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RENAL FUNCTION EVALUATION BY Tc-99m-DTPA IN ATHLETIC HORSES.

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The aim of this study was to measure the glomerular filtration rate (GFR) in athletic horses of Three Days Events Competition – a sport model for horses seemed with Triathlon Competition for men –. The GFR was measured by the single injection method using Tc99m-DTPA. This method uses a two-compartment blood clearance curves to calculate GFR, at rest and after exercise. Mean GFR was $160,0 \pm 50,0 \text{ mL}/100 \text{ kg}/\text{min}$, at rest, and $158,2 \pm 64,8 \text{ mL}/100 \text{ kg}/\text{min}$, after exercise. Significant ($P = 0,29$) difference was not observed in the Wilcoxon Test ($W = 1,05$). This study show that the Tc99m-DTPA blood clearance method is a practical procedure to measure GFR in the horse, because it not require urine collection, a very difficult procedure in this animal specie. The results show that there were no significant differences between the GFR at rest and after the exercise.

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99mTc-DIMERCAPTOSUCCINIC ACID (DMSA) ABSOLUTE RENAL UPTAKE WITH NEW KIT FORMULATION FROM CENTRO DE RADIOFARMÁCIA – INSTITUTO DE PESQUISAS ENERGÉTICAS E NUCLEARES (IPEN-CNEN).

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Introduction: 99mTc-dimercaptosuccinic acid (DMSA) is used for static renal imaging. Renal scintigraphy with 99mTc-DMSA is a well-known procedure for assessment of renal morphology and relative function. Absolute uptake measure is desirable to evaluate decreased individual renal function or to determine if there is kidney function deterioration resulting in low bilateral renal concentration when both kidney were affected. It has been shown that organ distribution of 99mTc-DMSA can be modified markedly by method of preparation, especially the original pH and lyophilized kit composition. The aim of this study was to evaluate de the normal ranges for absolute uptake of new DMSA kit formulation. **Material and methods:** A total of 23 voluntaries adult normal patients were evaluated with ages that ranges from 18 to 69 years median 42.60 and standard deviation 13.69, between April and June of 2006. A commercial IPEN kit for labeling DMSA with 99mTcO₄ was used and prepared according to the instructions of the manufacturer. A dose of 111 MBq was intravenously injected. Six hours later scintigraphy of the kidneys was performed using a gamma camera with a parallel-hole, low-energy, high-resolution collimator, on 128x128 matrix. One minute duration images were made for at posterior position to renal counts right and left. For determination of the absolute 99mTc-DMSA uptake, liquid dose injected was calculated measuring syringe activity before and after administration to the patient. Determination of renal depth was made by means of software that makes correction using Raynaud formula. **Results:** Values of right kidney 99mTc-DMSA uptake ranged from 19.16 to 31.58. A mean value of 25.84 and standard deviation of 3.47 were found. Left kidney values ranged from 21.3 to 33.4. The mean value and the standard deviation found were respectively 27.40 and 3.51. **Conclusion:** Our data suggest that the newly synthesized 99mTc-DMSA by IPEN have uptake values similar to those founded in national and international literature. Based on our initial results, further evaluation with a larger number of patients will be necessary to determinate more accurate means values.

Oncologia

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APLICAÇÕES DA MEDICINA NUCLEAR NO DIAGNÓSTICO E TERAPIA DO HEPATOCARCINOMA: RELATO DE 2 CASOS E REVISÃO DA LITERATURA.

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Objetivo: Relatar dois casos em que a medicina nuclear (MN) contribuiu na conduta de pacientes com hepatocarcinoma (HC). Fazer breve revisão da literatura sobre o tema. **Métodos e resultados:** *Caso 1:* Paciente do sexo masculino, de 67 anos, apresentando nódulo hepático suspeito. Uma cintilografia com hemácias marcadas excluiu a presença de hemangioma. ATC abdominal evidenciou lesão extensa e mal definida no segmento IV, sugestiva de HC. Uma biópsia confirmou o diagnóstico. Decidiu-se pela embolização da lesão com lipiodol- I131. Uma cintilografia com MAA-99mTc foi indicada para excluir a presença de shunt hepato-pulmonar. Após a cateterização da artéria hepática, infundiu-se 60 mCi de lipiodol- I131. O paciente foi submetido a cintilografia e TC de controle. As imagens da TC foram fundidas às cintilográficas (SPECT) e revelaram presença focal do lipiodol - I131 na lesão hepática. O paciente evoluiu clinicamente bem no seguimento de três meses. *Caso 2:* Paciente do sexo feminino, de 72 anos, submetida a exérese de HC no lobo direito, há 10 anos. Evoluiu com redução dos marcadores tumorais e tomografias negativas. Há três meses uma TC evidenciou nódulos hepáticos sugestivos de recidiva. Foi encaminhada à MN, onde realizou SPECT hepático 48 horas após injeção de 7 mCi de gálio-67 e 15 minutos após administração de 10 mCi de fitato-99mTc. As imagens revelaram três áreas hipercaptantes ao gálio-67 em correspondência com áreas hipocaptantes ao fitato-99mTc, na mesma topografia das lesões assinaladas pela CT, reforçando o diagnóstico de recidiva tumoral. **Discussão:** A cintilografia hepática com hemácias marcadas é indicada para excluir a presença de hemangiomas. O gálio-67 exibe um padrão de hipercaptação em cerca de 90% dos HC. O estudo hepático com radiocolóides é útil no diagnóstico diferencial da hiperplasia nodular focal (HNF) e apresenta hipocaptação em lesões de outra natureza. O DISIDA-99mTc pode demonstrar hipercaptação precoce na HNF e tardia no HC. A pesquisa de shunt hepato-pulmonar é realizada através da cateterização da artéria hepática e infusão do MAA-99mTc. Tanto o FDG-18F quanto o acetato-11C são traçadores de PET utilizados na avaliação do HC. O tratamento paliativo do HC com lipiodol-131I apresenta taxa de resposta de 17 a 92%. Outra opção terapêutica, com eficácia semelhante, são as microesferas marcadas com 90Y. **Conclusão:** A MN pode contribuir de forma significativa para o diagnóstico e terapia de lesões de HC.

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BONE MANIFESTATION OF THE RICHTER'S SYNDROME (RS) – RARE PATHOLOGY ASSESSED BY THE NUCLEAR MEDICINE. CASE REPORT AND LITERATURE REVISION.

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Introduction: Patients with chronic lymphoid leukemia (CLL) rarely develop diffuse large B-cell lymphoma, known as RS. The transformation of CLL in lymphoma has incidence of 3 to 5% and they attack a lymph node, or more frequently, a group of lymph nodes. However, in some patients, the extranodal location has been observed. The prognostic regarding patients that develop RS is not a good one.

