Results: In this model of lung metastasis, tumor cells rapidly accumulate in the lungs and do not seed in other organs. After tumor cell inoculation the activity per ROI peaked within 2-5 minutes, followed by a gradual down slope. Statistical analysis using a linear mixed model revealed a significantly accelerated decrease of lung time activity in sham controls compared to NK depleted animal (coefficient of slope: -0.66 vs -0.54).

Conclusions: For the first time we provide direct evidence for a very rapid NK cell mediated lysis of tumor targets in vivo and in an individual organ, we conclude that a functional in vivo monitoring of FDG-labeled tumor cells represents a promising approach to gain more insight into the kinetics of the mechanisms of metastasis formation and related cellular host defense processes.

1027 POSTER

Evaluation of pulmonary lesions using ^{99m}Tc-depreotide and ^{201}Tl-chloride. Preliminary results

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Background: Recent reports have indicated the value of ^{99m}Tc-depreotide, a labelled somatostatin analogue, in the evaluation of pulmonary nodules. ^{201}Tl-chloride has been for long and applied in the diagnosis of lung cancer. The purpose of this study is to compare the diagnostic potential of ^{99m}Tc-depreotide and ^{201}Tl-chloride in the evaluation of pulmonary lesions.

Material and Methods: Eighteen patients (mean age 62.3±9.4 yrs, 5 female) with 28 pulmonary lesions suspect for malignancy were submitted, on separate days,to ^{99m}Tc-depreotide and ^{201} Tl-chloride SPECT. Early (15 min) and delayed (3 hours) scans were acquired for each radiopharmaceutical. Tumor-to-contralateral normal lung activity ratio for both early (early ratio, ER) and delayed (delayed ratio, DR) scans were calculated and the retention index [RI = ((DR-ER)/ER)*100] was derived. Lesions were characterized as benign (9/28) or malignant (19/28) on the basis of histological examination, and/or clinical and radiological follow-up. Differences between benign and malignant lesionsí characteristics were examined by means of non-parametric Mann-Whitney statistics and linear regression analysis was used for correlations between radiopharmaceuticals.

Results: All malignant lesions accumulated both tracers. Six out of nine benign lesions were ^{201}Tl-negative. Four out of nine of them were also ^{99m}Tc-depreotide-negative, the rest showing minor accumulation of tracer. However, ER and DR of both agents were significantly different between benign and malignant lesions (^{99m}Tc-depreotide ER, 1.27±0.37 vs 2.81±0.60, $p<0.001$; ^{99m}Tc-depreotide DR, 1.40±0.45 vs 3.58±0.83, $p<0.001$; ^{201}Tl ER, 1.12±0.29 vs 2.57±0.66, $p<0.001$; ^{201}Tl DR, 1.06±0.15 vs 2.48±0.57, $p<0.001$). For each radiopharmaceutical ER was well correlated to DR (r=0.88 for ^{201}Tl and r=0.86 for ^{99m}Tc-depreotide) . Inter-agent correlation was fair for both scan phases (r=0.65 for ER and r=0.64 for DR). Interestingly, RI of both agents did not show any statistically significant difference between benign and malignant lesions or any inter-agent correlation.

Conclusion: These preliminary results show that ^{99m} Tc-depreotide may recognize malignant lung lesions as effectively as ^{201} Tl, having the advantages of improved image quality and favourable dosimetry. Semiquantitative analysis may be helpful in discrimination between benign and malignant lesions.

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Contrast-specific ultrasound (CS-US) in staging and follow-up of splenic lymphomas

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Aims: To illustrate our experience in the evaluation of splenic hematological malignancies with a real-time, CS-US mode.

Material and methods: January to December 2002 we studied 25 patients (10 with Hodgkin disease and 15 with non-Hodgkin lymphoma): 14 M and 11 F aged 28-79 years. After a baseline US study we rapidly injected 2.4-4.8 mL of the second-generation microbubble agent SonoVue® (Bracco). Contrast-enhanced studies were carried out with a contrast-specific software (CnTI - Contrast Tuned Imaging, Esaote) using a continuous-mode, harmonic acquisition and a low acoustic pressure. US studies outcome was retrospectively correlated with the results of standard tools, including CT (13 cases), MRI (1), US follow-up (10), and FNAB (4).

