5558

Changes in Thoracic Size Following the Administration of Broncho-constricting or Broncho-dilating Drugs to Dogs.*

MYRON PRINZMETAL, SELLING BRILL AND C. D. LEAKE.

From the Department of Surgery, Division of Thoracic Surgery, and the Pharmacological Laboratory, University of California Medical School.

Report has been made of the intrapleural pressure changes occurring after the administration of typical broncho-constricting or broncho-dilating drugs to dogs.[1] It has been suggested that these alterations in intrapleural pressure may be mediated by variations in thoracic girth accompanying the effects of these drugs on the respiratory mechanism, especially as a result of changes in alveolar and blood carbon dioxide tension following broncho-constriction or broncho-dilatation. The experiments here reported were undertaken to determine directly whether alteration in thoracic size actually occurs after the administration of broncho-constricting or broncho-dilating drugs.

The technique used for intrapleural pressure determination was the same as that previously described. In addition we measured directly the circumference of the thorax about 5 cm. above the xiphoid process, and we obtained records of respiratory movement by kymograph and pneumograph. After the subcutaneous injection of solutions of such broncho-constricting drugs as pilocarpine nitrate (2 experiments) and eserine salicylate (4 experiments), we found uniformly an *increase* in average thoracic girth accompany-

TABLE I.

Effect on intrapleural pressure and thoracic girth of the subcutaneous injection of 6 mgm. atropine sulphate in a 21 kilo dog anesthetized with sodium amytal.

	Intrapleural Pressure in Cm. H_2O		Thoracic Girth	
	Inspiration	Expiration	Inspiration	Expiration
			cm.	cm.
Normal	—2.8	0.0	25.2	25.1
5 min. after drug	—2.1	+3.0	25.0	24.8
10 " " "	—2.0	+7.0	24.8	24.5
15 " " "	—2.0	+8.0	24.6	24.4

* Supported in part by the J. J. and Nettie Mack and the Purington Research Funds.

[1] Brill, S., Prinzmetal, M., and Leake, C. D., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 518; 1931, **28**, 617; 1931, **28**, 832.

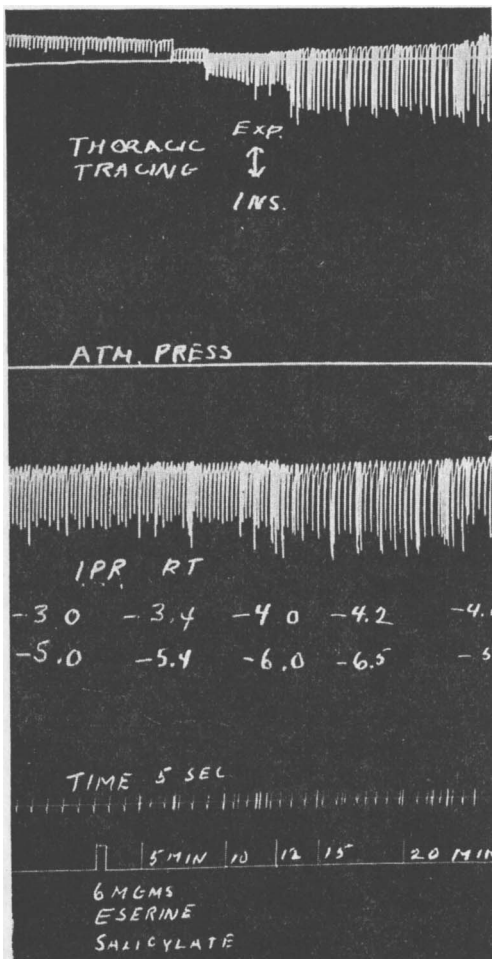

FIG. 1.

Effects of the injection of eserine, a typical broncho-constricting drug, on intrapleural pressure and thoracic girth as determined by pneumograph in a 12 kilo dog lightly anesthetized with sodium amytal. Intrapleural pressure figures are indicated in centimeters of water.

ing a more negative intrapleural pressure (Fig. 1). This corresponds to the change in thoracic size accompanying the more negative intrapleural pressure resulting from the inhalation of 10% CO_2 in oxygen. We found a *decrease* in mean thoracic girth (Table 1) accompanying a more positive intrapleural pressure after the administration of such broncho-dilating drugs as atropine sulphate (3 experiments) and epinephrine hydrochloride (1 experiment).

We may postulate that the effects of broncho-constriction or

broncho-dilatation on intrapleural pressure are mediated by a sequence of events, causally related, as follows:

Broncho-constriction	Broncho-dilatation
↓	↓
Increased alveolar and blood CO_2 tension	Diminished alveolar and blood CO_2 tension
↓	↓
Stimulation of inspiratory medullary center	Relative depression of inspiratory medullary center
↓	↓
Increased inspiratory muscular activity	Diminished inspiratory muscular activity
↓	↓
Increased average thoracic size	Reduced average thoracic girth
↓	↓
More negative intrapleural pressure	More positive intrapleural pressure

While our experimental evidence presented in this and previous reports does not prove that a causal relationship exists between the sequence of events as listed in these schema, we feel that it is sufficient to establish a working theory in the absence of any significant evidence otherwise.

5559

Iodochloroxyquinoline (Vioform, N.N.R.) as an Amebacide in Macaques.*

HAMILTON H. ANDERSON AND DOROTHY A. KOCH.
(Introduced by C. D. Leake.)

From the Pharmacological Laboratory, University of California Medical School, and the Pacific Institute of Tropical Medicine, Hooper Foundation for Medical Research, San Francisco.

In a previous study of a series of halogenated oxyquinoline derivatives, iodochloroxyquinoline (vioform, N.N.R.) was shown to be an effective balanticide in guinea pigs, with relatively low toxicity on repeated administration to monkeys.[1] The soluble hydrochloride of the basic ether of this compound was found to kill amoebae *in vitro* in high dilutions. On this basis we began to investigate the

* Part of an extended cooperative study of the chemotherapy of amebiasis, supported in part by the Ciba Co., Inc., New York City, and Eli Lilly and Co., Indianapolis.

[1] Anderson, H. H., David, N. A., and Koch, D. A., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 484.