The bone scintigraphy has high sensibility to detect osteoblastic lesions. Scintigraphy with gallium-67 is an effective method with high sensibility to locate the sites of lymphoma and evaluate the activity of the disease, being an important exam for follow-up and even prognostic for patients in treatment. **Objective:** To report a rare case of bone lymphoma as first manifestation of CLL-RS. **Case report:** A.F., 83 years old, male, forwarded to our care due to pain and a swelling of his right leg, which had been going on for a month already. The simple initial x-ray showed lytic lesion in the right tibial shaft. Anatomicopathological and immunohistochemical studies of biopsy of the right tibial shaft evidenced diffuse large B-cell non-Hodgkin's lymphoma. The blood count showed leukocytosis with almost absolute predominance of lymphocytes (90%); the myelogram evidenced hypercellularity constituted by 92% of lymphocytes. Immunophenotyping of the bone marrow peripheral blood was performed, showing CLL. The negative result of Cyclin D1 accomplished by PCR, excluded mantle cell lymphoma. The three-phase bone scintigraphy revealed an increased blood flow and vascular permeability, in accentuated degree, in the right leg. In the delayed image, the photopenic lineal area was observed occupying the pretibial right area with intense hyperconcentrated halo of radiopharmaceuticals that extended itself up to the posterior face of the tibial shaft. Scintigraphy with gallium-67 showed important anomalous uptake of the radiotracer in the medium third of the right tibial shaft with a swollen aspect. Patient initiated CHOP chemotherapy scheme, with clinical improvement after the second session. **Comments:** Bone scintigraphy was decisive in the diagnosis of the single focus in the appendicular skeleton and in the lesion extension evaluation, alerting the risk of pathological fracture. Scintigraphy with gallium-67 was indispensable in the detection of a rare pathology and it is of paramount importance for follow-up of the therapeutic answer.

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FDG PET AND PET/CT: A QUANTITATIVE INVESTIGATION OF THE NORMAL DISTRIBUTION IN THE GI TRACT.

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Aim: To determine 1: the qualitative and semi-quantitative distribution of 18F-FDG in the normal colon; 2: to assess the impact of PET versus PET/CT in this context and 3: to compare the differences between PET and PET/CT caused by the effect of oral contrast in PET/CT. **Material and methods:** Sixty six patients (46 with PET and 20 with PET/CT) that performed scans for breast cancer or paraneoplastic syndrome were retrospectively investigated. These two pathologies were considered least likely to affect the colon. Patients with known colonic disease were excluded. The uptake on the colon was qualitatively analyzed from 5 regions (ascending, transverse, descending, sigmoid and rectosigmoid) according to 4 patterns (A- no uptake, B- focal uptake, C- diffuse uptake and D- diffuse + focal uptake) and graded as: 0- no uptake, 1- mild uptake (less than or equal to bone marrow), 2- moderate uptake (between bone marrow and liver), 3- significant uptake (similar to liver) and 4- major uptake (greater than liver). The SUVmax for the liver and of the different colonic regions was also measured. **Results:** The mean SUVmax, min and max values for each region were as follows: Without oral contrast – liver: 2.3 (1.4-4.1), ascending: 1.8 (0.6-6.2), transverse: 1.9 (1.0-3.5), descending: 2.0 (1.4-3.5), sigmoid: 2.2 (1.1-4.0) and rectosigmoid: 2.2 (1.4-4.1). With oral contrast – liver: 2.4 (1.8-4.2), ascending: 2.4 (0.6-7.0), transverse: 2.3 (1.1-4.9), descending: 2.7 (1.4-10.0), sigmoid: 2.0 (0.6-3.1) and rectosigmoid: 2.9 (1.8-6.8). There was no significant difference between the patterns of uptake on the PET group (without oral contrast) and the PET/CT group (oral contrast given). In both groups the diffuse pattern (C) predominated with 40% and 41% of the segments analyzed presenting this pattern respectively. On the other hand, the use of oral contrast increased the number of segments that were graded as 3 and 4. This was corroborated

by an increase of 15 to 20% in the value of the mean SUVmax in the 5 colon segments after oral contrast intake. In both groups the rectosigmoid region presented the highest SUV values. One of the patients presented a SUVmax of 10 on the descending colon while his liver SUVmax was 2.2. After further investigation this patient was subsequently discovered to have inflammatory bowel disease. **Conclusion:** The normal FDG uptake in the different colon segments is variable but the degree of uptake is usually close to liver activity. The use of oral contrast agents doesn't seem to change the pattern of distribution but it increases the magnitude of uptake. Values of SUVmax much greater than 3 should be further investigated since bowel pathology must be excluded.

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FDG-PET IN THE EVALUATION OF PRIMARY CARDIAC LYMPHOMA. CASE REPORT.

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Primary cardiac lymphoma (PCL) is a rare and usually fatal malignancy classically defined as a non-Hodgkin's lymphoma (NHL) involving only the heart and/or pericardium. Due to the heterogeneous clinical presentation and rarity the diagnosis is often difficult and is not infrequently made until autopsy. There is little consensus on management of this NHL, including the best modality of medical imaging for diagnosis and monitoring therapy. We report on a 48 year old man with progressive dyspnea and cervical pain as initial symptoms. He had a definitive pacemaker implanted previously as a consequence of a total atrioventricular block after multiple ablations of atrial flutter and ventricular tachycardia. Transesophageal echocardiograph showed intracardiac mass and pericardial effusion. Histology attained by catheter-guided biopsy showed a diffuse large B cell lymphoma. Systemic chemotherapy with six cycles of the combination of monoclonal anti-CD20 antibody (rituximab), cyclophosphamide, vincristine and prednisolone was given at 21-day intervals, adriamycin was not administered because of low heart function (LVFE 30%). Anatomical imaging with computed tomography (CT) and functional imaging with positron emission tomography using 2-[18F] fluoro-2-deoxy-D-glucose (FDG-PET) with rigorous low carbohydrate diet, to minimize cardiac uptake, was used in the primary staging. The anatomical extent and metabolic activity of the lymphoma was demonstrated with the combination of CT and PET scanning. Magnetic resonance imaging was not performed because of definitive pacemaker. While chemotherapy is the only effective treatment of PCL, early post-chemotherapy period is considered critical because of the fatal complications. FDG-PET scan after second cycle of chemotherapy demonstrated important reduction of metabolic activity of the lymphoma, indicating good response to chemotherapy. In this unusual and potentially dangerous clinical setting, the evaluation of metabolic changes of the PCL after two cycles of chemotherapy may help risk-adapted treatment strategies.

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FEOCROMOCITOMA INTRATORÁCICO – RELATO DE CASO E REVISÃO DE LITERATURA.

