

Studies on Absorptive Function of Tracheo-Bronchial Wall Using Radioisotope

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The pathophysiological aspects of tracheo-bronchi were studied from the standpoint of the absorptive function. The present report was shown the absorptive function of tracheo-bronchial wall of dogs.

The absorptive function of tracheo-bronchial wall was assessed in terms of introducing RI (^{32}P) into a certain tracheo-bronchial lumen and analyzing its blood radioactivity curves and the transition of intracellular RI on its autoradiogram were identified. The following results were obtained.

1. There was seen the difference in the absorptive function due to the concentration of RI solution. High concentration made the absorptive function tend to decrease and 20 per cent glucose made it good. The influence of low concentration on absorptive function was not remarkable.

2. Under the influence of vagus on the absorptive function of tracheo-bronchial wall, the absorptive function tended to decrease in vagotomized and stimulated group, compared with the normals.

The influence on the absorptive function on tracheo-bronchia wall was insignificant by lateral stimulation of vagus and lateral vagotomy, but by bilateral stimulation of vagus, remarkable reduction of absorptive function was recognized. The absorptive function on

bilateral vagotomy was less decreased than the group of bilateral stimulation of vagus.

3. Under the influence of drugs on the absorptive function of tracheo-bronchial wall, the absorptive function was slightly decreased by adrenaline and pirocarpine, but histamine gave the reduction to the absorptive function. By acetylcholine, it was differed from other absorbing curves. It showed the reduction of absorptive function at the first, and gradually it was turned good. The group injected histamine and acetylcholine into airway showed the reduction of the absorptive function.

4. The regional pulmonary circulatory disturbance in pulmonary scintigramming were distinctly correlated with absorptive function of bronchial wall. The regional disturbance of pulmonary blood flow was seen in many of the cases reduced absorptive function of bronchial wall.

5. On the autoradiogram of tracheo and bronchial wall, introduction of RI into cells in tracheo and bronchial wall was comparatively clear. The autoradiogram showed a character of the absorptive function.

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Lung Scintiphotograms of Children Suffering from Bronchial Asthma

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Lung Scintiphtograms of 40 bronchial asthmatic patients were performed with ^{131}I -

MAA or $^{113\text{m}}\text{In}$ -macroparticles in both attacks and their intervals.

In attacks, all the patients proved to have focal perfusion abnormalities, while in remission they had no abnormalities in the majority, however some of them demonstrated the abnormalities even when asymptomatic.

In one patient examined during repeated attacks the abnormality appeared to be localized in the same regions. While in other three patients the different areas of pulmonary circulation were affected in different attacks.

When we compare various positional views, more informations may be obtained.

In our laboratory, scintigrams in eight dif-

ferent directions had been obtained with Anger type scinticamera (A-P, P-A, r/l lateral, r/l antero oblique and r/l postero oblique). It seemed that this technique was very suitable for detecting the focal perfusion abnormalities in asthma.

Recently, time serial scintiphotograms with ^{133}Xe saline injected intravenously have been studied which demonstrate the distribution of pulmonary blood flow and clearance of the radioactive substance from the lung. The affected lungs washed ^{133}Xe gas out more slowly than normal.

Lung Scanning in Cardiac Patients

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Pre- and postoperative pulmonary scintiscanning was performed for regional pulmonary blood flow study in 115 cardiac patients, 80 congenital and 35 acquired.

In sitting or supine position, 100 to 150 micro-Ci. of ^{131}I -MAA was intravenously administered and pulmonary scinti-scanning was performed to measure regional blood flow of the bilateral upper and lower lung fields for calculation of the pulmonary blood flow index. Same technic was applied for total body linear scanning in cyanotic cases to calculate the right to left shunt ratio.

In mitral cases, the pulmonary blood flow ratio between the upper and lower fields (upper and lower ratio) was significantly high i.e. decrease of the lower lung field was remarkably noted.

In MS cases, the upper and lower ratio was high and pulmonary blood flow was influenced by changing position of the patient, while in MI, the upper and lower ratio was low. The upper and lower ratio was well correlated to left atrial mean pressure and pulmonary arterial pressure.

The high upper and lower ratio will be an indicator of high left atrial and pulmonary arterial pressure and the grade of mitral

valve disease. In these cases, decrease of the lower lung field was not so remarkable as in mitral cases.

In non-cyanotic congenital cases, the upper and lower ratio was not high and was not correlated to pulmonary circulatory disturbance, while in 3 Eisenmenger syndrome cases, the ratio was very high and these cases were out of surgical indication. In these cases, the right to left shunt was verified by total body linear scanning.

In congenital cyanotic cases, the upper and lower ratio was within normal range and the ratio was high after radical or Blalock shunt operation of tetralogy of Fallot. In 13 of these cases, regional pulmonary blood flow disturbance was observed. Total body linear scanning was performed in all these cases, and the right to left shunt ratio to the whole venous return was 18 to 60%. After Blalock shunt operation, the shunt ratio decreased and shunt disappeared after radical operation by total linear scanning.

Pulmonary scinti-scanning is well tolerated by patients and a less dangerous diagnostic method and will be an important clue of surgical indication and prognostic evaluation.