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BOOK OF ABSTRACTS

RÉSUMÉS

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l'Association canadienne de médecine nucléaire

001

"STUDY ON CORRELATION OF PROSTATE SPECIFIC ANTIGEN WITH METASTATIC BONE DISEASE IN PROSTATE CANCER ON SKELETAL SCINTIGRAPHY"

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Objective: To evaluate the ability of serum concentration of PSA between two cutting points considering it as a predictor of bone metastasis on bone scan in men with prostate cancer.
Materials and Method: From Aug-2013 to Nov-2013, 42 consecutive patients with prostate cancer who underwent (Tc-99mMDP) whole body bone scan were prospectively analyzed. The information was collected from the scintigraphic database at a Nuclear medicine department SIUT Pakistan. Patients who did not have a serum PSA concentration available within 1 month before or after the time of performing the Tc-99m MDP whole body bone scan were excluded from this study. In addition, all patients necessarily have a pathological report available. Bony metastases were determined from the bone scan studies and no further correlation with histopathology or other imaging modalities were performed. To preserve patient confidentiality, direct patient identifiers were not collected.
Results: The mean age, mean PSA, and incidence of bone metastasis on bone scan were 68.35 years, 370.51 ng/mL and 19/42 (45.23%) respectively. According to PSA levels, patients were divided into 5 groups < 10ng/mL (10/42), 10-20 ng/mL (5/42), 20-50 ng/mL (2/42), 50-100 (3/42), 100-500ng/mL (3/42) and more than 500ng/mL (0/42) presenting negative bone scan. The incidence of positive bone scan (%) for bone metastasis for each group were O1 patient (5.26%), 0%, 03 patients (15.78%), 01 patient (5.26%), 04 patients (21.05%), and 10 patients (52.63%) respectively. From the 42 patients 19(45.23%) presented positive bone scan examination for the presence of bone metastasis. 1 patient presented bone metastasis on bone scan having PSA level less than 10ng/mL, and in only 1 patient (5.26%) with bone metastasis PSA concentration was less than 20 ng/mL. therefore, when the cutting point adopted for PSA serum concentration was 10ng/mL, a NPV for bone metastasis was 95% with sensitivity rates 94.74% and the PPV and specificity of the method were 56.53% and 43.48% respectively. When the cutting point of PSA serum concentration was 20ng/mL the observed results for PPV and specificity were (78.27% and 65.22% respectively) whereas NPV and sensitivity stood (100% and 95%) respectively.
Conclusion: We conclude that serum PSA concentration of higher than 20ng/mL was the more accurate cutting point than a serum concentration of PSA higher than 10ng/mL to predict metastasis on bone scan. In this way unnecessary cost can be avoided, since a considerable part of prostate adenocarcinomas present low serum PSA levels less than 20 ng/mL and for these cases bone scan could be unnecessary.

002

TIMING OF HORMONE WITHDRAWAL IN CHILDREN UNDERGOING I131 WHOLE BODY SCAN (WBS) FOR THYROID CANCER

Raymond Lambert, Sophie Turpin

Objectives: Evaluate the time needed to achieve adequate TSH levels prior to WBS imaging in children with thyroid cancer in the post-operative period or after hormone discontinuation.
Methods: Retrospective study of patients that underwent WBS since 2001, including prior studies if available. Patient's file were reviewed: type and date of withdrawal (T3, T4 or post-operative status without hormonal replacement), TSH levels measured prior to WBS (value and date). One tail Student-T test was used for statistical analysis.
Results: 175 WBS were performed in 66 patients (46 girls, 14.1 +- 2.8 years old and 20 boys ,13 +- 3.2 years old. Thirty-seven WBS were performed 2 to 7 weeks post-operative. TSH levels were 97+-33 for the 11 studies performed at 3 weeks and 117+-63 for the 17 studies performed at 4 weeks (p=0.14). Two patients had TSH < 50

T4 was stopped between 2 and 8 weeks prior to WBS in 101 studies. TSH was 1.78 after 2 weeks discontinuation in one patient. TSH levels were 124+-57 for the 49 studies performed at 3 weeks and 139 +-76 for the 32 studies performed at 4 weeks (p=0.16). TSH levels in the remaining patients were > 50.
T3 was stopped between 1 and 28 days prior to WBS in 37 studies. Cessation less than 7 days was associated with lower TSH levels (61 +_ 38) when compared to cessation between 8 and 14 days (115 +- 54) (p=0.007). Three patients had to rescheduled due to TSH < 30. Two other patients had borderline TSH (41 and 49). A cut off value of 15 days withdrawal was associated with adequate TSH levels in all our patients.
Conclusion: Adequate TSH levels were achieved at 3 weeks post-operative or after T4 withdrawal and at 2 weeks after T3 cessation.