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Introdução: Feocromocitoma é um tumor raro das células cromafins, produtoras de catecolaminas. A maioria dos feocromocitomas deriva da medula adrenal, mas nos adultos cerca de 10% são extra-adrenais e podem acometer abdome (85%), pelve, tórax e pescoço. Dos

tumores extra-adrenais apenas 2% são encontrados na cavidade torácica e 1% no mediastino. Nos adultos as lesões extra-adrenais são malignas em 30 a 40% dos casos. Os sinais e sintomas encontrados em pacientes portadores de feocromocitoma são conseqüências diretas dos efeitos cardiovasculares, metabólicos e viscerais das catecolaminas, embora nem sempre seja possível correlacionar o quadro clínico com os níveis destas aminas. **Relato do caso:** Paciente do sexo masculino, 16 anos de idade, com história de crises hipertensivas. Durante a investigação realizou radiografia, tomografia computadorizada (TC) e ressonância magnética (RM) de tórax que mostrou massa mediastinal posterior, paravertebral direita, medindo cerca de 6,0 cm, com área central de necrose e componente cístico no interior, além de erosão óssea da sétima vértebra, sétima e oitava costelas desse lado. A cintilografia com metaiodobenzilguanidina (MIBG)- 131I evidenciou concentração anômala do radiofármaco na região posterior do hemitórax direito. **Discussão:** Dentre os métodos anatômicos a TC e a RM apresentam sensibilidade entre 90 e 95%, sendo a ressonância superior na detecção de tumores extra-renais. Porém, ambos possuem baixa especificidade, até 50% segundo alguns autores. O estudo funcional atualmente mais utilizado, especialmente onde há limitação na disponibilidade de estudos com PET, é a cintilografia com MIBG-131I. A sensibilidade do MIBG para feocromocitoma é de 80 a 90%, especificidade de 95 a 99% e apresenta maior acurácia em relação à TC e RM para tumores extra-adrenais. Outra vantagem da cintilografia com MIBG é a pesquisa do corpo inteiro, na avaliação de metástases. O caso apresentado destacou a importância da associação da clínica e dos métodos de imagem na confirmação do diagnóstico. Portanto, esses métodos podem ser utilizados no rastreamento familiar do paciente, já que aproximadamente 10% desses tumores têm caráter familiar.

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HEPATOCELLULAR CARCINOMA THERAPY WITH 131I-LIPIODOL AND SPECT/CT IMAGING CONTROL: CASE REPORT.

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Aim: To report a case of a patient with hepatocellular carcinoma (HCC) submitted to intra-arterial therapy with 131I-lipiodol and SPECT/CT imaging control. **Methods and results:** Male patient, 67 years old, cirrhotic, recently presenting low platelets blood count. An abdominal ultrasonography revealed liver nodules in segments II and V. Tumor markers were all normal apart from CA 19.9, which was slightly increased. One liver scan using labeled red blood cells excluded the presence of hemangioma. A multi-slice abdominal CT depicted one lesion involving segments IVA and IVB, 102 x 72 mm in diameter, suggesting an HCC. A CT guided biopsy specimen revealed morphology and immunohistochemistry characteristics that confirmed the diagnosis of HCC. As the surgery was not indicated (due to the lesion size), embolization with 131I-lipiodol was considered. A 99mTc-MAA scan was performed to exclude a liver-lung shunt (contraindication for the procedure). The embolization was performed via the hepatic artery branch responsible for the lesion blood supply, followed by the infusion of 60 mCi (2200 MBq) of 131I-lipiodol and 20 mg of mitomicin D. The patient stayed in a shielded ward for 4 days. After 4 and 5 days he had a multi-slice abdominal CT and scintigraphic control respectively. Besides whole body images, a liver SPECT before and after the administration of 10 mCi (370 MBq) of 99mTc-fitate was performed. The last CT revealed a reduction of the tumor volume (70 x 54 mm). The SPECT images were registered and fused with the CT images using a fusion software (Xeleris, GE, Milwaukee, USA) and revealed a focal uptake of 131I-lipiodol corresponding to the hepatic lesion seen on the CT. The patient was clinically stable at the 3 months follow-up after the procedure. **Conclusions:** Intra-arterial therapy with 131I-lipiodol mitomicin D contributed to a good clinical follow-up of the patient and reduction of the volume

of the lesion. Image fusion (SPECT/CT) can provide a precise evaluation of the area submitted to embolization.

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HIGH 18F-FDG UPTAKE IN BRONCHIOALVEOLAR CARCINOMA: REPORT OF 2 CASES.

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Objective: To report on 2 cases of high 18F-FDG uptake in bronchioalveolar carcinomas. **Methods:** Two male patients, one with 76 years of age and the other with 54 years of age, with biopsy proven bronchioalveolar carcinoma (the first patient had a focal type of tumor and the other one had a diffuse, multi-focal type), were submitted to a whole-body PET/CT study 1 hour after an intravenous injection of 395.9 MBq (10.7 mCi) and 344.1 MBq (9.3 mCi) of 18F-FDG in a dedicated scanner, followed by fully diagnostic CT images after an intravenous injection of non-ionic iodinated contrast of the same region. **Results:** In the first case, there was irregular nodular opacity in the right lung apex, with markedly increased metabolic activity (SUV = 7.6). In the second case, there was a mixed infiltrate in the posterior aspect of the lower pulmonary lobe bilaterally, especially on the left side, where there was also a more solid component. These abnormalities had a moderately increased 18F-FDG uptake, with some focal areas of markedly increased tracer uptake within it. **Conclusions:** Traditionally, bronchioalveolar carcinoma has been described as with low or absent 18F-FDG uptake, due to its slow growth pattern, low cellularity and large mucinous component. Due to its low sensibility in this histological subtype of tumor, 18F-FDG-PET/CT has not been used in the routine workup of these patients. However, in some cases, especially in the multi-focal type of tumor, 18F-FDG uptake may be high, just as it would be in a less differentiated adenocarcinoma of the lung, allowing it to be used as a staging tool and possibly in the follow up of these patients.

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HIGH-GRADE MUCOEPIDERMOID CARCINOMA OF THE ACCESSORY PAROTID GLAND WITH DISTANT METASTASES IDENTIFIED BY 18F-FDG PET-CT IN A CHILD.

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Aim: To report a rare case of a metastatic mucoepidermoid carcinoma (MEC) arising from the accessory parotid gland in which an 18F-FDG PET-CT study helped to confirm the recurrence and to depict multiple sites of distant spread. **Methods:** A 14-year-old male presented with a lump in his right cheek six weeks after falling from a trampoline. As the mass continued to grow, he underwent an ultrasound guided fine needle aspiration (FNA), which demonstrated a glandular tumour in the anterior parotid gland. In the pre-surgical assessment the MR and CT showed no other abnormalities apart from the primary lesion. The lesion was excised and confirmed as a high grade mucoepidermoid carcinoma. Four months later he presented a site of recurrence in his right temple. An 18F-FDG PET-CT was requested to look for other sites of spread. **Results:** The PET-CT scan showed 18F-FDG avid metastases in the left tonsillar region, left posterior triangle and level II cervical nodes. In the right lung there was a FDG avid mass along the posterior part of the right main bronchus, a nodule along interlobar fissure and a nodule along posterior pleural surface of the right lower lobe. In the left lung field there was a nodule in the anterior cardiophrenic area. A biopsy of a cervical node confirmed the distant spread of the disease. In view of the findings and poor prognosis of the patient, surgical intervention and radiotherapy were avoided and palliative measures were set in place. **Conclusion:** This case shows the potential of molecular imaging with

18F-FDG PET-CT in these patients and the findings suggest that therapeutic decisions in patients with MEC should include 18F-FDG PET-CT scanning in addition to conventional imaging and histological grading.

