1.0-2.5 in males and 3.4-11.2 in females (crude rate per 100000). The mortality rate of thyroid cancer varies between 0, 4-1.4 per 100000 in males and 1.1-2.7 per 100000 in females. Analyzing incidence data in different age groups one can see that the highest thyroid cancer incidence is in age groups of 55-64 and after 75 years. Histopathological analysis showed that number of papillary carcinoma cases increased. Also, there is increase in the number of first stage of thyroid cancer. For many years the recommended therapy for DTC, with exception of microcarcinoma, was total- or near total thyroidectomy with following <sup>131</sup>I therapy, but in past 2-3 years we can see tendency to abolish <sup>131</sup>I treatment for DTC stage I patients or perform it only for selected stage I patients (multifocal disease, nodal metastases, extrathyroidal or vascular invasion, more aggressive histology). In our study we analyzed <sup>131</sup>I uptake in thyroid bed for 127 DTC patients undergoing surgery in 2007. Small activity (3-5 MBq) of <sup>131</sup>I was given and measured uptake % in 24 hours. Only 63 patients (50%) had uptake <10%, 35 patients (28%) had uptake 10-20%, 29 patients (22%) even > 20% of given activity. Most of patients (80%) were referred to surgery due to nodular goiter and thyroid cancer was found unexpectedly after thyroidectomy, in such cases prophylactic central lymph node dissection was not performed. Clinical N=0 is not always histopathological N=0. In our study the stage I after <sup>131</sup>I therapy was changed to stage II for 1 patient, to stage III for 5 patients and to stage IV for 1 patient (Staging according to AICC Cancer Staging Manual, Six Edition, 2002). Conclusion. Thyroid cancer incidence in Latvia is increasing and is significantly higher in females. After surgery 50% of DTC patients have relatively large thyroid remnants and in such cases benefits of <sup>131</sup>I treatment (destroying occult microscopic cancer foci and micrometastases, ablating normal thyroid remnant tissue, thereby increasing the specificity of serum thyroglobulin and whole-body scintigraphy as markers for persistent or recurrent disease, uncovering previously undetected foci of <sup>131</sup>I uptake in whole body scintigraphy 4-7 days after <sup>131</sup>I treatment) outweigh the risks.

018

#### Is measuring of <sup>131</sup>I thyroid uptake using gamma camera reliable enough?

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Radioiodine thyroid uptake is a procedure mainly used in selecting the appropriate <sup>131</sup>I activity to be applied in the treatment of hyperthyroidism and to measure uptake in thyroid remnants following surgery for differentiated thyroid cancer. The fraction of an administered amount of radioiodine that accumulates in the thyroid or thyroid remnants at the selected time following application is usually performed using sodium iodide (NaI) crystal uptake probe with suitable lead shielding and a flat field collimator. The aim of the study was to assess whether radioiodine thyroid uptake could be reliably measured by gamma camera using region of interest (ROI) technique. The research was carried out on 19 Swiss mice, both male and female, which received <sup>131</sup>I by means of intraperitoneal injection with mean activity value of  $0.037 \pm 0.003$  MBq. With each mouse the radioactivity in the syringe was measured using gamma camera prior to the application, as well as rest radioactivity after the application. After the background corrections, by subtracting the second value from the first one, the net amount of the injected <sup>131</sup>I for each mouse was obtained. The measurements were performed by means of scintillation camera (Siemens ECAM), equipped with high-energy collimator and set to <sup>131</sup>I photo peak (364 keV), using ROI of the same size for determining the syringe region. The measuring was repeated using a gamma counter (Wallac Wizard 1470), which was also set to <sup>131</sup>I photo peak. Seventy-two hours after the radioiodine application the mice were anesthetized and the radioactivity in their thyroid glands was measured in-situ via gamma camera, using ROIs of the same size to determine the thyroid region. Correction for neck background activity outside the thyroid was also performed. The thyroid glands of the anesthetized mice were then extirpated and their radioactivity was measured in the same conditions by means of gamma camera. The radioactivity in the extracted glands was also determined by means of gamma counter. After correcting for physical decay of <sup>131</sup>I the measured radioactivity values in the mice's thyroid glands were expressed as percentages of the applied radioactivity. The results obtained by means of gamma camera showed slightly higher rates of uptake in 'in situ' thyroid glands ( $72.27 \pm 10.76\%$ ), in comparison to the uptake in extirpated thyroid glands ( $65.34 \pm 11.83\%$ ). However, the difference in values ( $p > 0.05$ ) was not statistically significant. The uptake values of <sup>131</sup>I obtained by measurements in the extracted thyroid glands on the gamma counter were higher ( $75.19 \pm 9.40\%$ ) than those obtained in the previous measurements by gamma camera, but the difference in values ( $p > 0.05$ ) was not statistically significant. The high value of correlation was found between all three, ways in which the measurements were performed. Our results led us to the conclusion that the

