

amount of shift to the diseased lung in lateral position was quite variable.

In peripheral type, pulmonary blood flow in supine position was found almost unchanged

after the radiotherapy in this series. The change in the amount of shift to the diseased lung was found increased in one case and unchanged in the remaining two.

Studies on Regional Disturbance of Respiratory Function in Various Pulmonary Diseases

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The present report describes about the detection of regional impairment of ventilation and perfusion in various pulmonary diseases.

As one of this purpose, pulmonary scanning after intravenous administration of ^{131}I -Macroaggregated Albumin has been used to study the regional distribution of pulmonary arterial blood flow in 159 cases with chronic pulmonary diseases. Chronic bronchitis with severe obstructive ventilatory disturbance, chronic pulmonary emphysema and severe pneumoconiosis cases show the lung scan revealing diminished radioactivity or diminished with absence of radioactivity in multiple areas. This information is suggested severe impairment of regional pulmonary arterial blood flow in these cases.

Inhalation scanning using ^{198}Au Colloid was added to investigate the correlation between

regional disturbance of ventilation and perfusion. Chronic bronchitis shows a good correlation between regional diminished radioactivity of inhalation scan and perfusion scan. Some cases of chronic pulmonary emphysema also reveal same good correlation, but another cases show more decreased radioactivity in inhalation scan than perfusion scan.

In addition, radioactive gas (^{133}Xe) was used to obtain information of dynamic change of regional impairment on ventilation and perfusion. The radioactive Xenon was administered either by inhalation or intravenous injection. Half time for Xenon clearance and 90% wash-out time were determined from the ^{133}Xe clearance curves following inhalation or intravenous injection. Extension of 90% wash-out time and half time for Xenon clearance were found in chronic bronchitis with obstructive ventilatory disturbance.

Relationship between Lung Scan and Operability of Lung Cancer

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A comparative appraisal was carried out on chest x-ray films and lung scans of 29 cases with primary lung cancer which were

taken ten days or less before pneumonectomy. Lung scanning were performed by isosensitive dual-probe scanner. A definite relation-

ship were found between lung scan and operability.

1) In 18 cases whose lung scans showed areas of diminished or absent activity confined to single segment same as were expected from chest x-ray film, results of surgery were all radical.

2) On the other hand, in cases demonstrating diminished or absent activity in lung scan extended to other segments or lobes than were expected from chest x-ray film, all but one of 11 surgical operation was palliative or ex-

ploratory.

Above-mentioned results show lung scan can indicate well the extent of invasion of lung cancer into the mediastinum. This is the important problem worth while to be studied in more details.

Even if the isosensitive scanner is not available, conventional scans are also useful for the comparison with x-ray film provided that anterior, posterior and lateral scans are interpreted together.

The Changes of Pulmonary Perfusion Before and After Pulmonary Resections

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Pulmonary resection is always associated with a loss of pulmonary function of varying magnitude. It is important in postoperative management to understand the postoperative changes in pulmonary function, especially the changes in pulmonary blood flow distribution. We studied the changes in pulmonary perfusion in preoperative and immediate and distant postoperative periods by means of pulmonary scintiscanning using $^{131}\text{IMAA}$.

The subjects of our study consisted of 16 cases of pulmonary resections. Preoperative scanning was done with the patient in a supine position and a 200 to 250 μCi of $^{131}\text{IMAA}$ was injected intravenously. Immediate postoperative study was performed in the same position on the second postoperative day using 100 μCi of $^{131}\text{IMAA}$. On the second postoperative day the blood flow on unaffected side showed a relative increase of 13.3%, whereas the blood flow on the operated side of the lung showed an average decrease of 19%, with the magnitude of decrease depending on the amount of lung resected. Lobectomy

cases showed relatively larger decrease in perfusion. On unaffected side the postoperative increase of perfusion was generally more marked in upper lung field (mean increase 31.2%), whereas the perfusion in the lower lung field even showed a slight decrease.

When pulmonary perfusion in a distant (1 to 2 months) postoperative period is studied the perfusion on the healthy side showed a decline from 64.6% in immediate postoperative period to 58.7%, whereas the perfusion on the operated side increased from 35.5% in immediate postoperative period to 41.3% in distant postoperative period. Perfusion ratio of upper/lower lung fields on the healthy side was 0.73 in immediate postoperative period; in the distant postoperative period immediate postoperative period; in the distant postoperative period it was 0.57 and it approximated the preoperative value.

We believe the postoperative decrease of pulmonary perfusion is due to a ventilatory insufficiency of the remaining lung and resultant local hypoxemia, which in turn cause a vasoconstriction of pulmonary vascular bed