• Tema Livre •

IMPACT OF [F-18] FDG PET-CT ON THE MANAGEMENT OF PATIENTS WITH MALIGNANT MELANOMA.

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Introduction: A small number of studies have shown the impact of positron emission tomography (FDG-PET) on the management of patients with malignant melanoma, but none of them have addressed this issue with PET-CT. **Purpose:** The aim of this retrospective study was to assess the impact of FDG with PET-CT on the treatment of patients with malignant melanoma. **Methods:** The medical records of 56 patients (26 females, 20 males; ages ranging from 27 to 77 years, mean 53 years) were reviewed. Treatment planning before and after FDG PET-CT was evaluated for changes in the management of the disease. FDG PET-CT scans were performed in patients with stages II (6/56), III (14/56) and IV (36/56) disease. All patients were injected with 370 MBq of [F-18] FDG and imaged from head to feet 60 minutes later using oral contrast. Patients were required to fast for 4-6 hours and blood glucose levels were required to be below 140 mg/dl prior to the radiotracer injection. Images were performed in a 2-slice PET-CT (Siemens Biograph). **Results:** In 12/56 patients (21.4%) treatment was changed after the FDG PET-CT studies. Three of them (25%) were upstaged as a result of FDG PET-CT. Treatment was changed after FDG PET-CT in 4/14 (29%) stage III patients and in 7/36 (19%) stage IV patients. **Conclusion:** FDG PET-CT is most valuable in patients with stage III malignant melanoma, but may also be useful on stage IV disease.

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IN HOUSE PRODUCTION OF ^{99m}Tc-EDDA-HYNIC-[TYR3]-OCTREOTIDE FOR SOMATOSTATIN RECEPTOR SCINTIGRAPHY.

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Aim: Scintigraphy using ¹¹¹In-diethylene-triamine-penta-acetic-acid-D-Phe1-octreotide (DTPA-octreotide) gained widespread acceptance. Radio-labelling of peptides with indium-111 has some drawbacks, including suboptimal gamma energy. Recently, a new technetium labeled peptide was developed. The somatostatin analogue is an octreotide derivative with high specific tumor uptake, and showed promising results in the detection of neuroendocrine tumors. **Methods:** Reagents were purchased from Sigma-Aldrich. HYNIC-[Tyr3]-octreotide (HYNIC-TOC) was purchased from PiChem. ^{99m}TcO₄- was obtained from commercial ⁹⁹Mo/^{99m}Tc generator produced by G.E. Healthcare. Radio-labeling experiments were performed using the protocol issued by the University Hospital of Innsbruck. Overall the following formulation and labeling conditions with reproducible labeling yields of >90% were established: 20 mg HYNIC-TOC, 10mg EDDA, 20 mg tricine, 10 mg SnCl₂. 2H₂O, pH 6.5–7.5, labeled with 1200 MBq ^{99m}TcO₄- in a total volume of 2 ml, reaction time: 10 min in boiling water. Quality control was performed as follows: HPLC: Reaction solutions were tested for radiochemical purity by HPLC. Column: Dionex Acclaim 300 ODS 5 µm, 4.6 mm x 250 mm. Mobile phase: linear gradient of increasing concentrations of ACN in 0.01 N phosphate buffer pH 6,2: 0–3 min

0% ACN, 3–5 min 0% 25% ACN, 5–18 min 25% ACN, 18–22 min 25%–70% ACN, 22–24 min 70%, 24–25 70%–0% ACN 25–30 min 0% ACN. Flow rate: 1 ml/min. Detection: a sodium-iodide detector interfaced to a multichannel analyzer (Raytest). Thin-layer chromatography: instant thin-layer chromatography on silica gel (ITLC-SG, Gelman Sciences) was performed using different mobile phases. Sep-Pak Purification: A C-18-SepPak-Mini cartridge (Waters) was activated using 5 ml ethanol, followed by 5 ml of water and 5 ml of air. The radiolabeling mixture was passed through the cartridge which was then washed with 5 ml of water. The radiolabelled peptide was eluted with 1 ml ethanol and 1 ml of water. **Results:** This method of preparation has been safely used in more than 30 patients in our Department with always a purity yield of more than 95% with a preparation time of approximately 30 minutes. **Conclusion:** The high specific tumor uptake, rapid blood clearance, and predominantly renal excretion make ^{99m}Tc-EDDA-HYNIC-TOC a promising candidate as an alternative to ¹¹¹In-DTPA-octreotide for tumor imaging.

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LINFOMA CUTÂNEO E SÍNDROME DE SÉZARY (SS) – PATOLOGIA AVALIADA E ESTADIADA PELA MEDICINA NUCLEAR. RELATO DE CASO E REVISÃO DE LITERATURA.

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Introdução: Linfomas de células T (LCT) representam cerca de 15% de todos os linfomas não-Hodgkin. Esses podem ser clinicamente agressivos e relativamente raros quando comparados aos linfomas B. Linfoma cutâneo de células T, conhecido como Mycosis fungoides (MF) é caracterizado pelo acometimento cutâneo local ou disseminado da doença. Em raros casos, evolui para forma sistêmica, onde outros órgãos são acometidos, caracterizando a Síndrome de Sézary. O prognóstico de pacientes com MF depende do estágio, do tipo, da extensão das lesões cutâneas e da presença de doença extracutânea. A expectativa de sobrevida em dez anos é de 98% em pacientes em estádios precoces, diminuindo em estádios mais avançados, sendo de 83% em pacientes com envolvimento superior a 10% da superfície da pele; 42% com tumoração e de 20% naqueles com envolvimento linfonodal. A cintilografia com gálio-67 é método efetivo com alta sensibilidade em localizar e determinar a atividade nos sítios de linfoma, sendo importante exame para estadiamento, seguimento e prognóstico dessa patologia. **Objetivo:** Relatar um caso de linfoma cutâneo disseminado com acometimento sistêmico – Síndrome de Sézary, por meio da cintilografia com gálio-67. **Relato de caso:** AHW, 65 anos, feminina, com queixa de lesão cutânea nodular em glúteo direito, iniciada há cinco meses, com posterior ulceração e disseminação para outras regiões cutâneas. A biópsia revelou linfoma maligno não Hodgkin difuso de células T. O hemograma mostrou leucocitose com predominância linfocítica de 64%. O esfregaço evidenciou presença de linfócitos de tamanho médio, núcleos com contornos irregulares, alguns convolutos, cromatina com maturação intermediária, citoplasma com microvacúolos. Essas células representaram maioria da população linfóide. As sombras nucleares foram raras. A imunofenotipagem das células do sangue periférico revelou presença de 94% de linfócitos T e 1% de linfócitos B-CD19+. Os linfócitos T apresentaram o seguinte perfil CD3+, CD2+, CD5-, CD7+, CD4+, CD8-, CD1-, TCR alfa/beta+, CD16-, CD56-, CD57-. Este fenótipo é compatível com síndrome de Sézary (SS). O mielograma foi compatível com diagnóstico de infiltração de medula óssea por linfócitos. A cintilografia com gálio-67 revelou múltiplas lesões gálio-captantes cutâneas e extracutâneas ativas, localizadas em mediastino; região infra-mamária, hemibacia, raiz da coxa (partes moles), glúteo e terços médio e distal do fêmur à direita; terço médio de coxas (partes moles) e região inguinal esquerda, sendo submetida ao esquema quimioterápico com Gemcitabina. **Comentários:** A cintilografia com gálio-67 foi imprescindível na de-

terminação do estágio mais agressivo de uma patologia pouco freqüente, revelando sua manifestação cutânea e extracutânea em atividade.

