

tal extremity and proximal of tibia and right tibia distal extremity. At the moment, patient undergoes a palliative treatment with oral Etoposide, plus pain relief. **Comments:** In this case report, bone scintigraphy was decisive in documenting the monostotic to multicentric evolution evidencing the disease aggressiveness in agreement with literature.

• Painel •

URINARY FISTULA TO SEMINAL VESICLE DETECTED BY DEDICATED PET/CT: UNUSUAL CAUSE OF FALSE-POSITIVE FINDING. CASE REPORT.

Marcus V. Grigolon; Tiago Mundim; Cássio M. dos Santos; Edgar A. Franco Neto; Christiane M. França; José A. de Cássia; Tito L. Mundim. *Clínica Villas Boas – Brasília, DF, Brasil.*

Objective: To report on a case of urinary fistula to seminal vesicle detected by dedicated PET/CT and the importance of performing a fully diagnostic intravenous contrast-enhanced CT. **Method:** 65-year-old heavy smoker male with history of rising in blood tumor markers and benign prostatic hyperplasia treated with trans-urethral resection. Ultrasonography detected a possible thickening of the bladder wall. Patient was submitted to a whole body PET/CT study 1 hour after an intravenous injection of 288.6 MBq (7.8 mCi) of 18F-FDG in a dedicated PET/CT scanner. Fully diagnostic intravenous contrast-enhanced CT images were acquired immediately after PET images. Delayed PET/CT images of the pelvic region were also acquired approximately 40 minutes after an intravenous injection of furosemide to improve lesion detection in the bladder wall. **Results:** Images showed a spiculated pulmonary nodule in the left upper lobe and large bulky mediastinal lymph adenopathy, all of them with markedly increased 18F-FDG uptake. Delayed post-furosemide PET images showed a focal area of moderately increased 18F-FDG uptake in the right hemi pelvis that corresponded to the right seminal vesicle on the CT images, which was fulfilled with iodinated contrast. These abnormalities were not present in the first set of images. **Conclusions:** The use of intravenous iodinated contrast in the CT images allowed the precise characterization of the 18F-FDG concentration in the right seminal vesicle that was noted only in the delayed images, and corresponded to a urinary fistula to the right seminal vesicle. Have we not injected the intravenous contrast for the fully diagnostic CT images, this abnormality would be incorrectly characterized as a lesion with increased metabolic activity.

Outros

• Tema Livre •

A NEW PROPOSAL FOR MONITORING PATIENTS IN NUCLEAR MEDICINE.

J. Willegaignon; Maria I.C. Guimarães; Marcelo Tatit Sapienza; Michael G. Stabin; Luiz F. Malvestiti; Marília Marone; Gian-Maria A.A. Sordi. *Instituto de Pesquisas Energéticas e Nucleares (IPEN); Centro de Medicina Nuclear da Faculdade de Medicina da USP; Hospital Samaritano; Universidade de Vanderbilt.*

The measurement of the exposure rates is fundamentally important in the release of patients given radioactive material and for keeping the exposures of others as low as reasonable achievable (ALARA). Similar measurements methodologies have generally been used for point and extended sources, but this approach may lead to methodological errors in calculating radiation dose estimates. In this study, nuclear medicine patients (n=122) who received activities of Na131I for therapy (0.74 to 16.6 GBq, 20 to 450 mCi) were monitored using different measurement methodologies and the results showed that the usual measurement performed at 1.0 meter in front of the body resulted in a mean

error of 40% between experimental and theoretical exposure rates. The best measurements were obtained when performed at 2.0 meters in front of the patients. With this approach, the error was about 2% between experimental and theoretical values and the determination of the activity retained by patients' body yield more accuracy and precision following the measures at 2.0 meters instead 1.0 meter. These findings suggest a new methodology for patients' measurement in nuclear medicine and could be useful for personal monitoring in cases of radiological emergencies involving 131I ingestion.

• Tema Livre •

EVALUATION OF THE ABSORBED DOSE FROM PATIENTS BASED ON WHOLE-BODY 131I CLEARANCE IN THYROID CANCER THERAPY.

J. Willegaignon; Michael G. Stabin; Maria I. C. Guimarães; Luiz F. Malvestiti; Marcelo Tatit Sapienza; Marília Marone; Gian-Maria A.A. Sordi. *Instituto de Pesquisas Energéticas e Nucleares (IPEN); Centro de Medicina Nuclear da Faculdade de Medicina da USP; Hospital Samaritano; Universidade de Vanderbilt.*

The evaluation of the absorbed dose from radioactive patients during the treatment of thyroid disease is an important factor to establish precautions in these procedures, and the 131I retention/excretion by patients' body provides additional information to medical and radioprotection service. In 94 patients, the measurement of the exposure rates was performed over the 7 days after Na131I administration and the rates permitted to study the dynamic of excretion and the potential dose evaluation. The administered activities ranged from 3.7 GBq (100 mCi) to 16.65 GBq (450 mCi) and the results proved that the majority of the activity is excreted by patients in first three days after Na131I administration. The average 131I activity excreted at 24, 48, 72, 96 and 120 hours after oral administration was (72 ± 10), (91 ± 6), (97 ± 3), (98.9 ± 1.5) and (99.6 ± 0.7)% respectively. According to the administered activity, the evaluation of the accumulated absorbed dose from patients ranged from 3.0 ± 0.7 to 8.4 ± 1.1 mSv at one meter and 1.2 ± 0.4 to 3.2 ± 0.4 mSv at two meters. The data reported here are important to radioprotection policy and to add and improve on the guidelines reported in USNRC Regulatory Guide 8.39.