003

RIGHT THORACIC RENAL ECTOPIA, AN UNUSUAL FINDING ON TC-99M MDP (METHYLENE DIPHOSPHONATE) BONE SCINTIGRAPHY; CHEST WITH PUMPING HEART AND EXCRETING KIDNEY!

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Introduction: Thoracic renal ectopia is rare condition. It accounts for about less than 5% of all renal ectopia. It usually remains asymptomatic and mostly diagnosed as an incidental finding on evaluation for any other disease. Thoracic kidney is more commonly found on left side of the thorax with male predominance. Exact cause is not known, but sometimes it is accompanied with other birth or acquired defects. If it remains normal with no organ specific disease, no interventions are needed throughout the life. Here, we are presenting a case of a lady who was diagnosed with soft tissue fibrosarcoma and her Tc-99m MDP scan which was done to find out bone metastasis showed increased radioactivity in right thorax, which usually do not appear normally, found to be right thoracic kidney.
Case History: A 68-year-old female patient, known case of diabetes mellitus, hypertension, seasonal bronchitis, with history of "right total knee replacement" two years back. Since then she felt a tissue mass growing over surgical wound. Abnormal tissue mass grew rapidly in the past five months, so she went through total surgical excision of that tissue mass. Its biopsy revealed "Soft Tissue Fibrosarcoma Rt Knee". Her general physical examination was unremarkable and her recent laboratory tests were within limits. A whole body Technetium-99m Methylene Diphosphonate (MDP) scan was done with intravenous dose of 20mCi. Patient remain well hydratedand and frequent voiding was advised. After two and a half hour of dose injection, patient was scanned with supine position on Gamma Camera (Siemens Signature E-series) with anterior and posterior imaging (delayed imaging). Her bone scan was found to be negative for distant metastases. A photon deficient area over right knee indicating prosthesis is appreciated. "BUT"scan revealed an abnormal well outlined increase radioactivity impression on right upper thorax with absent right kidney form its usual lumber region. Local area over the chest and back was being cleaned to remove any cloth/skin contamination. Lateral and Oblique views were taken, on the basis of various extra views, there is an evidence of Rt thoracic renal ectopia with extrarenal pelvis. Patient than had CT scan and MRI scan which further conformed the presence of "Right Thoracic Renal Ectopia".
Point to remember is; one should not forget ectopic location of kidney, if any abnormal mass/impression is found on thorax in any radiological investigation.

004

BASELINE FDG UPTAKE IN NON-ANEURYSMAL THORACIC AND ABDOMINAL AORTAS

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Objectives: Several studies have correlated increased FDG-uptake with rapidly progressing abdominal aortic aneurysms, focal wall stress and rupture risk. Currently, risk stratification for aortic aneurysm rupture is crudely estimated using aneurysm size and growth rate. Our study aims to establish a baseline aortic FDG-uptake level to be utilized for future risk stratification and prediction of aneurysm rupture using FDG-PET.
Methods: Retrospective analysis oncologic patients having undergone a standard whole body FDG-PET/CT for work-up or treatment follow-up. Two-dimensional maximum standard uptake values (SUVmax) of the aorta were taken at highest uptake points within the walls of the ascending aorta, aortic arch, descending thoracic aorta, and abdominal aorta; using two different PET-CT scanners. SUVmax was measured on each patient using two separate scanners, and when available, two separate attenuation correction methods. Target-to-background ratios (TBR) were obtained from the liver and inferior vena cava.
Results: Ninety-nine consecutive FDG-PET/CT studies were included (n=184) and SUVmax were measured at each of the four aortic stations. The least statistical variability was observed when using the SUV/liver ratio. There was, however, a significant difference when comparing metabolic activity between the two scanners ($P<0.05$). Baseline FDG-uptake of the ascending aorta was significantly less (mean SUV/liver ratio = 0.744) when compared to the rest of the aorta ($P < 0.05$). Baseline FDG-activity of the aortic arch, descending and abdominal aorta were not significantly different. The upper limit baseline uptake (SUV_{max}/Liver ratio) did not exceed 0.77 in the ascending aorta or 0.85 in the remainder of the aorta.
Conclusion: Baseline FDG-uptake for the non-aneurysmal aorta has been established. Ascending aorta baseline metabolic activity is lower than the remainder of the aorta.

005

REPRODUCIBILITY OF SENTINEL NODE LYMPHOSCINTIGRAPHY IN PATIENTS WITH MELANOMA

Golfam M, Martineau P and Zuckier LS.

