Study on Scintigrams of Lung

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The present communication deals with the results obtained of the lung-scintiscanning with $^{131}$I-macroaggregated albumin ($^{131}$I-MAA) conducted on 29 cases of lung diseases composed mainly of lung tuberculosis. The subjects were 23 cases of lung tuberculosis, 4 of lung cancer, one of silicosis, and one of pancreatic cancer with hepatic metastasis. Examinations were commenced five minutes after venous injection of 200 $\mu$Ci of $^{131}$I-MMA at supine posture. The apparatus used was Toshiba ML 200II model scintiscanner (2 x 2" NaI crystal, 12 mm straight collimeter), which was modified as to enable us to take one color scintigram and two spark scintigrams with distinct radioactivity levels.

The incidence of injury detected in the scintigrams of various fields is greatest (55%) in the right lung apex and left sinus phrenicocostalis, followed by the right upper lung field (52%) and the left lower lung field (41.5%). The roentgenograms of the lung injury as detected in the scintigram revealed a high rate of swelling, infiltration, elevated diaphragm, and shrinkage of the thoracic cavity. In addition, the detectable rate of lung injury by the scintigrams was 100% in atelectasis, elevated diaphragm, and shrunken thoracic cavity, and it was about 50 to 80% in other pathological findings.

In the scintigrams taken from 7 cases who underwent lung lobectomy or the reconstruction of thoracic cavity, there can be observed a considerable circulatory damage in the residual lobes in those less than 2 and half years after either operation, but a distinct recovery can be seen in those 5 years after the operation. The scintigrams of those receiving lobectomy generally tend to reveal a heavier damage to the circulatory system as compared with their X-ray pictures. In contrast, in three cases who had complication of a marked swelling after pleuritis, strangely the circulatory damage is slight as compared with their X-ray pictures. In the four cases of lung cancer the scintigrams reveal the injury in the atelectatic field but there was a case who showed circulatory damage of the lung field adjacent to the atelectatic field revealed no striking injury in X-ray pictures. Although this case died shortly afterwards, it is presumed that foci had developed extensively prior to the injury being detected by X-ray pictures. Therefore, it is concluded that this scintiscanning method will afford clearly a significant approach to know the prognosis in lung diseases.

Studies on Distribution of Regional Pulmonary Blood Flow by Scintillation Scanning (I)

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By means of the lung scintiscanning, it has become possible to know quantitatively the ratio of the regional pulmonary blood flow and to understand better the relationship of pulmonary function to regional pulmonary vascular beds.

Before performing scintiscanning of the lung on human subjects, mice treated with inorganic iodine before hand were given 10–20 $\mu$C of $^{131}$I-MAA i.v. and sacrificed at each predetermined time. Radioactivity of the lungs, liver, spleen, kidneys, brain, heart, thyroid and the G.I. canal was measured by the well-type scintillation counter. Ninety-two to ninety-three per cent of the injected dose remained in the lungs in the first forty-five minutes, and then decreased slowly until 120 minutes when eighty-five per cent of the