

Studies on Broncho-Pulmonary Circulation Using Radioisotopes

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The studies on the broncho-pulmonary circulation using radioisotopes on the various view points has been reported.

This time, the following results were obtained using blood radioactivity curves and pulmonary scintiscanning on the experimental pulmonary infarction and some experimental pulmonary diseases.

1. In normal dogs, we observed uniform scintigram in both lungs, with the pulmonary arterial flow being almost equal in both lungs. And in bronchial arterial scintigram, bilateral and lateral types were found, with the lateral type confined to a group of cases with filaria.

2. Of the case with experimentally produced pulmonary infarction, only a few were found to show clear abnormal shadows in roentgenograms, and even in cases in which abnormal shadows were not recognizable, we could observe clearly in lung scintigram disturbance of the pulmonary arterial blood flow.

3. In pulmonary arterial scintigrams of pulmonary infarction, the existence of a cold area, clearly representing a defect in radioactivity and corresponding to the infarcted part, was observed. From this, the existence of disturbances of regional pulmonary blood flow was clearly substantiated.

In as many as 87.2 per cent of the bronchial arterial scintigrams (BAS) of the cases

of pulmonary infarction, we could observe hot lesions corresponding, in position, to cold areas in pulmonary arterial scintigrams (PAS). From the existence of these hot lesions, we were able to suppose an increase in the bronchial arterial blood flow in the infarcted part. Besides, from radioisotopes counts in removed lungs, which, in the infarcted part and in lobes around that part, were usually 4-5 times as high as those in lobes without infarction, we could prove the existence of hot lesions through bronchial arterial scintigrams (BAS).

4. Measured at fixed intervals of time, RI counts in the infarcted lobe in a removed lung showed the fact that, during a period from the first to third week, bronchial arterial blood flow showed a tendency to increase remarkably, while, from the fourth week, it showed a tendency to decrease gradually. The results we obtained proved to be in good agreement with those obtained by Sugihara of our department from his measurements of bronchial arterial blood flow.

5. From our findings respecting blood radioactivity (RI) curves of the blood extracted simultaneously from the vena caval vein and from the femoral artery, it was presumed that the existence of anastomosis between the pulmonary artery and the bronchial artery was undeniable.