Purpose: To assess reproducibility of draining lymph node visualization (LNs) identified during lymphoscintigraphy of cutaneous melanoma.
Methods: We perform lymphoscintigraphy on melanoma patients twice: 1. As a **planning** tool, typically weeks prior to surgery to elucidate basins of LN drainage and 2. **Pre-operatively** to confirm adequacy of injection and serve as a road-map in conjunction with use of an intraoperative probe for identification of draining LNs for sentinel LN biopsy. The later instance is performed either with filtered (**F**) sulfur colloid (SC) on the day of surgery or with unfiltered (**U**) SC on the afternoon prior to surgery. Typically, patients receive 4 intradermal injections surrounding the skin lesion and are imaged over the course of 1 hour. We identified these paired lymphoscintigraphy studies as an opportunity to assess test/retest reproducibility of F/F and F/U ^{99m}Tc-colloid injections.
A sample of 29 patients with melanoma who underwent paired LS studies was randomly selected and retrospectively reviewed. 1 patient was excluded due to insufficient images. A board-certified nuclear medicine physician and a nuclear medicine resident co-reviewed the images; the distribution of visualized nodes was noted and reproducibility of sentinel node visualization across the paired studies was recorded by consensus, classified as congruent or non-congruent, and analyzed using descriptive statistics.

Results: Initial planning imaging typically consisted of 4 injections, each 10 MBq F-SC. Sites of primary melanoma location included back (13), arms (8), neck (3), shoulders (2), flank (1) and leg (1) and were not noticeably different between the F-SC and U-SC group. The 2 groups were analyzed separately.
A. F-SC (n=18, mean age= 64): Follow-up imaging was performed with a total of 39±14 MBq. The interval between paired imaging sessions was 15±16 days. Lesions drained to two basins in nine patients (50%); otherwise drainage was only noted to one basin. Paired Imaging was 89% congruent by patient (95% CI: 66% to 98%) and 89% by basin (95% CI: 71% to 98%)
B. U-FC (n=10, mean age= 63): Follow-up imaging was performed with a total of 138±45 MBq. The interval between paired imaging sessions was 7±2d. Lesions drained to two basins in 3 patients (30%); otherwise drainage was only noted to one basin. Paired imaging was 80% (95% CI: 48%-95%) congruent by patient and 85% (95% CI: 56%-97%) by basin.
Though there was a slightly greater congruence in F/F paired examinations compared to F/U exams by patient or by basin, neither difference achieved statistical significance (P values of 0.1 and 0.5, respectively), though the statistical power was limited in our modest cohort size.
Conclusions: There is a high level of reproducibility between the results of planning and pre-operative lymphoscintigraphy when both are performed with F-SC. The high level of reproducibility validates the consistency of our injection and imaging technique and supports the utility of lymphoscintigraphy as an accurate marker of lymph node drainage. In a small cohort of patients, uptake of U-SC was slightly less than with F-SC, though this difference did not achieve statistical significance in our modest-sized cohorts.

006

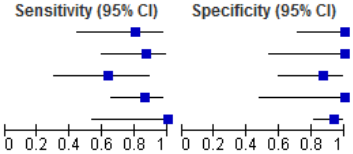
SCINTIGRAPHIC ASSESSMENT OF CARDIAC IMPLANTABLE ELECTRONIC DEVICE INFECTION: A SYSTEMATIC REVIEW

Mohammad Golfam, Shady Garas and Lionel S. Zuckier

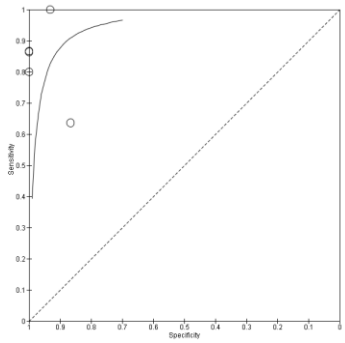
Aims: To examine the utility of scintigraphic imaging, including labeled WBC and ^{18}F-fluorodeoxyglucose (FDG) PET-CT, in the diagnosis of cardiac implantable electronic device infection.
Methods: A systematic computerized search of the literature was conducted, using Embase (*1947 to 2015 March 23)*, Medline (*1946 to Present)* and the Cochrane library databases, in order to generate a comprehensive pool of relevant articles. The literature search was conducted by an experienced librarian at the Ottawa Hospital, using a well-developed search strategy. A comprehensive list of inclusion criteria were developed and studies were screened at two levels of screening (title and abstract and full text). Using a piloted form completed by two independent reviewers, data were extracted from the full text studies. Diagnostic test performance measures were collated for data analysis.
Results: There were a total of 401 results with 323 unique articles remaining after removal of duplicates. After multiple levels of screening, 5 studies with a total of 145 participants were included for pooled estimate analysis. All studies used FDG PET-CT for the assessment of intracardiac device infection; WBC studies did not reach criteria for acceptance. Table 1 summarizes the performance measure of each study.