• Tema Livre •

SCHISTOSOMIASIS HAEMATOBIA: CLINICAL ASPECTS AND SCINTIGRAPHIC IMAGES IN BRAZILIAN PATIENTS.

Joaquim d'Almeida; Carmelindo Maliska; Paulo M. Pellegrini; Rodrigo A. Collares; Maria E. Penas; Maria G.A. Cruz. *Serviço de Medicina Nuclear do Hospital Central do Exército, Triagem – Rio de Janeiro, RJ, Brasil.*

The *Schistosoma haematobium* is a trematode that cause schistosomiasis haematobia and resides in venous plexus around the vesicle bladder, where the eggs are deposited. The aim of this study was to evaluate the scintigraphic alterations trying to identify obstructive uropathy and its modifications during clinical evolution, because the worsening of renal function is related to the intensity and duration of the obstruction. In this study, 19 male Brazilian patients aged from 26 to 36 years, infected in Mozambique, were evaluated. Clinical and laboratorial diagnosis was done in a period of few months to 7 years after the contact with parasite. They underwent dynamic renal scintigraphy with 99mTc-DTPA and tubular function with 99mTc-DMSA. Among results there were 2 patients had abnormal scintigraphy 12 months after beginning of symptoms. Other 2 patients had normal exams 24 months after being symptomatic. Among patients being symptomatic for 48 months only one had obstructive pattern and renal scar, two had obstructive pattern and one presented a normal exam. We can be concluded that the alterations are randomic in relation to duration of symptoms, depending more on individual response, parasite charge, then others. This favors the idea

of close clinical and scintigraphic evolution because alterations non-detected earlier increases morbidity and irreversible damage to patient.

Radiobiologia/Instrumentação

• Painel •

CORRELAÇÃO ENTRE A VARIAÇÃO DE TEMPERATURA, UMIDADE, TENSÃO, CORRENTE E UNIFORMIDADE EM UM SISTEMA SPECT.

Argleydson L. Dias; Aline M. Furlan; Clarissa P. Bornemann.
Hospital Universitário de Santa Maria – Universidade Federal de Santa Maria.

Objetivo: O objetivo deste trabalho foi analisar temperatura, umidade, tensão e corrente para verificar se dentro das condições atuais de funcionamento de um determinado sistema SPECT é possível detectar variações significativas na Uniformidade do sistema. A Uniformidade avalia a diferença de resposta do detector em diferentes pontos do campo visual, sendo um dos parâmetros mais importantes no desempenho de um sistema SPECT. **Metodologia:** O estudo do comportamento dos valores da Uniformidade foi realizado num sistema SPECT dotado de dois detectores. Este equipamento está sujeito a variações térmicas e umidade devido à região climática em que se encontra. As variações de tensão e corrente foram analisadas, pois a rede elétrica que alimenta este equipamento é a mesma que alimenta todos os equipamentos de radiodiagnóstico. Este equipamento tem sua Uniformidade analisada diariamente conforme recomendações do IAEA e do fabricante. Registraram-se diariamente os valores de Uniformidade, temperatura e umidade ambiente, tensão e corrente. **Resultados:** Por meio do termohigrômetro e do MUG, verificamos a possível constância das grandezas avaliadas. A variação de temperatura ocorre entre os 23 e 25 C e a umidade entre 36,5 e 51%, o que indica uma faixa de variação muito reduzida. Apesar da umidade apresentar certa variação, quando confrontado com a Uniformidade percebe-se que esta não é significativa. O fabricante sugere que não se exponha o detector a variações de temperatura superiores a 5 C/hora e que os limites sejam de 15 e 27 C. A temperatura média verificada foi de 20,55 C, não havendo variação de 5 C e a variação de umidade indicada pelo fabricante é de 20 a 80%, e em nossa análise verificamos uma média de 44,75%. O fabricante define a tensão de entrada 120 V ($\pm 10\%$) e a média encontrada foi de 112 V ($\pm 6\%$). A corrente de entrada é fixada em 5 A ($\pm 10\%$), sendo que a média foi de 6,16 A ($\pm 1,2\%$). **Conclusões:** Neste trabalho, percebemos que todas as grandezas analisadas não interferem na Uniformidade medida para este sistema SPECT. Além disso, constatamos que não há porque imaginar que possa haver desgaste elétrico no sistema, se o nobreak estiver em bom funcionamento, bem como atribuir à falta de qualidade da imagem, à tensão e a corrente recebida ou a variações de temperatura e umidade se essas grandezas permanecerem controladas e constantes. Verificamos, a partir da análise realizada, que as variações percebidas na Uniformidade são muito pequenas (para este sistema) de modo que as grandezas analisadas não interferem significativamente na mesma.