measurement of thyroid uptake by means of gamma camera is a reliable method, which can be applied instead of using specialized devices, primarily in patients who require the application of therapeutic doses of this radionuclide.

**019**

**Persistent and unusual combination of negative thyroglobulin levels and positive I-131 avid metastases in a patient with metastatic follicular carcinoma of thyroid**

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Thyroglobulin (Tg) is a 660-kDa dimeric protein, which is produced only by the thyroid follicular cells. The thyroid tissue-specific origin of Tg biosynthesis has led to its widespread use as a tumor marker for differentiated thyroid carcinoma. Tg and I-131 whole body scans (WBS) are well-established methods for long-term follow-up and monitoring of patients with differentiated thyroid carcinomas. Generally, an undetectable Tg level and a negative I-131 whole body scan would suggest absence of functioning metastasis. In contrast, an elevated Tg concentration is seen in association with I-131 avid loco-regional or distant metastases. However, discordant results of Tg measurement and I-131 WBS have been reported. Negative I-131 WBS and a positive Tg test have been reported in most of these cases. The occurrence of positive I-131 WBS and a negative Tg test has also been reported sporadically. But it may not be that uncommon as has been reported in recent literature. We present a case of metastatic follicular carcinoma with persistently false negative Tg in the presence of florid metastatic disease and positive I-131 whole body scans. A female patient who was then 57 years old first presented to the thyroid clinic in 2001. She had more than 20 years history of left neck swelling until later presented with right scalp mass, which prompted her to seek treatment. CT scan of the brain was performed which showed large lytic foci in the right parietal region and another small focus in the left frontal bone. Subsequently, she underwent total thyroidectomy and radical neck dissection with histopathology yielding minimally invasive follicular carcinoma in the left lobe. No tumor was found in the left cervical lymph nodes as well as in the right thyroid lobe parenchyma. After the uneventful surgery, 200mCi radioiodine therapy was given. Post-therapy scan showed abnormal I-131 activities consistent with functioning thyroid metastases in the skull, lower thoracic vertebrae and the trochanteric region of the left femur. Subsequently the patient received several high doses of I-131 for the treatment of metastatic disease. Throughout the period of treatments and follow up, her Tg levels remain very low or undetectable. It is therefore concluded that simple measurement of serum Tg may not be good enough to monitor patients of thyroid cancer during follow up. A

combination of Tg and I-131 WBS should be the standard practice in the follow up of such patients to achieve optimum results.

