

5617

Subtotal Atelectasis and Pneumectomy in Dogs.

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Permanent closure of the bronchial stump in pneumectomy is essential to a low mortality accompanying that condition. Experimental studies by Bettman^{1, 2} and ourselves^{3, 4} show healing of the stump to be brought about by peribronchial tissue. Thus, whereas the removal of a lung with a generous stump left for closure is usually attended by success, the reverse is often true when a bare bronchial closure remains.⁵

The instigation of the following experimental work was the finding of a safe and reliable method for closing large bronchi. This consisted of an application of a 35% solution of silver nitrate to the entire circumference of a bronchus. Complete stenosis followed within 2 weeks. With the bronchus stenosed, the lung became atelectatic and its subsequent removal could be safely and easily accomplished.

The following experiments were carried out to determine the maximum amount of pulmonary tissue that could be collapsed or removed in the dog.

In the earlier experiments each bronchus was stenosed individually and only one or 2 lobes were removed at a single operation. Later, however, the right or left primary bronchus was dealt with as a whole and the entire lung removed at one stage. Subsequent stenosis of remaining bronchi was attended with some difficulty, this increasing as more of the pulmonary tissue was collapsed. Once the bronchus was completely stenosed, however, its subsequent removal was always attended by success.

Subtotal Atelectasis and Subtotal Pneumectomy in 6 Dogs. The percentages in Table I represent the value of each lobe in comparison to the total lung volume by weight. Those on the right represent that portion of the total pulmonary tissue functioning at the present time.

¹ Bettman, R. B., *Arch. Surg.*, 1924, **8**, 418.

² Bettman, R. B., *et al.*, *Surg. Gyn. and Obst.*, 1928, **46**, 602.

³ Adams, W. E., and Livingston, H. M., *Ann. Surg.*, 1930, **91**, 342.

⁴ Adams, W. E., and Livingstone, H. M., "A Safe and Sure Method of Closing Large Bronchi." Ready for press.

⁵ Robinson, S., and Sauerbruch, F., *Deutsch. Z. f. Chir.*, 1909, **102**, 543.

In 3 dogs, a subtotal atelectasis was produced, while in 3, lobectomy and pneumectomy were performed subsequent to collapse of the pulmonary tissue. No deaths occurred during the experimentation during which time 3 pneumectomies and 2 lobectomies of 2 lobes each were carried out. Following the production of subtotal atelectasis, the dogs became quite dyspneic and somewhat cyanotic, which lasted from 1 to 4 days depending upon the amount of lung tissue collapsed at one time. Subsequent to this acute reaction, they appeared quite normal while at rest but became very dyspneic on slight exertion.

TABLE I. *Pulmonary Lobes.*

Dog No.	15% Rt. Upper	8.7% Rt. Middle	25% Rt. Lower	8.3% Accessory	15% Left Upper	27.9% Left Lower	Lung tissue remaining
161c	Collapse 6-10-30	Collapse 4-29-30	Collapse 3-4-31	Collapse 6-10-30	Collapse 4-29-31	Normal	% 27.9
638c	Collapse 5-12-31	Collapse 5-12-31	Collapse 5-12-31	Collapse 6-1-30	Collapse 12-8-30	Normal	27.9
617c	Collapse 10-29-30	Collapse 10-29-30	Collapse 10-29-30	Collapse 10-29-30	Normal	Collapse 5-11-31	15.0
642c	Normal	Collapse 11-26-30 Lobect'y 4-23-31	Normal	Collapse 10-9-30 Lobect'y 4-23-31	Collapse 6-5-30 Pneumectomy 7-1-30	Collapse 6-5-30	40.0
795c	Normal	Normal	Collapse 8-22-30 Lobect'y 8-26-30	Collapse 7-15-30 Lobect'y 8-26-30	Collapse 10-29-30 Pneumectomy 4-23-31	Collapse 10-29-30	23.7
615c	Collapse 10-29-30 Pneumectomy Right	Collapse 10-29-30	Collapse 10-29-30	Collapse 10-29-30	Normal	Normal	42.9

In contrast to this, no dyspnea was noted following lobectomy or pneumectomy. The animals lay quietly in their habitat and refused food for the first 2 or 3 days. Subsequent to this they appeared quite normal with the exception of experiencing a non-productive cough. They, too, exhibited great dyspnea on slight exertion.