• Tema Livre •

EFFECT OF RECOMBINANT TSH (rTSH) ON IODINE-131 RESIDENCE TIME AND DOSIMETRY ON THYROID GLAND: FINAL RESULTS.

Maria Inês Calil Cury Guimarães(1); Márcia Augusta da Silva(2), Hélio Yoriyaz(2); Carlos Alberto Buchpiguel(1); Kayo Okazaki(2); Paulo Bartolini(1).

(1)Centro de Medicina Nuclear do Hospital das Clínicas da Universidade de São Paulo; (2)Instituto de Pesquisas Energéticas e Nucleares – IPEN-CNEN/SP.

Introduction: Patients with total thyroidectomy are strongly depended on hormone reposition therapy to maintain a normal metabolic status. The hormone therapy is mandatory for serum TSH levels suppression and for avoiding undesirable symptoms of hypothyroidism such as tiredness and slowness. However, patients with differentiated thyroid carcinoma need at least two whole body iodine-131 surveys within the first 2 years of total thyroidectomy, which requires increased levels of serum TSH to residual thyroid tissue or even metastases. Recombinant human thyrotropin (rTSH) was developed to avoid the interruption on hormone therapy, which brings comfort and safety to the patient. **Objective:** Our purpose was to estimate the effect of rTSH on thyroid-absorbed dose and total glandular residence time after an oral administration of iodine-131. **Methodology:** In this experimental model, 27 Wistar rats, 200 g of weight each, received 11,1 MBq of I-131 orally. Nine of these animals received rTSH (IPEN-CNEN) and, nine received Thyrogen (Gensyme), respectively, on the day before. Twenty four hours urine was collected for each animal. The urine was collected in metabolic cages and the tube collectors that contained the urine were verified on hourly basis. A CRC-15R Capintec dose calibrator was used to determinate their activities. The accumulated activity in thyroid and the residence time were calculated by MIRD standards. The absorbed dose was calculated by the Monte Carlo Method through the program MCNP-4C. **Results:** The accumulated activity of 9 rats who received I-131 without rTSH stimulus was: $\bar{A} = 2087,50 \pm 374,11$ MBq.h and the average residence time was: $RT = 188,00 \pm 33,69$ h. The 9 rats who ingested I-131 preceded by Thyrogen presented accumulated activity on thyroid: $\bar{A} = 2105,26 \pm 328,01$ MBq.h. The residence time was: $RT = 189,70 \pm 29,56$ h. The 9 rats who ingested I-131 preceded by rTSH/IPEN presented accumulated activity on thyroid: $\bar{A} = 2291,11 \pm 514,40$. The residence time was: $204,80 \pm 46,57$ h. The absorbed dose in thyroid was respectively: $D = 2.295,8$ Gy (I-131), $2.315,4$ Gy (Thyrogen) and $2.522,6$ (rTSH – IPEN). **Conclusions:** These data suggest that rTSH promotes rates of accumulated activity of I-131 in the thyroid gland and also prolongs the residence time of iodine in normal glands, in this case about 10%. So far, these preliminary results had not been associated with an increase in the genetic damage.

• Painel •

HIGH SPATIAL AND TEMPORAL RESOLUTION SCINTIGRAPHIC IMAGES OF SMALL VOLUMES USING CODED MASKS AND STANDARD CLINICAL GAMMA CAMERAS.

Jorge Mejía; Orfa Y. Galvis-Alonso; João Braga; Ricardo Corrêa; João Leite; Marcus V. Simões.

Divisão de Astrofísica – INPE; Departamento de Biologia Molecular – Famerp; Departamento de Neurologia e Medicina Nuclear – USP-RP.

Rationale: Non invasive imaging techniques, used in experimental protocols with small animals, are very powerful tools for making sequential in vivo studies on the same subject, so reducing research time and costs and providing more reliable results. These techniques can be very useful for studies of human diseases, and discovery and development of new drugs. **Objectives:** Given the small size of some animal organs, we propose to implement hardware and software techniques which allow us to obtain high spatial (better than 1 mm) and temporal (equivalent to that of clinical studies) resolution scintigraphic images of small volumes using conventional clinical SPECT gamma cameras. The proposed techniques include coded mask-based multipinhole collimators and iterative image restoration algorithms. **Method:** In order to reach high spatial resolution in scintigraphy, it is necessary to reduce the collimator hole size (in pin-hole or parallel-hole collimators), conveying a simultaneous reduction in camera's sensitivity. Initially, we have made Monte Carlo simulations (MCS) of a pinhole collimator camera with inserts of different sizes to gain a better understanding of those effects. After that, MCS of the effect of a multipinhole collimator (1-mm size), based on a MURA 7x7 coded mask, were carried out. We built and tested this collimator with a Siemens Orbiter NaI(Tl)-based clinical gamma