Results: Among 16 cases with focal involvement contrast-enhanced US detected 47/52 lesions demonstrated altogether by reference tools. Conventional US recognized 35/52 lesions.Lesion extent defined by CS-US correlated with standard tools, being similar (81% of cases), underestimated (13%), and overestimated (6%). Baseline US defined the lesion size correctly in 56% of cases, underestimating in 31% and overestimating in 13%. Lesion-to-parenchyma contrast of CS-US resulted low (11% of cases), intermediate (62%), and high (27%). Conspicuity at conventional US was low (52% of cases), intermediate (33%), and high (15%). Lesions appeared as constantly hypoechoic (hypovascular), better definable during intermediate-delayed phase of enhancement than on early phase. Arteries were visible around the lesion and perpendicularly entering along intralesional septa. A clear intralesional microcirculation was visible. Among 9 subjects studied after chemotherapy, loss of microcirculation and marked lesion hypoechogenicity were visible in case of response. Hence, the disease activity could be assessed. In 9 patients with diffuse disease we recognized a slightly less intense and persistent parenchymal opacification, suggesting the need for a full, 4.8 mL contrast medium dose.

Conclusion: The spleen is an optimal target CS-US, being superficial, highly vascularized, relatively small, and homogeneous. Contrast-enhanced, gray-scale US is a simple and poorly-invasive tool in morphological and functional imaging of lymphomatous disease.

1029 POSTER

Quantification of microvasculature in cervix carcinoma with functional CT imaging

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Background: Functional CT (fCT) imaging has been commonly accepted for clinical practice in a few selected anatomic sites such as the brain. The fCT method is based on dynamic CT scanning on the volume of interest post intravenous injection of X-ray dye. The arterial and tissue uptake curves of dye can be obtained from the dynamic CT images and they are applied to tracer kinetics models based on which physiologic parameters are determined. This pilot study is to demonstrate the feasibility of fCT on cervix carcinoma applied to the "distributed capillary adiabatic tissue homogeneity" (DCATH) model we previously proposed [1]. The fCT parameters were also compared to oxygenation (PO2) and interstitial fluid pressure (IFP) measurement.

Material and Methods: A group of 20 patients with cervix carcinoma took part in a pilot study of fCT at time of disease staging prior to radiation therapy. They were scanned with a GE Light Speed CT scanner and cine technique factors of 120 kVp, 100 mA, 1s rotation for 120 s. The data were downloaded to a SUN BLADE 1000 workstation for analysis with a nonlinear deconvolution method using the quasi-Newton algorithm. The DCATH model calculated 5 fCT parameters; namely, blood flow (BF), capillary permeability surface area product (PS), blood volume (BV), mean transit time (MTT) and transit time spread (TTS). The advantage of this model is that TTS measures the architecture complexity of microvasculature in the tissue. Seventeen patients also received IFP measurement by a sick-in needle technique while 15 patients had PO2 measured with the Eppendorf probe. The fCT parameters were tested against IFP and PO2 for correlation.

Results: The average fCT parameter estimates for tumor are: BF = 62.7±21.3 ml/min/100g, PS = 25.2±11.1 ml/min/100g, BV = 11.5±4.0ml/100g, MTT=12.1±3.5s and TTS=5.3±1.3s. The average measured IFP and PO2 are 18.2±8.9 mmHg and 17.3±18.2 mmHg respectively. None of the fCT parameters indicated strong correlation with IFP or PO2 and the only significant correlation is between BF and mean PO2 (r=0.46). However, BF was found to strongly correlate with the slope of tissue uptake curve (r=0.85).

Conclusions: The feasibility of the fCT method was demonstrated and average values of the fCT parameters were obtained in this group of patients with cervix carcinoma. The initial slope of the tissue uptake curve may be a good relative measure of BF because of their strong correlation. The weak correlation between BF and PO2 suggests that tissue oxygenation is somewhat dependent on supply via blood flow into the tissue but perhaps