Table 1. Performance measures of included studies

Study	TP	FP	FN	TN	Sensitivity (95% CI)	Specificity (95% CI)
Bensimhon L	8	0	2	11	0.80 [0.44, 0.97]	1.00 [0.72, 1.00]
Cautela J	13	0	2	6	0.87 [0.60, 0.98]	1.00 [0.54, 1.00]
Graziosi M	7	2	4	13	0.64 [0.31, 0.89]	0.87 [0.60, 0.98]
Leccisotti L	19	0	3	5	0.86 [0.65, 0.97]	1.00 [0.48, 1.00]
Ploux S	6	3	0	41	1.00 [0.54, 1.00]	0.93 [0.81, 0.99]



Next, using the sensitivity and specificity of above studies, pooled ROC curve was generated.



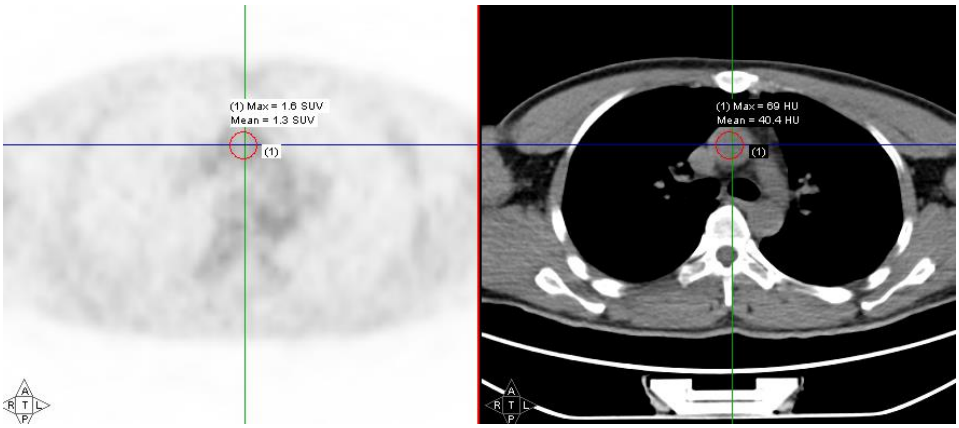
Conclusion: High-quality data supports the proposition that FDG PET-CT has both high sensitivity and high specificity for the diagnosis of intracardiac electronic device infection. This level of data was not available to evaluate efficacy of labeled WB

007

ASSESSMENT OF SOLITARY PLEURAL FIBROMA BY PET/CT

Mohammad Golfam, Entao Liu

A 41-year-old male presented for routine check-up where he was found to have a nodule on regular chest X-ray. He denied any symptoms or prior medical treatment and had unremarkable vital signs.
Patient was followed with FDG PET-CT which showed a right sided broad based solitary fibrotic tumor originating from pleura, with SUV max of 1.6. The pathological examination reported the tumor as Solitary Fibrous Tumor of the Pleura.



Solitary fibrous tumours of the pleura (SFTP) are rare neoplasms arising from mesenchymal cells in the areolar tissue that account for less than 5% of all pleural tumors. Until Oct 2006 a total of 800 cases were reported worldwide. Although malignant features have been reported in about 10-20% of these tumors, the tumors behave unpredictably but very different from malignant mesothelioma, which is the most common pleural malignancy.
Treatment is surgical for benign and malignant tumors and re-operation for those with recurrence. With malignant SFTPs, although higher recurrence is expected, long term survival is anticipated.
SFTP is a mysterious tumor with inadequate clinical and radiological diagnostic features and a distinction between benign and malignant lesion cannot be made radiologically. As a result of limited literature, there is no clear evidence on the role of PET/CT for assessment of SFTP. Positive FDG-PET has been reported in patients with malignant SFTP with no positivity in those with benign tumor. Prior studies suggested that a SUV of less than 2.5 is indicative of a

benign SFTP. Potential benefits of FDG-PET in the evaluation of SFTP include ruling out malignancies or reveal rare metastatic recurrences.

008

COCKADE SIGN OF INTRAOSSEOUS LIPOMA OF CALCANEUS ON TRIPHASIC BONE SCAN

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Intraossesous lipoma is a rare benign tumor of bone most commonly involving the calcaneus and derived from mature lipocytes. It has a classical appearance of Cockade on plain X-ray (Cockade sign). We present a case of 40 years old lady with 05 months history of pain of moderate severity over left calcaneal region. On local examination, her left calcaneal region was normal looking with no sign of acute inflammation but she had mild tenderness. A dynamic triphasic bone scan was performed with 20 mCi of Technetium-99m Methylene Diphosphonate (Tc-99m MDP). Her dynamic images revealed asymmetrical flow over left calcaneal region and a well defined area of enhanced activity over mid of left calcaneus on blood pool images. Delayed images show a curvilinear area of increased tracer uptake over proximal part of inferior border of left calcaneus and a small photon lucency just above it, is also seen. Abnormal uptake over tarsal joints were also noted. This was followed by an X-ray of left calcaneus which revealed a large lytic area over left calcaneus with a well defined radio-opaque area in the centre and significant sclerosis over the inferior surface. The findings were classical for Cockade sign of intraosseous lipoma with a central calcification.