**020**

**Clinical significance of serial measurements of serum thyroglobulin**

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Objectives: Serum thyroglobulin measurements are the most sensitive modality for the detection of recurrent or persistent disease during the follow-up of well differentiated thyroid cancer. However, thyroglobulin autoantibodies (TgAb) may seriously interfere with the measurement and limit the accuracy of the measured Tg concentration. The purpose of this study was to evaluate prevalence and change of TgAb in DTC patients with and without recurrences or metastasis during follow-up. Total 56 patients with DTC, who were treated between October 2007 and March 2009 by total or near-total thyroidectomy followed by radioiodine therapy, were included. The follow-up protocol for determining disease status consists of I-131 whole body scan, neck ultrasonography, CT scan and serum thyroglobulin measurements under TSH stimulation. Thyroglobulin levels were measured using immunoradiometric assay kit (Schering Cis Bio) with low detection limit of 0.2 ng/ml. Comparison of serum TgAb levels at pre-ablation, 3 months after RIT & 6 months and 9-12 months after RIT were performed by students t-test  $p < 0.05$  was considered significant. Results: TgAb pre-ablation was 234.52 U/ml. TgAb at 3 months time were 198.7 U/ml. TgAb -6 months was 135.36 U/ml. TgAb 9-12-months was 88.94 U/ml. Serum TgAb concentration gradually decreases after thyroidectomy. Each periodic TgAb concentration was significantly lower than the previous values. When comparison was done between patients with metastatic involvement and disease free patients there was significant difference of Tg and TgAb levels at cut-off points of 3, 6 and 9-12 months. Conclusion: Serum TgAb values of DTC patients with and without recurrences or metastasis during initial follow-up accurately portrays the disease status. In patients with no metastases or recurrence Tg and TgAb significantly decrease after thyroidectomy. Hence, any abnormal rise or persistently raised levels of the serum TgAb could be an indication of existing persistent Tg or production associated with normal malignant thyroid tissue.

## ABSTRACTS

021

**Radioiodine treatment complications in mother and child in patients with differentiated thyroid carcinoma**

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Objectives: Radioiodine (I-131) is widely used in the treatment of differentiated thyroid carcinoma (DTC). As radiation is a known mutagen, we decided to evaluate the outcome of pregnancy in DTC female patients and genetic risks and health status of their children. Methods: We retrospectively studied the medical records of DTC patients in our centre from 1999 to 2002. 1100 women were hospitalized for treatment with high dose radioiodine therapy (at least 100mCi) during the above period, from which 653 were in reproductive years. 100 of these women had at least one pregnancy after radioiodine therapy. Data on 126 pregnancies after treatment were obtained by interviewing these 100 women, who had totally 101 pregnancies before I-131therapy. We asked about pregnancy outcomes such as abortion and stillbirth, and the health status of their children. We also reviewed radioiodine last dose and cumulative dose. Results: The incidence of abortion increased from 16.83% (17 out of 101 pregnancies before I-131therapy) to 26.19% (33 out of 126 pregnancies after I-131therapy). 13 of 33 abortions were spontaneous and 20 abortions were induced (69.7% all abortions after I-131therapy). There was no significant difference between the mean last dose and also the cumulative dose in patients with and without history of abortions. Mean interval between the last dose of I-131 therapy and abortion and the last dose and live child birth had a significant difference (16.20i,±10.97 versus 32.10i,±18.22 month, p<0.001). All children had normal birth weight. 3 anomalies (Down's syndrome, heart anomaly and macrocephaly) in 3 children were present. 3 episodes of intrauterine death were recorded, but this was not statistically significant. Conclusion: Shorter interval between I-131-therapy and pregnancy increases the risk of abortions. It appears that radioiodine therapy has no obvious adverse effect on fertility or genetic risks in the offsprings.

022

**Evaluation of the efficacy of low and high dose radioiodine therapy for ablation**

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(Abstract not available)

