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Effects of Typical Broncho-Dilating Drugs on Intrapleural Pressure.*

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By means of suitable trochars and rubber tubing, one may observe intrapleural pressures from both sides of the chest of normal unanesthetized dogs. The tubing may be branched so that both manometric and kymographic records may be obtained for intrapleural pressure changes from each side of the chest. With such an arrangement we have noted the effects on intrapleural pressure of the administration of (1) epinephrin, a typical stimulant of the thoraco-lumbar autonomics and (2) atropine, a drug acting by peripheral paralysis of the cranio-sacral autonomics. Both drugs cause bronchodilatation.

Examples of approximate intrapleural pressure changes in dogs following the administration of these drugs are offered in the tables. The mean pressure, which is given in a separate column, is the average of the intrapleural pressure at inspiration and expiration. It is difficult to obtain satisfactory manometric readings with a rap-

TABLE I.

Dog—Wt. 6 kilos. No anesthesia. Intrapleural pressure readings after injection of 2 cc. epinephrin hydrochloride 1/1000 subcutaneously.

	Right Chest		Left Chest	
	IPP in cms. of H_2O	Mean IPP in cms. of H_2O	IPP in cms. of H_2O	Mean IPP in cms. of H_2O
Normal average	+0.6 to —8.4	—3.9	+2.0 to —8.6	—3.3
5 min. after epinephrin	+2.6 to —8.4	—2.9	+3.4 to —8.6	—2.6
8 min. after epinephrin	+2.6 to —8.8	—3.1	+3.4 to —8.2	—2.4
9 min. after epinephrin	+3.6 to —8.4	—2.4	+3.2 to —8.2	—2.5
15 min. after epinephrin	+3.6 to —9.0	—2.7	+4.2 to —8.2	—2.0
17 min. after epinephrin	+3.6 to —8.4	—2.4	+3.8 to —8.2	—2.2
24 min. after epinephrin	+4.4 to —8.8	—2.2	+5.8	
29 min. after epinephrin	+4.0 to —8.8	—2.4		
1 hr. after epinephrin	+5.6 to —7.8	—1.1		

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TABLE II.

Dog—Wt. 9 kilos. Anesthesia sodium neonal, 450 mgm. intraperitoneally. Intrapleural pressure readings after intravenous injection of 0.4 cc. epinephrin hydrochloride 1/1000.

	IPP Right Chest in cms. H_2O	Mean IPP in cms. H_2O
Normal	—3.6 to —7.0	—5.3
3 min. after epinephrin	—3.6 to —7.2	—5.4
6 min. after epinephrin	—3.4 to —7.2	—5.3
8 min. after epinephrin	—2.6 to —6.6	—4.6
10 min. after epinephrin	—1.6 to —5.6	—3.6
11 min. after epinephrin	+0.2 to —5.6	—2.7
13 min. after epinephrin	+3.0 to —5.6	—1.3
15 min. after epinephrin	+5.4 to —5.6	—0.1

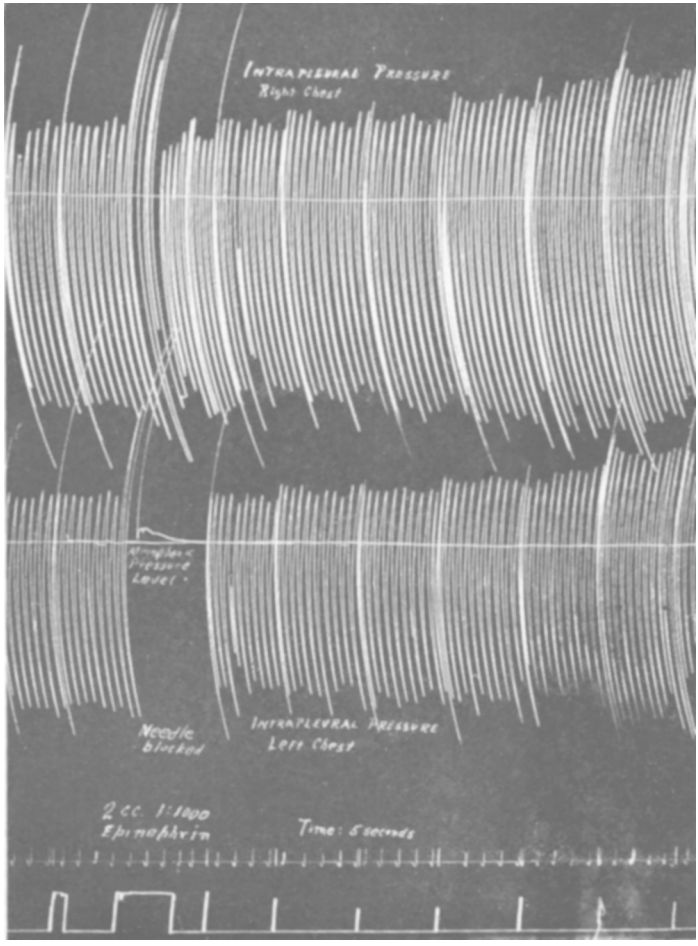

FIG. 1.