• Painel •

LINFONODO SENTINELA NO ADENOCARCINOMA DE CÓLON.

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Introdução: No câncer colorretal a principal via de disseminação tumoral é a linfática. O acometimento dos linfonodos tem importância no estadiamento, na terapêutica e no prognóstico do indivíduo. O trabalho exposto é um estudo piloto com 4 pacientes, parte de um projeto de pesquisa, tema de mestrado pela Universidade Federal de Minas Gerais (UFMG), iniciado em 2005 após aprovação do Comitê de Ética da Fundação Hospitalar de Minas Gerais (FHEMIG), realizado no Hospital Alberto Cavalcanti, em Belo Horizonte, Minas Gerais. **Objetivos:** Avaliar a viabilidade da pesquisa de linfonodo sentinela em tumores de cólon e comparar a incidência de metástases entre o linfonodo sentinela e os demais linfonodos. **Métodos:** São 4 pacientes de uma série, regida por critérios de inclusão e exclusão, obedecendo ao protocolo descrito a seguir: Primeira Parte: Cirurgia 1- Laparotomia e mobilização do cólon. 2- Injeção de radiotraçador. 3- Identificação intra-operatória dos linfonodos. 5- Colectomia com linfadenectomia e laparorráfia. 7- Mapearmento da peça cirúrgica e realização de imagens cintilográficas. 8- Dissecção de linfonodos e realização de exame anatomopatológico. Segunda Parte: Estudo AnatomoPatológico 1- Rotina: hematoxilina-eosina (HE). 2- Multiseções. 3- Imuno-histoquímica. **Discussão:** Podemos observar que a técnica é executável, desde que haja interesse da equipe envolvida e disponibilidade do arsenal necessário. Sendo o linfonodo sentinela o primeiro nodo a receber drenagem tumoral, é maior a probabilidade do mesmo conter metástases. Estes casos devem receber tratamento adjuvante, visando aumento da sobrevida. Assim, o benefício ao paciente fica evidente pela maior precisão do estadiamento linfonodal do câncer colorretal.

• Tema Livre •

MONITORIZAÇÃO RADIOGUIADA INTRA-OPERATÓRIA DAS MARGENS CIRÚRGICAS NO CÂNCER DE MAMA.

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Introdução: Algumas mulheres submetidas a tratamento cirúrgico conservador do câncer de mama apresentam doença residual, devido à falta de métodos eficazes na identificação e ressecção do tumor. **Objetivo:** Avaliar a utilidade de uma técnica intitulada Monitorização Radioguiada Intraoperatória das Margens (RIMM) na ressecção completa do câncer de mama. **Materiais e métodos:** Foram estudadas 23 mulheres portadoras de carcinoma ductal de mama estágio IIA a IIIA com indicação de mastectomia radical, tumor unifocal, unilateral e sem quimioterapia neoadjuvante. Dois a 10 dias antes da mastectomia foi realizada uma cintilografia mamária com 740 MBq de sestamibi-99mTc para avaliar a intensidade e o padrão de captação no tumor e traçar curvas de captação em função do tempo no tumor (alvo) e no tecido mamário normal (radiação de fundo - RF). Foi estimado o tempo ideal para a cirurgia radioguiada, determinado como sendo o momento em que a razão alvo/RF havia sido máxima. Vinte pacientes realizaram, também, ressonância magnética (RM) mamária. Na cirurgia, a mesma dose do sestamibi-99mTc foi administrada. Os tumores foram ressecados com o au-

xílio de um gama-probe. Após a ressecção do tumor, realizou-se a contagem da radioatividade no leito tumoral. As margens que apresentavam contagem maior que a RF foram ampliadas. Em seguida, foi realizada mastectomia radical modificada. O tumor e a mama residual foram examinados histopatologicamente. **Resultados:** Todas as pacientes apresentaram captação tumoral de sestamibi-99mTc, identificada pela cintilografia, possibilitando utilizar a RIMM durante a ressecção tumoral. A média de tempo ideal para RIMM foi de 4,7 minutos após a injeção do radiofármaco. A média de contagens radiativas no tumor foi 286,6 cps e da RF foi 156,9 cps. Foi necessária ampliação em 3 casos, devido a alta contagem no leito tumoral. Em 19/23 pacientes (83%) as margens de ressecção do tumor estavam livres, em apenas 1/23 paciente a margem estava comprometida focalmente por carcinoma invasivo, e em 3/23 pacientes as margens estavam comprometidas focalmente por carcinoma “in situ”. Doze pacientes apresentavam, ainda, lesões multifocais na mama residual, que não haviam sido previamente detectadas pela RM, palpação ou cintilografia. A média do tamanho da doença residual foi 3,7 mm. **Conclusões:** A RIMM é uma técnica que permite auxiliar na ressecção do câncer de mama com margens cirúrgicas livres de doença na maioria das pacientes. A RM, a cintilografia e a palpação podem apresentar limitações na identificação pré-operatória de microcarcinomas multifocais.

• Painel •

OSTEOSSARCOMA MULTIFOCAL (OSTEOSSARCOMATOSE).

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Objetivo: Relatar caso de paciente com múltiplas lesões primárias ósseas, histologicamente compatíveis com osteossarcoma (osteossarcomatose), submetido a tratamento agressivo, e evolução satisfatória em vigência de Quimioterapia. **Relato do caso:** Paciente do sexo masculino, 15 anos de idade, negro, apresentando queixas de dor em joelhos, coluna lombar, emagrecimento de 8 kg e febre intermitente com 2 meses de evolução anteriores à realização da cintilografia óssea. Realizou exames laboratoriais e sorologias sem alterações e radiografia de joelhos que evidenciou lesões focais circulares, de caráter blástico em fêmur distal e tíbia proximal bilateralmente. Solicitada cintilografia óssea que demonstrou doença difusa em todo esqueleto. Submetido à biópsia, visto que não apresentava padrão característico de osteossarcoma, geralmente único e respeitando limites anatômicos. A histologia confirmou osteossarcoma blástico, firmando-se o diagnóstico de osteossarcomatose devido ao acometimento cintilográfico difuso. Paciente foi submetido a 12 ciclos de quimioterapia e retornou ao serviço de medicina nuclear para exame de controle após 8 meses, que demonstrou boa resposta e melhora da qualidade de vida do paciente. **Conclusões:** A osteossarcomatose é uma forma altamente agressiva e relativamente rara de osteossarcoma (1 a 10% dos casos). As múltiplas lesões podem ser decorrentes de tumores primários sincrônicos ou ao aparecimento precoce de lesões secundárias com crescimento rápido. Mesmo quando instituída quimioterapia agressiva, a osteossarcomatose apresenta prognóstico limitado, com curso fatal rápido e sobrevida média de 12 meses.

