of $V_{50}$ and $V_{25}$ to the control level. Any contrast medium was cleared from the major bronchi in 24 hours, forming acinar or millimeter patterns in the lung parenchyma. Hytrast appeared to remain in the lung for a longer period than the other 3 contrast media.

In summary, Hytrast seems to give a most and prolonged derangement on lung function followed by Dionosil oily. Dionosil (aqueous) and Urokolin give the least disturbance. It is speculated that the reason for an early recovery of perfusion despite a prolonged effect on $V_{50}$ and $V_{25}$ is due to establishment of collateral ventilation distal to the small airways.

Regulation of Regional Perfusion as a Function of Oxygen Concentration in Inspired Gas and Alveolar Pressure

T. ISAWA, T. TESHIMA, T. HIRANO and K. KONNO
Department of Medicine, The Research Institute for Tuberculosis,
Leprosy and Cancer, Tohoku University, Sendai

The purpose of the study is to elucidate the effects of regionally inspired gas of different oxygen concentration and alveolar pressure on perfusion of a lobe isolated in vivo from the rest of the lungs.

A balloon catheter was inserted into the right upper lobe (RUL) bronchus of a nembutal-anesthetized dog with the aid of a flexible bronchoscopy and sealed its orifice with the balloon inflated. The external end of the catheter was connected via a three-way stop-cock to a water manometer and syringes for gas exchange. Gas mixtures of different oxygen concentration were artificially administered to inflate the RUL at the maximal pressure of +14-19 cmH$_2$O (TLC) and +1-1 cmH$_2$O (tidal range). $^{99m}$Tc-MAA was used for perfusion measurement with a scintillation camera.

At the lobar TLC, regional perfusion increased with breathing air, 40% $O_2$, 100% $O_2$ and 10% $CO_2$ in air as compared with $N_2$ gas, but was still less than that during air breathing without the balloon catheter. At tidal pressure range, perfusion of the RUL increased almost linearly as $O_2$ concentration in the inspired gas increased, and during 100% $O_2$ gas respiration, it was almost identical or slightly increased as compared with that during air breathing without the balloon catheter. Aminophylline did not increase regional perfusion.

Perfusion was measured at different alveolar pressures in the RUL during air and $N_2$ gas breathing. Regional perfusion decreased with either gas at TLC, but was greatest at the tidal pressure range. Regional perfusion decreased as alveolar pressure or volume decreased. It was more marked during $N_2$ gas breathing than during air breathing.

In summary, regional perfusion seems influenced most by oxygen concentration in inspired gas and alveolar pressure or the degree of alveolar expansion. As far as the volume is concerned, the alveolar volume of tidal pressure range seems most favorable for maintaining maximal regional perfusion.