023

**Predictive value of TSH levels after 131-I treatment of patients with Graves' disease**Pavel Bochev, Borislav Chaushev, Anelia Klisarova, Zhivka Dancheva, Kiril Hristozov, Yana Bocheva  
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Radioiodine treatment of patients with Graves' disease is marked with various degree of uncertainty, regarding dose regimen and decision for second dose application. The aim of the study is to evaluate the predictive value of TSH measurement up to six months after treatment regarding 1 year endpoint outcome and define the time for a second dose application whenever needed. Subject of study were 46 patients (9 men, 37 women)with Gravs' disease, treated with fixed doses 131-I – 5 and 7.5 mCi. All patients were on antithyroid medication before and after the therapy except for a one week withdrawal pre- and post radioiodine therapy. TSH and FT3, FT4 levels were measured before the procedure, at 3, 6, 12 month after administration. ATD therapy was not discontinued before the 3rd month after therapy. A second dose was not administered during the first year after the initial treatment in any of the patients for various reasons. The results from the follow up show that only 20% of the patients with high TSH at 3rd month remain hypothyroid at 1 year, while half of the patients with high TSH at 6th month remain hypothyroid. Among the patients with low TSH levels at 3rd month control 63% tend to remain hyperthyroid at 1 year with similar percentage for 6th month control. Euthyroid at 3rd and 6th month patients remain euthyroid after 1 year in 57% and 72% respectively. The results show that early hypothyroidism is predominantly transient and is of no predictive value for the outcome. Early hyperthyroidism at 3rd month control is likely to persist at 1 year and needs an early administration of second dose 131-I.

024

**Diagnostic Value of Serum Thyroglobulin in Differentiated Thyroid Carcinoma Patients to Monitor Persistence or Recurrence Disease**

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Serum thyroglobulin (Tg) is widely accepted as a tumor marker to evaluate the effectiveness of treatment for differentiated thyroid cancer (DTC) and to monitor for persistence or recurrence. However, Tg level can be misleading in the certain instances in which levels are low but have recurrence. The aim of this study to evaluate the diagnostic value of serum thyroglobulin in DTC patients to monitor persistence or recurrence disease

A retrospective study of 62 patients, 56 females and 6 males who had proper follow-ups after received I-131 ablation. Range of age was 19 to 73 years old. During the follow-ups,

serum Tg, anti-thyroglobulin antibody (TgAb), chest X-ray and bone scintigraphy were examined. Serum thyroglobulin 2 ng/mL was used as positive for persistence or recurrence disease during thyroid hormone withdrawal.

Positive Tg and negative TgAb were found in 6 of 62 (9.67%) patients who showed abnormal uptake on bone scintigraphy. Negative Tg in 56 of 62 (90.03%) patients, 49 of 56 (87.5%) patients had both Tg and TgAb negative and bone scintigraphy also showed normal uptake. 6 of 56 (10.7%) patients had negative both Tg and TgAb but having abnormal bone scintigraphy which showed uptake at ribs in two patients, at lumbal spine in two patients, at sternum in one patient and the rest at both right-sacroiliac joint and parietal bones. One of 56 (1.7%) patient who had negative Tg, positive TgAb, normal bone scintigraphy and I-131 whole body scan showed an abnormal uptake at left and right area of the neck. Sensitivity and specificity for serum thyroglobulin were 46.15% and 100% respectively.

Serum thyroglobulin cannot be considered as a single indicator to monitor of thyroid cancer, furthermore TgAb examination should be included. Additional imaging tests such bone scintigraphy, I-131 whole body scan may improve diagnostic value to identify persistence or recurrence disease.

## 025

### **Umbilical cord blood TSH values in neonates for screening of congenital hypothyroidism**

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**Objectives:** The aim of this study was to determine the thyroid stimulating hormone (TSH) levels from cord blood in neonates and to establish the practice for possible application of congenital hypothyroidism screening in Bangladesh. **Methods:** TSH was measured from cord blood of 2858 newborns from maternal wards of 28 hospitals of the Dhaka city and 5 hospitals of other districts where Nuclear Medicine Centers were located. The Neonatal TSH IRMA kit supplied by HTA Co; LTD, Beijing, China was used for screening test of congenital hypothyroidism. **Results:** From the total of 1495 male and 1363 female neonates 92.64% male neonates and 93.18% female neonates had non- detectable or TSH values less than 10 mIU/L. 7.29% males and 6.60% females had TSH values between 10-20 mIU/L. Only one male and three female neonates had raised TSH values greater than 20mIU/L. **Conclusions:** Cord blood on filter paper was practical and easy to collect. It was applicable for blood spot assay of congenital hypothyroidism. It could be put in practice for large-scale newborn screening programme in Bangladesh.