• Painel •

PET-CT NA AVALIAÇÃO DO LINFOMA: ENSAIO PICTÓRICO.

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Os linfomas, um grupo de doenças malignas que se originam do tecido linfóide, representam cerca de 8% dos cânceres em adultos e 10% dos tumores infantis. São neoplasias potencialmente curáveis, e a taxa de sucesso do tratamento depende da seleção apropriada de modalidades

terapêuticas após o estadiamento acurado e estratificação de risco. A Tomografia por Emissão de Pósitrons (Positron Emission Tomography, PET), devido a sua capacidade de detectar alterações metabólicas, independentemente da existência de alterações morfológicas, é o método de maior sensibilidade e especificidade para a avaliação do linfoma. A fusão com imagens anatômicas, como aquelas obtidas por Tomografia Computadorizada (PET-CT), resulta em aumento significativo da acurácia do teste. Este ensaio pictórico tem por objetivo exemplificar as indicações do PET-CT na avaliação dos linfomas: 1- Estadiamento nodal; 2- Estadiamento extranodal; 3- Avaliação de resposta ao tratamento; 4- Avaliação de lesão residual.

• Painel •

PET-CT NO ACOMPANHAMENTO DO ANGIOSSARCOMA CUTÂNEO PÓS-RADIOTERAPIA MAMÁRIA.

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Introdução: O angiossarcoma iatrogênico após o tratamento do câncer de mama, quando atribuído à presença de linfedema, é conhecido por síndrome de Stewart-Treves. Com o crescente uso do tratamento conservador do câncer de mama, seguido de radioterapia adjuvante, uma nova forma de angiossarcoma cutâneo pós-radioterapia mamária (AC-PRM) tem sido descrita. **Objetivo:** Relatar um caso em que as imagens de PET/CT foram úteis para estadiar e acompanhar o tratamento do ACPMR. **Métodos:** Paciente do sexo feminino, 65 anos, há 15 anos havia realizado quadrantectomia de mama direita por carcinoma ductal infiltrante, seguida de linfadenectomia axilar. Logo após, foi submetida a quimioterapia e radioterapia local. Há dois anos, apresentou lesão na pele da mama direita, com característica bolhosa e coloração violácea. Foi realizada biópsia, seguida de exploração cirúrgica, cujos estudos anatomopatológicos mostraram angiossarcoma cutâneo com extensão para o tecido mamário direito. Foi tratada com mastectomia radical modificada, seguida de quimioterapia. Há um ano iniciou quadro de hemoptise e dispnéia progressiva. Realizou tomografia computadorizada que mostrou lesão em pulmão esquerdo, ressecada cirurgicamente. Para avaliar a extensão da doença, foi indicado PET/CT. **Resultados:** O PET/CT evidenciou extensas lesões hipermetabólicas no pulmão e pleura esquerdos, no mediastino e na parede torácica anterior à direita. A paciente foi submetida a tratamento quimioterápico de resgate. Novo PET/CT evidenciou o desaparecimento das lesões no pulmão esquerdo, parede torácica direita e mediastino e redução significativa da atividade metabólica das lesões pleurais. **Conclusão:** As imagens de PET/CT foram úteis para avaliar a extensão da doença para e acompanhar o tratamento deste caso de ACPMR.

• Painel •

RADIOGUIDED SURGERY IN CERVICAL NODE METASTASIS OF PAPILAR THYROID CANCER: REPORT OF 2 CASES.

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Aim: To demonstrate the importance of radioguided surgery in 2 cases of cervical node metastasis by papillary thyroid cancer. **Methods:** Two young female with papillary thyroid cancer were submitted to follow-up whole-body imaging, 72 hours after oral administration of 4 mCi (148 MBq) of iodine-131, one year after thyroidectomy and radioiodine ablative therapy. Both exams depicted focal uptake in the cervical region, suggesting lymph node metastasis. The patients performed new scans 72 hours after the administration of 4 mCi (148 MBq) of iodine-131 to mark the areas of uptake on the skin topography, and were submitted to a radioguided surgery on the day after. **Results:** In both cases, cervical lymph nodes were removed and histopathology

confirmed papillary thyroid cancer metastasis. In one patient a node was identified in an unusual location. This patient was submitted to a new radioiodine therapy with 150 mCi and the post-dose scan did not show abnormal uptake, confirming that the metastatic disease was removed. **Conclusion:** Radioguided surgery in cervical lymph nodes metastases of papillary thyroid cancer was useful in the 2 cases reported. This procedure could offer a new therapeutic perspective in some cases of metastatic differentiated thyroid cancer.

• Painel •

REGISTRATION AND FUSION OF MRI AND FDG PET IMAGES TO ASSESS PANCREATIC LESIONS.

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Aim: Our study aimed to evaluate if image registration and fusion, using data acquired on stand alone MRI and FDG PET scanners, is able to increase the diagnostic accuracy of the two single imaging modalities, in the evaluation of pancreatic lesions. **Methods:** We retrospectively evaluate 17 patients (13 male and 4 female), with a mean age of 65.5 y, ranging from 49 to 83 y. All patients were referred for a total-body FDG PET or an abdominal MRI scan for a clinically doubtful pancreas lesion and were studied during a 36 months period. Twelve out of 17 patients were studied for diagnostic and staging purposes, while 5 were evaluated for a suspected post-surgical relapse. Eleven patients had pancreatic adenocarcinoma, 1 a pancreatic neuroendocrine tumor and 5 had no definitive pathologic assessment. The mean interval between FDG PET and MRI assessment was 7 days, ranging from 0 to 28 days. MRI images were acquired on 1.5 Tesla Philips Achieva and Siemens Symphony scanners. Total-body PET images where acquired on a Siemens ECAT Accell LSO scanner, 60 minutes after the injection of 370-500 MBq of 18F-FDG. Patients were fasting for at least 8 hours prior the FDG administration and had blood glucose level below 150 mg/dL. MRI DICOM 3.0 images were imported from the Hospital PACS system on a Siemens Syngo console. Data set from different modalities were registered and fused using Siemens e-soft software, without using external confidential makers. No significant artifacts were encountered during the fusion process. All images were evaluated by consensus between an experienced nuclear physician and an experienced radiologist. **Results:** Diagnostic conclusions were compared with pathology results or follow-up. In 4 out of 17 patients fused images were able to modify the diagnostic conclusion obtained on a single modality. In all cases fusion with MRI helped to improve anatomic localization of lesions seen on PET. Diagnostic accuracy for the single modalities was 76% (13/17) and improved to 94% (16/17) using fused images. **Conclusion:** Our data suggests the use of image fusion between MRI and PET to evaluate pancreatic lesions. Due to the difficulties in the diagnosis of a pancreatic cancer, this approach offers a simple and effective way to improve diagnostic accuracy.