009

COMPARISON OF RADIONUCLIDE CALIBRATORS IN MANITOBA

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In many nations around the world a service or regular comparison is performed to check the accuracy of administered doses of radiopharmaceuticals. The services are tailored to the population density and geography of their countries. For a ten-year period from 1986-1996, the National Research Council (NRC) of Canada offered such a service. This service was renewed by the NRC in recent years with a revalidation and reviving of the Secondary Standard Ionizing Radiation Chamber System (SSIRCS). Most recently the NRC collaborated with nuclear medicine sites in Manitoba to perform a comparison of radionuclide calibrators in that province. The comparison consisted of two sample geometries, a 5 mL serum vial (SV) and a 3 mL syringe, and focused exclusively on 99mTc. The SV measurements indicated that while all participants were within 10% of the reference standard all but one of the participants were systematically below the reference value. The syringe results showed that the majority of radionuclide calibrators were within 5% of the reference standard but the few outliers were at or beyond the 10% guideline. The outliers were measured in radionuclide calibrators focused on PET isotopes so the 99mTc calibration was not a concern, however, it highlights the need for a further comparison with 18F or the PET isotope routinely in use. Historically, having large number of Canadian participants in a national comparison with the NRC has been challenging. Even when the service was offered only 10% of the potential sites in Canada participated. The NRC is committed to tailoring the service to provinces and/or smaller regions. In the past, the calibration isotope was sent to the NRC for calibration and this is still an option. The Manitoba experience was performed by sending a reference chamber traceable to

primary standards and having an NRC scientist on site to lead the effort. Both extremes and some intermediate option are open to any Canadians interested in the calibration of radionuclide calibrators.

010

GASTROESOPHAGEAL REFLUX SCINTIGRAPHY-MILK SCAN: THE OPTIMAL STUDY DURATION

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Purpose: Diagnosis of gastroesophageal reflux disease (GERD) in 30min. vs 60min. vs 90min. study.
Methods: 134 studies were selected that completed the 90min. protocol. The babies (age <12 months) were referred to the department for repeated chest infections or failure to thrive. Feeding was avoided for a minimum of 2 hrs. 20 MBq of Tc99m nanocolloid was mixed with 10ml of formula milk given through nasogastric tube followed by the full feed of the baby. NG tube was then taken out and immediate dynamic images were acquired in posterior position at 10sec/frame for 90min. Tracer in esophagus in at least one frame was labelled as positive for GERD. Study was graded as low grade when the tracer is seen in 2/3rd and high grade if the tracer is seen in full length of esophagus.
Results: 93(69%) out of 134 patients showed GERD during the 90 min study. Mean reflux episode observed were 5.12±3.7(1-19 episodes). 76(82%) patients were diagnosed GERD in the first 30 min. while another 15(16%) were diagnosed in 60 min., further 2(2%) showed reflux after 60 min. In all 486 episodes of reflux were observed of which 352(72%) were high grade. 215(44%) of which in 30 min., 171(35%) in further 60 min. and another 100(21%) noted after 60 min. The no. of reflux is higher in first 30 min. and gradually decreased in 60 and 90min. period. The results showed 76/134(57%) patients can be diagnosed in 30min. study which reflects to about 3 out of every 5 patients.
Conclusion: 30min. study is a feasible option which can save the camera time. The best option is to stop the study at 30min. when the reflux is seen. Study after 60min. has little impact on the diagnostic accuracy of the test.

