

Effect of Oil of Peppermint, Dehydrocholic Acid and Disodium Phosphate on Gastric Emptying in Dogs.

J. CLIFFORD STICKNEY. (Introduced by Edward J. Van Liere.)

From the Department of Physiology, School of Medicine, West Virginia University, Morgantown, W.Va.

The results reported here were obtained in an endeavor to find a simple substance which would reduce to normal the increased gastric emptying time produced by anoxia. Oil of peppermint,¹ dehydrocholic acid² and disodium phosphate³ were chosen, because they have been reported to decrease gastric emptying time in human beings and the first named agent in dogs as well. In addition they have little or no complicating side effects.

Normal gastric emptying time was determined fluoroscopically on 4 dogs following a meal of 10 g ground dried bread, 20 g ground lean beef and 50 cc skim milk to which 15 g barium sulfate were added. From 6 to 11 control determinations were made on each dog to establish the mean. In the case of dogs 2, 3 and 4 the control and experimental values were obtained with the dogs in a low-pressure chamber at normal atmospheric pressure when the experiments with oil of peppermint were undertaken. For the other experiments the dogs were kept in their accustomed quarters. The dehydrocholic acid and the disodium phosphate were mixed with the test meal

while the oil of peppermint was given orally in a capsule immediately before the test meal.

The dogs weighed from 8.6 to 9.8 kg. The effect of oil of peppermint was tested at three dosage levels: 0.1, 0.2 and 1.0 cc. Dog 4 vomited on two occasions with the 1.0 cc dose, so it was concluded that no larger amount could profitably be given. The amount of dehydrocholic acid administered was 0.5 g. Disodium phosphate was tested at the 0.5 and 1.0 g dosage levels. In every case with one exception four or more trials were made on each drug at each dosage level.

The results are given in the accompanying tables along with the calculation of Fisher's "p"⁴ to determine the significance of the differences. It will be noticed that with 2 exceptions gastric emptying time was increased in every case when the groups are taken as a whole, but with certain dogs there was a significant increase for certain dosage levels of the drugs. Dog 1, which was also given oil of peppermint at the 0.2 cc dosage level, had a significant increase in gastric emptying time after 0.1 cc and 0.2 cc oil of peppermint.

TABLE I.
Effect of 0.1 and 1.0 cc Oil of Peppermint on Gastric Emptying Time.

Dog No.	Control, hr	After 0.1 cc oil of peppermint, hr	Difference, hr	Fisher's "p"	After 1.0 cc oil of peppermint, hr	Difference, hr	Fisher's "p"
1	5.50	6.30	+ .80*	<.001	5.85	+ .35*	>.05
2	5.16	5.81	+ .66	>.10	5.48	+ .32	>.20
3	5.78	6.75	+ .97	>.10	7.06	+ 1.27*	<.01
4	4.83				4.94	+ .11	>.20
Avg	5.48†	6.29	+ .81	>.05	5.83	+ .51	>.20

* Significant when "p" is .05 or less.

† Dog 4 not included.

¹ Sapoznik, H. I., Arens, R. A., Meyer, J., and Necheles, H., *J. Am. Med. Assn.*, 1935, **104**, 1792.

² Van Liere, E. J., and Northup, D. W., *Am. J. Dig. Dis.*, 1941, **8**, 26.

³ Van Liere, E. J., and Sleeth, C. K., *Am. J. Dig. Dis.*, 1940, **7**, 118.

⁴ Fisher, R. A., *Statistical Methods for Research Workers*, fourth edition, Oliver and Boyd, London, 1932.

TABLE II.
Effect of 0.5 and 1.0 g Disodium Phosphate on Gastric Emptying Time.

Dog No.	Control, hr	After 0.5 g disodium phosphate, hr	Difference, hr	Fisher's "p"	After 1.0 g disodium phosphate, hr	Difference, hr	Fisher's "p"
1	5.50	5.79	+ .29	>.20	5.80	+ .30	>.20
2	5.32	5.85	+ .53*	>.10	5.10	— .22	>.20
4	4.94	5.30	+ .36	>.10	5.62	+ .69*	>.05
Avg	5.25	5.64	+ .39	>.20	5.51	+ .26	>.20

* Significant when "p" is .05 or less.

TABLE III.
Effect of 0.5 g Dehydrocholic Acid on Gastric Emptying Time.

Dog No.	Control, hr	After dehydro- cholic acid, hr	Difference, hr	Fisher's "p"
2	5.32	5.62	+ .31	>.20
3	5.40	5.00	— .40	>.20
4	4.94	6.06	+ 1.12*	<.01
Avg	5.22	5.56	+ .34	>.20

* Significant when "p" is .05 or less.

In the case of oil of peppermint, the results confirm the work of Van Liere and Northup,⁵ who found no change in gastric emptying time in human subjects. The lack of confirmation of the work of Sapoznik *et al.*¹ may be attributed to their use of a different method to determine gastric emptying in their dogs and also to their use of very large doses of

oil of peppermint. In regard to dehydrocholic acid and disodium phosphate it is difficult to explain why the dogs reacted differently than did the human subjects of Van Liere and his coworkers.^{2,3}

Conclusions. The gastric emptying time of dogs has not been found to be significantly changed on the whole by the administration of oil of peppermint, dehydrocholic acid or disodium phosphate at the dosage levels used.

⁵ Van Liere, E. J., and Northup, D. W., *J. Pharm. and Exp. Ther.*, 1942, **76**, 39.