• Tema Livre •

RESPONSE PREDICTION WITH FDG-PET IN MESOTHELIOMA PATIENTS.

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Aim: Response evaluation in malignant pleural mesothelioma (MPM) using conventional criteria based on computed tomography (CT) is particularly difficult, due to its diffuse pattern of growth. Changes in tumor FDG uptake after therapy have been proposed to predict response and patient outcome early in the course of treatment. We aimed to

evaluate FDG PET as a surrogate end-point of chemotherapy response in MPM. **Methods:** Patients with histologically proven MPM, not candidates to curative surgery were eligible. Chemotherapy regimens were single agent pemetrexed at a dose of 500 mg/m² every 3 weeks or pemetrexed 500 mg/m² in combination with carboplatin both given on day 1, every 3 weeks. Treatment was repeated for 6 cycles or until progression or non acceptable toxicity. PET imaging was performed at baseline within 2 weeks before chemotherapy, and was repeated after two cycles. All patients were fasting and had plasma glucose lower than 150 mg/dL. Attenuation corrected whole body scans in 3D mode were acquired 60 min after administration of 250 to 450 MBq of FDG, using a Siemens ECAT Accel LSO scanner. Maximum standardized uptake value (SUV_{max}), corrected for patient's weight was independently measured by two observers on the area of highest tumor related metabolic activity. A decrease of ‍25% SUV_{max} was defined as a metabolic response. Basal and contrast enhanced CT scans of chest and abdomen were performed at baseline and after every two cycles of chemotherapy, within 7 days of PET examination, on a Philips Aura single slice spiral CT system. Best overall response was determined according to published criteria (JCO 2003;21:2636-44). **Results:** Twenty-two patients were included and 20 were assessed for early metabolic response with FDG PET: 8 (40%) were classified as responders and 12 (60%) as non-responders. Early metabolic response was significantly correlated to median time to tumor progression (TTP); median TTP for metabolic responders was 14 months versus 7 months for non responders (p=0.02). On the contrary, no correlation was found between TTP and radiological response evaluated by CT. **Conclusion:** Our data support the use of metabolic response evaluated by FDG PET as a surrogate end-point in MPM. Lack of metabolic response should represent a criterion for early switch to an alternative therapeutic approach.

• Tema Livre •

RETROSPECTIVE ANALYSIS OF 182 RADIOGUIDED SURGERIES.

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Aims: To retrospectively analyze the results of 182 radioguided surgeries assisted by one of our nuclear medicine units. **Methods:** The results of 182 radioguided surgeries, from October 2002 to June 2006, were analyzed. The procedures were: 152 occult breast lesion localization (ROLL), 17 breast cancer sentinel node biopsy (SNB), 07 melanoma lesions SNB, 02 breast lesions SNB and ROLL (SNOLL), 01 radioguided parathyroidectomy and 02 radioguided surgeries of metastatic papillary thyroid cancer. **Results:** Among the 152 patients submitted to ROLL, 1 had atypical ductal carcinoma, 1 “in situ” carcinoma in the right breast and infiltrative ductal hyperplasia in the left breast (ROLL both breasts), 1 patient had sclerotic adenosis, and all the other had benign findings (mainly fibroadenomas). In this group, the method failed to identify the suspect lesion in 4 (2.6%) cases. In 3 patients, the radioactive specimen removed did not correspond to the suspected lesion (2 nodes and 1 microcalcification) and in 1 patient the lesion was not found during the procedure, although previously identified by scintigraphy and gamma-probe “ex vivo”. In the 24 cases of SNB, the sentinel node depicted by lymphoscintigraphy was not identified during surgery in 3 patients (2 with breast cancer and 1 with melanoma). All the other radioguided procedures (2 SNOLL, 1 radioguided parathyroidectomy and 2 radioguided surgeries of metastatic papillary thyroid cancer) had accuracy of 100%. **Conclusion:** The mentioned experience exemplifies the feasibility and utility of different radioguided surgical applications. For the good practice of these precise and less invasive techniques, a multidisciplinary interaction (nuclear physician, radiologist, surgeon and pathologist) is mandatory in order to avoid the few cases of unsuccessful localization.

• Tema Livre •

SENTINEL LYMPH NODE MAPPING FOR COLORECTAL CANCER – IMPORTANCE, TECHNIQUES AND RESULTS.

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Background: Considering that lymph node status is a key factor in colorectal cancer staging, and the main determinant for adjuvant therapy, it may be responsible for a significant increase in colorectal cancer patient survival. Staging methods should be the most accurate in order to offer the individuals the opportunity to be adequate treated to achieve the best possible survival. Sentinel Lymph Node Biopsy (SLN) has been widely applied in the staging of several solid neoplasms including colon and rectal cancer. This method increases sensitivity in detection of positive nodes to reveal a more accurate stage and prognosis in colorectal cancer patients. **Method and Results:** Thirty-four patients diagnosed with colon adenocarcinomas were prospectively investigated and sentinel lymph node was identified in 100% of the cases utilizing either patent blue or in association with radiotracer based on 99mTc-sulphur colloid solution in a randomized study. The mean number of sentinel lymph nodes per patient was 1.96 ranging from 1 to 3 nodes. With the addition of trans operative lymphoscintigraphy five extra sentinel nodes, not identified by the blue dye, were identified and considered for histopathologic study. In five cases (14.7%) the sentinel lymph node was the only site of metastasis being detected by association of hematoxylin-eosin (H&E) staining and immunohistochemical examination. **Conclusion:** We suggest the combined technique for a higher yield and minimal false negatives.

• Tema Livre •

THE POTENTIAL OF FDG PET TO REDUCE UNNECESSARY THYROID SURGERY IN NODULES WITH INCONCLUSIVE FINE-NEEDLE ASPIRATION BIOPSY RESULTS (PARTIAL RESULTS).

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Objective: Cytological examination of fine-needle aspiration biopsy (FNAB) specimens is currently the best method for selecting patients with thyroid nodules for either surgery or observation. However, is inconclusive in about 20% of the patients, when the aspirate does not permit a definite diagnosis of malignancy. In these cases surgery approach is necessary, but up to 80-85% of the nodules prove to be benign. The aim of this study was to evaluate the potential of fluorine-18-fluorodeoxyglucose positron emission tomography (FDG-PET) to reduce unnecessary surgery in the preoperative assessment of thyroid nodules with inconclusive FNAB results. **Methods:** A total of 23 consecutive patients scheduled for surgery because inconclusive FNAB findings participated in this prospective study. FDG-PET (in dedicated equipment) of thyroid region was performed in 27 nodules before surgical resection. Visual analysis and standard uptake value (SUV) were calculated for regions of increased FDG uptake. Final pathologic diagnoses were compared with PET findings. Final pathologic diagnoses were compared with PET findings. **Results:** A total of seven nodules were histologically proved to be thyroid carcinoma (six papillary, 1 follicular) and 20 benign nodules (3 adenomas and 17 degenerative goiters). All malignant lesions were FDG-avid (sensitivity 100% and negative predictive value 100%). FDG accumulated in seven of 20 benign nodules with specificity of 65,0%. The potential to reduce unnecessary thyroid surgery using FDG PET to discriminate benign from malignant lesions was 65%, avoiding 13 surgeries in 20 nodules (Fisher's exact test,

$p=0.0038$). Higher SUV were observed in malignant tumors than in benign nodules, however SUV did not help to further reduce the number of surgeries. **Conclusions:** Our results indicate that FDG-PET provides a high negative predictive value for malignancy, and is a powerful tool in the evaluation of thyroid nodules with indeterminate FNAB, with the potential to reduce drastically the number of unnecessary thyroid surgery.