011

THE STRIATAL DISSOCIATION BETWEEN RESTING STATE FDG PET AND PERFUSION MRI IN PARKINSON'S PATIENTS RECEIVING LEVODOPA

The forefront treatment of Parkinson's disease (PD) is levodopa. Previously, it has been reported that cerebral blood flow (probed by perfusion H215O PET) is increased while neuronal activity (probed by FDG-PET) is decreased in key subcortical regions including the putamen when patients are treated with levodopa. This may be associated with levodopa-related motor complications (Hirano et al., J Neurosci, 28:4201-4209, 2008). To study the effect of this medication, eight PD patients have been scanned with FDG-PET and perfusion MRI (pMRI) both when they are ON and OFF medication (4 scans in total). The images were preprocessed using statistical parametric mapping with standard protocol. Each image's voxel values were proportionally normalized to the whole brain value for both FDG-PET and pMRI. Regions of interest (ROI) were defined and mean values were calculated for each ROI. The 2x2 repeated measures ANOVA test has been performed to investigate the main effect of imaging modality (FDG-PET vs. pMRI) and medication (ON vs. OFF) and their interaction effects. A significant interaction effect has been found in the putamen and pons ($p<0.05$), but not in the caudate, subthalamic nuclei nor thalamus. These findings partially replicate the previous report, suggesting that increased cerebral blood flow is not caused by increased neuronal activity (probed by FDG-PET) but it is secondary to the vasodilating effect of dopamine in the putamen and pons which might deregulate the dopamine delivery to these regions and contribute to the incidence of levodopa-related side effects such as tardive dyskinesia.

Eric Lepp Clinical Vignettes

EL-001

ABERRANT AUDITORY CORTEX ACTIVITY ON BRAIN FDG-PET PROMPTS CLINICAL AUDIT OF SOUND LEVELS IN THE UPTAKE FACILITIES AT A UNIVERSITY HOSPITAL SITE

[1]Aguilar, H., [2]Romaniuk, K., [1]Hung, R. [1]Abele, J.

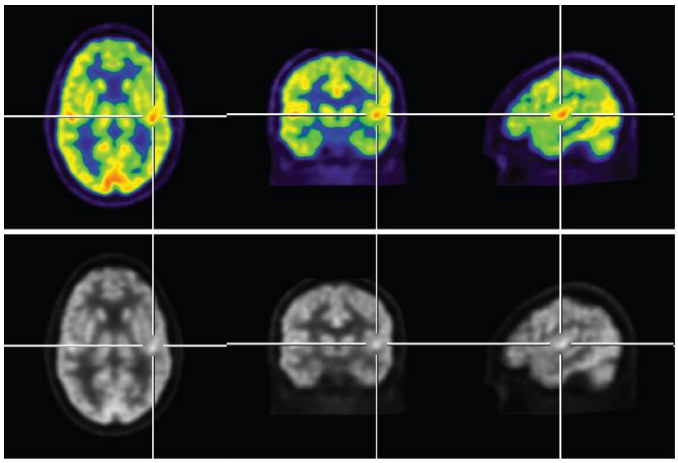
Clinical History: A brain FDG-PET study was performed in a 58-year-old male with behavioral changes and cognitive impairment, to evaluate for Alzheimer's or frontotemporal dementia. PET findings supported the latter, however, unexpected increased metabolism was noted in Brodmann's areas 41 and 42 (primary auditory cortex; see figure), of uncertain etiology. We suspected excessive ambient noise during radiotracer uptake as the culprit, therefore we undertook a clinical audit of sound levels in the uptake facilities.

Methods: Maximum sound levels and the percentage of time exceeding 50 dB (typical office noise) were measured using a validated smartphone application. Samples were acquired once per second during the uptake period for 30 routine examinations, not limited to brain PET. We set a target of <10% of readings exceeding 50 dB as acceptable.

Results: 30 routine FDG-PET examinations were conducted over 10 weeks. 2 of these were non-oncologic (1 brain and 1 cardiac), encompassing pediatric and adult patients of both genders. The mean (± SEM) uptake period was 59.2 ± 3.4 min. Our target was not met, since 99.2 ± 0.3% (95% CI 98.6 - 99.8%) of readings exceeded 50 dB. Of interest, 10.1 ± 0.0% (6.0 – 14.1%) of readings exceeded 60 dB. The mean maximum and range of sound levels experienced were 92.3 ± 1.0 dB (90.4 - 94.2 dB) and 33.2 ± 0.8 dB (31.7 - 34.8 dB), respectively.

Conclusion: Sound levels are unacceptable in our facilities, likely related to their location in a busy hallway. While not definitely causal, this could account for the aberrant auditory cortex activity in question. We have presented these audit data to the relevant nuclear medicine technical staff, and requested that brain PET patients wear industrial grade sound reduction ear buds (10-30 dB reduction efficacy) as well as closing the facility door during the uptake period.

Figure. Multiplanar (color and grayscale) FDG-PET brain images from study in a 58-year-old male with suspected Alzheimer's or frontotemporal dementia. Unexpected increased FDG uptake in Brodmann's areas (primary auditory cortex; triangulation lines).



