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LUNG MOTION CORRECTION PROGRAM FOR GATED Xe-133 VENTILATION IMAGES.

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A lung motion correction program using a linear coordinate transformation for phase analysis of the gated ventilation image was insufficient to correct the different regionalmotion from the base to the apex ofthe lung. The purpose of this study is to design and evaluate the other programs which used polynominal coordinate transformation and polar coordinate transformation. The equations we used are as follows. (1)Program A -$X'=ax+by+cxy+d$, $Y'=ex+fy+gxy+h$. (2)Program B-$X'=ax+by+cxy+dx^2+ey^2+f$, $Y'=gx+hy+ixy+jx^2+ky^2+l$. (3)Program C-$r'(\theta)=a\ r\ (\theta)(i=0\text{-}63)$. (X',Y') and (r',θ) represent the coordinates in the corrected lung image. Polynominal coordinate transformation using program A showed good results of the contour fitting and phase images only when the adequate refference points were selected. The other polynominal coordinate trans-formation using program B failed to match the lung contours and showed the skew of the intrapulmonary coordinates, which was probably due to the high degree of freedom of transformation. The polar coordinate transformation was succesful in matching the lun contour but showed the skew of the intrapulmonary coordinates. Since all of them were impossible to use in routine clinical practise, some other reasonable programs should be designed.

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CARCINOEMBRYONIC ANTIGEN CHANGES OF PATIENTS WITH SMALL CELL LUNG CANCER DURING TREATMENT.

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Carcinoembryonic antigen (CEA) in serum was measured weekly to 170 (Limited Disease 91, Extensive Disease 79) patients with small cell lung cancer (SCLC). From analysis of CEA chnages during treatment, we evaluated usefullness of CEA as monitering of therapeutic effects, survival and recurrency of SCLC. The radioimmunoassay procedure with two-step sandwitch method was used for determining CEA levels.

Twenty three complete responders (CR), 83 partial responders (PR) and 48 non responders (NC) were observed to initial therapy. Mean CEA levels was decreased from 5.5 ng/ml to 1.8 ng/ml in 23 CRs, from 4.4 ng/ml to 3.3 ng/ml in 83 PRs, and from 7.1 ng/ml to 6.4 ng/ml in 48 NRs during therapy. out of 23 CRs, 14 cases had pretreatment CEA levels above 2.6 ng/ml, and those CEA levels decreased to below 2.5 ng/ml after initial therapy.

The median survival of 104 cases, whose CEA levels were decreased after initial therapy, was 36 weeks, in contrast, the median survival of 66 cases, whose CEA levels were increased after initial therapy, was 24 weeks. There was significant difference ($p=0.01$).

We also investigated the relationship between clinical coarse, such as recurrency and death, and CEA changes during treatment.

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ASSESSMENT OF MUCOUS FLOW AND CILIARY ACTION USING RADIOAEROSOL IN PATIENTS WITH LUNG CANCER WHO UNDERWENT TRACHEOBRONCHOPLASTY.

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We studied the clearance of inhaled radioaerosol from the tracheobronchial tree of post-operative patients with lung cancer. The number of the patients with reconstractive surgery was 9, and that of the patients with the so-called lobectomy was 5. Tc-99m HSA was used as aerosol particle that was produced by the DeVilbiss nebulizer apparatus. Continuous measurement of radioactivity was performed for 120 min. in the supine position. In order to assess the mucociliary clearance of the tracheobronchial trees quantitatively, the clearance curves of the whole lungs were fitted into 2 compartment curves, fast and slow, by minimum square involution. And half time of the curve that subtract the slow compartment from the fast was calculated.

In conclusion, half time value appeared to be well correlated with the visual assessment of cine-scintigraphy. Mucociliary clearance of the bronchial tree with reconstraction was prolonged(T1/2,28.3±10.6 min.), compared with that of the bronchial tree without operation(T1/2,11.9±3.91min.). However, mucociliary clearance of the lobectomy group was not prolonged(T1/2,13.1 ±7.33min.).

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QUANTITATIVE MEASURMENT OF TRACER ACCUMULATION TO LUNG AND TUMOR USING THE CORRECTION WITH TISSUE DENSITY.

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In the 23rd annual meeting, we reported quantitative measurement of lung density with positron computed tomography (PCT) using C-11-CO inhalation method.
We can not evaluate tracer accumulation to lung exactly, because lung density is very low compared with other organs. So tracer accumulation to lung should be corrected with lung density.
In this meeting, we attempted to correct DAR (differential absorption ratio) values of lung and tumor in the imaging of pulmonary tumor with PCT using C-11-methionine.
The results showed that the difference of tracer accumulation between lung and tumor changed in each case.
We thought that these results were caused by the high methionine uptake of lung and the difference of tumor viability.