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 Concentartion in Inspired Gas and Alveolar Pressure

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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 bronchofiberscope 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_2O (TLC) and $+1-\ -1$ cmH_2O (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_1 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.