EL-002

^{18}F-FDG PET/CT UPTAKE OF A NONBACTERIAL THROMBOTIC ENDOCARDITIS

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In the last few years, non-oncological indications for ^{18}F-FDG PET/CT (FDG) have been more frequently emerging in clinical settings. It is essential to understand all potential causes of FDG uptake that could alter our interpretation in order to optimize patient management.
An 83-year-old woman presented to our centre with multiple ischemic strokes. Initial investigation in search of a thrombotic source was negative, including a transthoracic echocardiogram. A lung nodule was discovered and FDG was performed for lung cancer staging. FDG revealed stage II lung cancer, as well as an intense uptake of the mitral valve, highly suspicious of endocarditis.
The treating physician was immediately contacted and informed of our findings. We suggested pursuing the investigation with a transesophageal echocardiogram, which thereafter confirmed the presence of a mitral valve vegetation. The patient remained afebrile and three sets of subsequent blood cultures drawn prior to antibiotic treatment were negative after 5 days of incubation. Leukocyte count was normal and C-reactive protein was slightly elevated at 17 mg/L (normal: 0-8 mg/L). In light of a thorough multidisciplinary investigation, she was treated for a nonbacterial thrombotic endocarditis, most probably secondary to lung cancer. The differential diagnosis included a fastidious microorganism causing culture-negative endocarditis and, much less likely considering the echographic aspect, a mitral valve tumour (e.g. fibroelastoma, myxoma).
The unexpected FDG uptake of the mitral valve swiftly altered the medical management of this patient. The primary interest of this finding is to report the FDG uptake of a nonbacterial thrombotic endocarditis. Only one other case report exists and no cohort studies are available to characterize the metabolism of this rare type of endocarditis. Visual and semi-quantitative assessments on FDG alone may not yet be able to distinguish infective from noninfective thrombotic endocarditis.

EL-003

COPYCAT

Guillaume Chaussé
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Mr. E. is a hypertensive, diabetic and dyslipidemic 64 year-old gentleman known for Crohn's and a radiation-therapy/surgery-treated prostate cancer who recovered from multiple left hemispheric CVAs.
In a 2011 CT of the abdomen and pelvis, tiny sclerotic lesions to the ischial bones and femoral heads were incidentally found. 99mTc-MDP bone scan control showed new lesions in the distal regions of femoral diaphyses and proximal right tibia. CT guided biopsies revealed non-specific chronic fibro-inflammatory infiltrates.
In 2014, perirenal infiltration was incidentally found with severe involvement of both kidneys. Biopsy was non-contributory. Rituximab was started for possible IgG4-related disease.
In 2015, Mr. E. suffered ACS requiring admission to CCU and hemodynamic support due to a suspicious mass in the vicinity of the heart encasing the right atrium; triple vessel disease was diagnosed on cardiac catheterization. This was followed by three consecutive days of TIAs. MRI of the head revealed unchanged embolic-like frontal, temporal and parietal infarcts. Epilepsy was ruled out by EEG and vasculitis and angiocentric lymphoma were brought up to the differential diagnoses.
At that point in time, the patient had failed high dose prednisone and was scheduled for bortezomib.

Collegial consultation was done to Harvard's rheumatologist John Stone and his fellow Corry Perugino, who suggested Erdheim-Chester disease. Previous biopsies were reviewed, confirming the BRAF V600e mutation and targeted therapy (vemurafenib) was started.
Follow up images with FDG PET scan demonstrated excellent metabolic response and the patient reached complete remission by FDG PET scan in late 2015.
Unfortunately, and as suspected by the rise in PSA levels, one iliac lesion did not improve and was confirmed to be recurrence of prostatic carcinoma on 18F Fluorocholine PET scan.
Take home messages:

- MDP bone scan may prove useful in atypical presentation to assess polyostotic involvement of osteoblastic processes.
- FDG PETis useful in the follow-up of erdheim-chester, a rare histiocytosis treatable by targeted biological therapy. Using a cardiac protocol, it is possible to assess infiltrative angioproliferative diseases and to follow response to therapy.
- Multiple lesions in the context of multiple known primaries may be difficult to assess. The specificity of pet fluorocholine scan has proven helpful to explain partial response and to identify prostatic metastases, subsequently changing therapy.
- Sharing with colleagues and calling for help at other centers may lead to extraordinary benefits for both patients and academic knowledge.

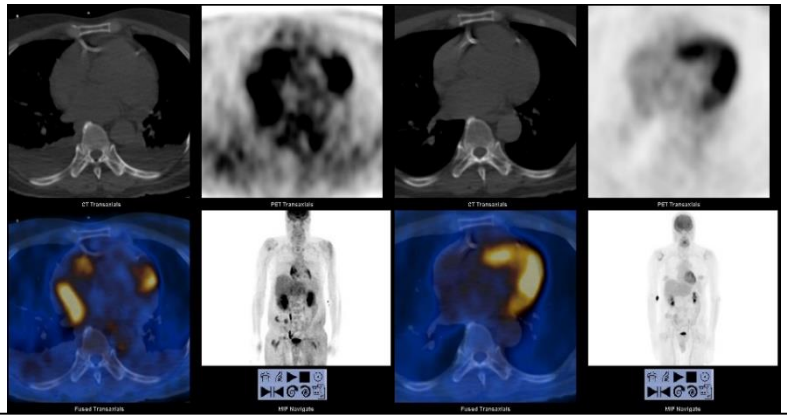

Figure 1. Right atrial mass: On the left, a right mass encasing the right atrium is FDG avid under cardiac preparation. On the right, complete resolution is confirmed after six months of targeted therapy. Later, a cardiac catheterization will prove resolution of previously noted coronary stenosis.

