SLOW DYNAMIC SPECT
-PHANTOM EXPERIMENT AND ITS CLINICAL
APPLICATION TO PULMONARY DISEASES-

A software for slow dynamic SPECT was
developed, which is expected to examine
the local dynamics of viscerais. The slow
dynamic SPECT technique was then utilized
for phantom experiment and seven clinical
cases. The following conclusions were
drawn.

1. Slow dynamic SPECT technique more
sensitively detected inner part dy-
namics of phantom, than planar tech-
nique.

2. Seven lung cancer cases were examined;
Xe-133 wash-out curve was presumed
to be 3-phase exponential by planar
and 2-phase by SPECT.

3. In blood-flow defected lesion, delayed
beginning of wash-out was observed,
which presumably is due to Xe-133 gas
by-pass like inflow through trachea.

4. Slow dynamic SPECT technique will be
available for the quantitative local
dynamic analysis.

THE EVALUATION OF REGIONAL PULMONARY
VENTILATION AMONG PATIENTS WITH CORONARY
ARTERY DISEASE.

Xe-133 pulmonary ventilation scintigrams
were used to examine the regional pulmonary
ventilation of a prior myocardial infarction
group and a control group. The prior
myocardial infarction group was divided in-
to 2 groups according to the level of pul-
monary congestion determined by plain chest
X-rays.

The Xe-133 wash-in time was 2 minutes;
wash-out time was 8 minutes. One logarith-
mic function for the wash-in time, and two
for the wash-out time, were derived from the
pulmonary time activity curve. The regres-
sion coefficients and determinant coeffi-
cients were then computed and used as an
index for regional pulmonary ventilation.

The cause of reduced left heart function
due to pulmonary congestion was evaluated
from the upper lung wash-out second compo-
ment value, X. This was also evident from
the spectrum of the pulmonary perfusion
scintigram.

Stenosis or obstruction of the terminal
airway at the pulmonary congestion was pre-
sumed according to the upper/lower lung
ratio of the wash-out first component slope,
b. This indicated that hemodynamic changes
due to heart disease affect regional pulmo-

PULMONARY VENTILATION AND PERFUSION STUDIES
IN REFERENCE TO PATIENTS WITH LUNG CANCER
BEFORE AND AFTER LUNG OPERATION.

In 28 patients, the ventilation and perfu-
sion studies were examined before and af-

ter lung surgery. Imaging of ventilation and
perfusion were done during tidal breathing
with Kr-81m gas and Tc-99m MAA. Scintigrams
were automatically analysed by software
using GPL on a GMS-55A computer system.
The functional loss in percentage of total
pretreatment function were calculated from
scintigraphic data of ventilation and perfu-
sion. The mean values and the standard dev-
ations of the percentage of V and Q were
V: 45.1±24.3% and Q: 52.1±26.3%. There are
some differences between segmental resec-
tion and lobectomy in the functional loss.
The anatomical loss in percentage of the tot-
al pretreatment capacity were 45.5±24.1%.
The functional images of V/Q ratio and Q/V
ratio in the sitting position showed that
no gravitational effect of operated lung
had been seen in 7 of 28 cases. Six months
later after operation ventilation and perfu-
sion has improved relative to those in 1
month later in 11 of 14 cases.