Kymographic record showing increase in intrapleural pressure following the subcutaneous injection of 2 cc. 1:1000 solution of epinephrin hydrochloride.

TABLE III.

Dog—Wt. 18 kilos. No anesthesia. Intrapleural pressure readings after injection of atropine sulphate subcutaneously.

Jan. 9. Dose 6 mg.			Jan. 31. Dose 5 mg.		
	IPP Left Chest in cms. H_2O	Mean IPP in cms. H_2O		IPP Left Chest in cms. H_2O	Mean IPP in cms. H_2O
Normal	—0.8 to —5.8	—3.3	Normal	—2.0 to —6.0	—4.0
2 min. after atropine	—0.8 to —5.2	—3.0	3 min after atropine	0.0 to —6.0	—3.0
5 min. after atropine	—0.8 to —5.2	—3.0	6 min. after atropine	+1.0 to —7.0	—3.0
8 min. after atropine	+0.6 to —4.8	—2.1	10 min. after atropine	—1.0 to —6.6	—3.8
11 min. after atropine	+2.8 to —4.8	—1.0	14 min. after atropine	—1.4 to —6.0	—3.7
13 min. after atropine	+5.2 to —2.8	+1.2	17 min. after atropine	—0.6 to —6.6	—3.6
15 min. after atropine	+5.2 to —2.8	+1.2	20 min. after atropine	+1.4 to —6.0	—2.3
			23 min. after atropine	+0.6 to —5.0	—2.2

idly moving column of water and, therefore, the kymograph tracings probably present a better picture of the changing intrapleural pressure.

Examination of the kymographic tracings and of the data presented in the tables shows that the administration of epinephrin or

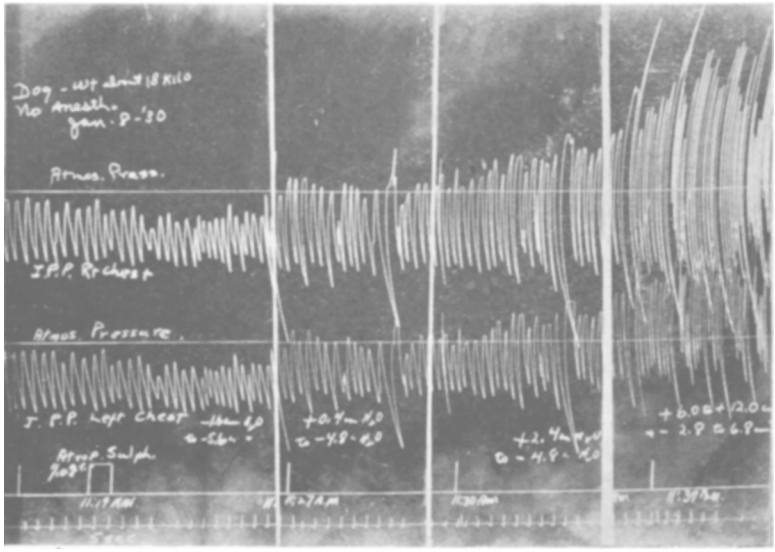

FIG. 2.

Kymographic record showing increase in intrapleural pressure following the subcutaneous injection of 6 mgm. atropine sulphate, in an unanesthetized dog.

atropine is followed by a definite increase in intrapleural pressure. The effect seems quite prolonged, and in the case of epinephrin, does not become apparent until the action of the drug on blood pressure has practically disappeared. With broncho-dilatation, less resistance is offered to the movement of air in and out of the lungs and this seems to be accompanied by less suction on expansion of the chest.

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Effect of Emetine Hydrochloride by Subcutaneous Injection on Oxygen Consumption in Human Subjects.

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Pellini and Wallace[1] in their review of the pharmacology of emetine mention the cardiac depressant action of the drug with the resultant fall in blood pressure. Respiratory changes may also occur but were thought to be dependent upon circulatory failure. These workers noted in fasting dogs an increase in total nitrogen, urea nitrogen, and ammonia nitrogen following injections of emetine. These results were believed to be due to an interference with intracellular metabolism with an accompanying acidosis. No work appears in the literature on the effect of emetine on oxygen consumption.

We have attempted to determine the effect of emetine hydrochloride† in therapeutic doses on pulse rate and pressure, respiratory rate, and oxygen consumption in normal humans and in patients under treatment for amebiasis. Five medical students were selected as "normal" subjects and 3 clinic patients were used for study, 2 harboring *Entamoeba histolytica* and one with gall-bladder disease. The oxygen consumption tests were made with the Sanborn "graphic" apparatus by the closed method.

After a 15-hour fast period and after lying quietly for 30 minutes the patient's pulse rate and pressure, and respiratory rate were taken and oxygen consumption tests were made. Following this the drug

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[1] Pellini, E. J., and Wallace, G. B., *Am. J. Med. Sci.*, 1916, clii, 325.

† Ampoules of emetine hydrochloride containing 0.065 gm. (Eli Lilly and Co.).