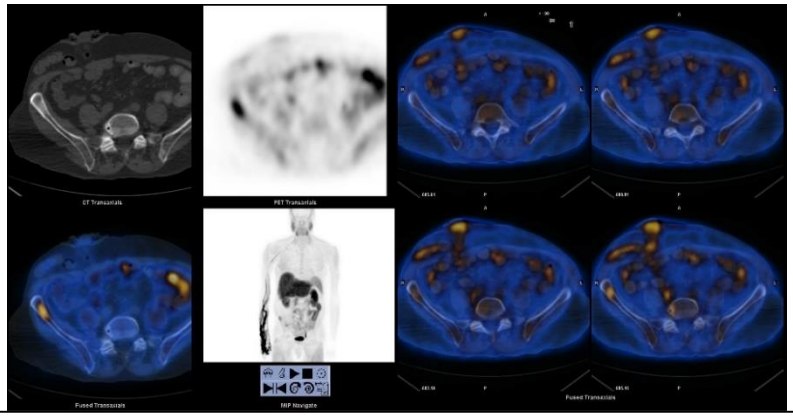

Figure 2. Right iliac lesion: (On the left) Axial images and MIP of 18F Fluorocholine PET scan shows a right iliac lesion. (On the right) four consecutive axial slices demonstrating a non-responding bone lesion on a previous FDG PET scan. This finding confirmed clinical suspicion of recurrent prostate cancer

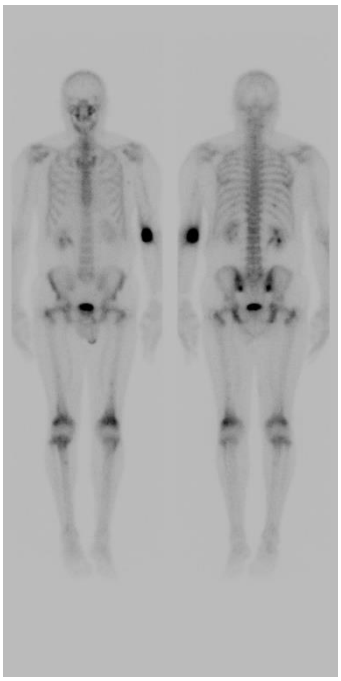

Figure 3. Distal femurs and proximal tibias uptake found on whole body 99m-MDP bone scan led to an inconclusive biopsy.

EL-004

LEUKOCYTE SCINTIGRAPHY: BELOW THE TIP OF THE INFECTION ICEBERG

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A 52-year old male with a history of IV drug use, COPD and hepatitis C cirrhosis presented to the ER with shortness of breath and decreased level of consciousness. Bloodwork early during admission indicated an elevated white blood cell count of 26.6. Blood cultures from multiple sites revealed Gram positive cocci in clumps, consistent with *Staphylococcus aureus*. Echocardiogram was performed, showing a vegetation on the mitral valve.

The clinical service requested a white blood cell scan to search for an occult source of infection. Dynamic planar images were obtained for 1 hour after administration of 99m-Technetium labelled white blood cells, followed by delayed planar scintigraphy and SPECT/CT at 4 and 24 hours.

The white blood cell scan was striking, showing a number of areas of abnormal activity and suspected infection. This included progressively intensifying white blood cell accumulation at the right sternoclavicular and left 1st carpal-metacarpal joints, concerning for septic arthritis; focal and progressively intensifying activity in both kidneys, suspicious for bilateral acute lobar nephronia or focal pyelonephritis; low grade uptake in the region of the mitral valve, consistent with infective endocarditis; and numerous foci of soft tissue uptake in the upper and lower extremities and muscles of the thorax, felt to represent either myositis or abscesses. In addition, there was low grade uptake within a cavity at the right lung apex, with an appearance most consistent with a chronic aspergilloma. The spleen had an unusual heterogenous appearance on planar scintigraphy, and SPECT/CT showed this was due to normal splenic tissue surrounded by liquefacted tissue.

This case demonstrates the utility of leukocyte scintigraphy in detecting clinically occult sites of infection. The multiple sites of infection that were identified portended a poorer prognosis for this patient, but presented more potential target sites for treatment and assessing response to treatment.
