LUNG MOTION CORRECTION PROGRAM FOR GATED VENTILATION IMAGES
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A lung motion correction program using a polynominal or polar coordinate transformation was insufficient to correct the different regions viewed from the base to the apex of the 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
   \[ \gamma = ax+by+cx+dy+ey+f, \]
   where \( \gamma \) and \( \theta \) represent the coordinates in the corrected lung image. Polynomial coordinate transformation using program A showed good results of the contour fitting and phase images only when the adequate reference points were selected. The other polynominal coordinate transformation 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 successful in matching the lung contour but showed the skew of the intrapulmonary coordinates. Since all of them were impossible to use in routine clinical practice, some other reasonable programs should be designed.

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 patients in the reconstructive 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 iteration. 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 reconstruction was prolonged(T1/2,26.3±10.6 min.), compared with that of the bronchial tree without operation(T1/2,13.1±7.33min.). However, mucociliary clearance of the lobectomy group was not prolonged(T1/2,26.3±10.6 min.).

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

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 changes during treatment, we evaluated usefulness of CEA as monitoring of therapeutic effects, survival and recurrence of SCLC. The radioimmunoassay procedure with two-step sandwich 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 were 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 NCs 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 course, such as recurrency and death, and CEA changes during treatment.