• Painel •

THE PRESENTATION OF MALIGNANT TUMOURS AND PRE-MALIGNANT LESIONS INCIDENTALLY FOUND ON PET-CT.

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Purpose: The purpose of the study was to determine the general and organ-specific presentation of incidental primary tumours on PET-CT. **Methods:** PET-CT reports of 2,360 consecutive patients were reviewed and revealed 156 lesions suspicious for a new unexpected malignancy, in 151 patients. One hundred and twenty of these lesions, in 115 patients, were further assessed, by biopsy ($n = 84$ patients) or by clinical and imaging follow-up ($n = 31$ patients) for a mean of 17 ± 4 months (range 12-25 months). **Results:** Forty-four unexpected malignancies were found in 41 of the study patients (1.7%). Twenty-seven of the 44 incidental tumours were identified on the basis of their location, which was uncommon for metastasis of the known malignancy. Eight were detected as a result of either the difference in FDG avidity of the known malignancy and the incidental lesion or the presence of an incidental non-FDG-avid mass on the CT part of the study. Four tumours were synchronous carcinomas in patients with known colorectal malignancy, three were identified by virtue of the discordant response to treatment compared with the known primary tumour and two were detected as new sites of disease after a prolonged disease-free period. There was organ variability in the positive predictive values (PPV) of PET-CT findings for incidental primary malignancy or pre-malignant lesions: 62% for colonic lesions, 54% for lung lesions and 24% for thyroid lesions. **Conclusion:** Incidental primary tumours may be identified on PET-CT based on their location, FDG avidity, response to therapy and time of appearance. The PET and CT parts of the study appear to complement each other and assist in identification of these incidental tumours.

• Painel •

THE ROUTINE USE OF FULLY DIAGNOSTIC MULTI-SLICE INTRAVENOUS CONTRAST-ENHANCED CT IMAGES IN DEDICATED PET/CT STUDIES TO IMPROVE DIAGNOSTIC ACCURACY AND PATIENT COMFORT.

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Objective: To go through the routine use of fully diagnostic multi-slice intravenous contrast-enhanced CT images in dedicated PET/CT studies and how it improves diagnostic accuracy and patient comfort. **Methods:** Patients that were submitted to a dedicated PET/CT study in our institution between April and July 2006 are the object of study. They were all submitted to a PET/CT study one hour after an intravenous injection of 5.18 MBq/kg (0.4 mCi/kg) of 18F-FDG in a dedicated scanner. Non-diagnostic CT images for attenuation correction were acquired from the base of the skull to the upper thighs, followed by PET images of the same region. Immediately after that, fully diagnostic CT images were acquired from the head to the upper thighs, after an intravenous injection of 1.2ml/kg of non-ionic iodinated contrast. The total increment of time added to the study was approximately 3 minutes. Non-diagnostic CT images were superimposed to the PET images (image

fusion) for better interpretation. Whenever technically possible, PET images were also fused with the fully diagnostic CT images. CT images were also post-processed with several techniques (MIP – maximum intensity projection, MinIP – minimum intensity projection, VR – volume rendering, MPR – multi projection reformatting, VIP – volume intensity projection), in order to increase diagnostic accuracy also. **Results:** Fully diagnostic CT images were absolutely indispensable for the correct interpretation of the cases in several occasions, helping in better identifying the involved structure, if there were other structures involved and better characterizing types of lesions, especially in the lungs and liver, improving diagnostic accuracy. There were no need for performing other day dedicated CTs of the thorax, abdomen and pelvis, improving patient comfort and reducing costs. **Conclusion:** The routine use of fully diagnostic multi-slice intravenous contrast-enhanced CT images in dedicated PET/CT studies has brought only advantages, with a better diagnostic accuracy and improved patient comfort. Although there is higher patient exposure to radiation on a first moment, there is no need for performing dedicated CT studies in other days, as it would be necessary otherwise, thus keeping patients in safety levels.

• Painel •

THREE-PHASE BONE SCINTIGRAPHY WITH ^{99m}Tc MDP AS A DETERMINANT FOR THE METACHRONOUS CLASSIFICATION OF THE MULTICENTRIC OSTEOSARCOMA. A CASE REPORT AND REVISION OF THE LITERATURE.

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Introduction: Osteosarcoma is the most common osteoblastic malign bone tumor during the first and second decade of life. The disease's multicentric manifestation is very rare and attacks children, developing multiple bone lesions with sclerotic aspect. Prognostic is invariably bad with high mortality. It is divided as synchronous and metachronous. On synchronous, detection of bone lesions occur at the moment of the primary lesion diagnosis and it is called sclerotic multifocal osteosarcoma. On metachronous, lesions appear later, after the primary tumor treatment. Osteosarcoma biological behavior matches the premise that 80% of patients hide micrometastasis in the lungs during diagnosis, reducing the identification of lungs metastases and other parts of the body. Bone scintigraphy is a sensitive method for detection of osteoblastic lesions, being the chosen type of exam for tracing bone metastases. **Objective:** Reporting a case of osteosarcoma with metachronous multicentric evolution through scintigraphy. **Case report:** TCMS, female, nine years old, presented an increased volume on the right knee medial face accompanied of inflammatory signs and difficulty in walking. Magnetic Resonance showed a single lesion on third distal of the right femur with extension to the distal epiphysis associated to a perilesional edema without apparent involvement of adjacent soft tissues. Blood flow, blood pool images and delayed images evidenced a single bone lesion on the right femur third distal, three-phase positive, suggesting osteoblastic osteosarcoma, confirmed by biopsy. Thorax CT evidenced a single tiny nodule in the right hemithorax. Treatment began according to the Brazilian protocol for bone tumors 99, having good clinical response when submitted to surgery with placement of endoprosthesis, however with only 60% of necrosis in the surgical tissue (Huvos Ayala grade II). Submitted to thoracotomy with bilateral metastasis surgical removal via sternum with compromising of 23/24 nodules. In this scenario, the option was a rescue treatment with high doses of Methotrexate, but after four months, patient developed a contralateral knee pain. Bone scan evidenced spread of the disease indicating multiple osteoblastic lesions in the right parietal area, anterior and posterior ribs to the left, proximal extremity of left humerus, left sacro-iliac articulation, right femoral neck, carpal/metacarpal left regions, left femur dis-

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.

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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.

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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.

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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.

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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