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Effect of Hyperpyrexia on Tonus of Human Common Bile Duct and Cardiac Sphincters.**HENRY DOUBILET AND WILLIAM BIERMAN.***From the Surgical Service of Dr. Ralph Colp and the Department of Physical Therapy, Mount Sinai Hospital, New York City.*

It has been known clinically that heat applied to various parts of the body causes muscular relaxation. There are, however, no records in literature to prove that heat actually relaxes intestinal sphincters. Advantage was taken of newly developed methods to record kymographically the effect of hyperpyrexia on the common bile duct sphincter and on the cardiac sphincter.

Methods. A duodenal tube was passed in a patient in whom the common bile duct had been drained by T-tube 2-3 weeks previously. By means of a simple apparatus,¹ a continuous flow of saline was allowed to pass into the T-tube, through the common duct, and into the duodenum. The duodenal tube then drained off the fluid by siphonage. The resistance produced by the sphincter of Oddi could then be measured by means of a water manometer and recorded kymographically on a smoked drum. After obtaining the normal level of resistance of the sphincter, the patient's temperature was raised in a cabinet to approximately 103°F. Changes in the tonus of this sphincter could then be recorded continuously.

Changes in the tonus of the cardiac sphincter were measured by means of a Levine tube to the end of which a balloon was attached. The Levine tube was passed through the cardiac sphincter in a patient who was being treated for cardiospasm. Under fluoroscopic control the balloon was inflated at the point at which the cardiac sphincter compressed its midportion. The inflation was such as to support a column of water in a manometer to the height of 80 mm of water. Changes in the tonus of the sphincter were measured by the rise and fall of this column of water and recorded continuously on a kymograph. Relaxation of the sphincter increased the volume of the balloon and caused the manometric level to fall.

Results. Fig. 1 is a typical record of a tracing showing changes in the tonus of a common bile duct sphincter. Under the influence of rising temperature it can be clearly seen that as the temperature was raised, the tonus of the sphincter gradually decreased from a level of 175 mm to about 125 mm. As the patient cooled, there was only a

¹ Doubilet, H., and Colp, R., *Surg., Gynec. and Obstet.*, 1937, **64**, 622.

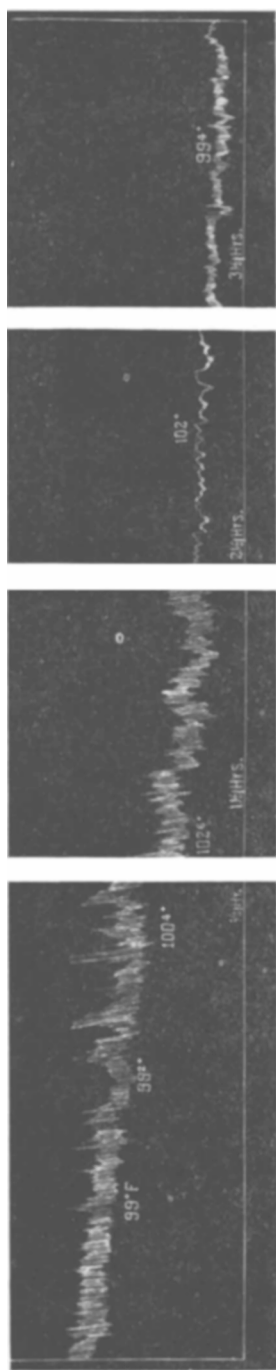


Fig. 1.

Portions of a continuous kymographic record of the resistance of the human common bile duct sphincter under the influence of hyperpyrexia. Note that the resistance of the sphincter fell from a level of 175 mm of water to a level of 125 mm of water after 2 hr of heat.

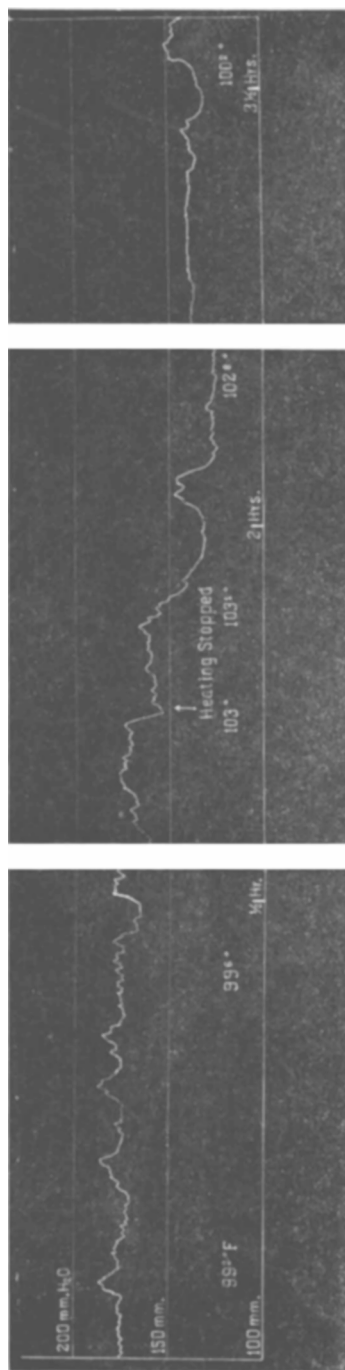


Fig. 2.

Portions of a continuous kymographic record of variations in the tonus of the cardiac sphincter. The fall to the level of the base line indicates that the sphincter is relaxing markedly. The fine tonus rhythm of the cardiac sphincter can be observed at a $2\frac{1}{2}$ -hr period very clearly.

slight increase in the tonus which was still low at the end of a $3\frac{1}{2}$ -hr. period. Fig. 2 is a typical record showing the decrease in the tonus of the cardiac sphincter in patient who was being treated for cardio-spasm by means of hyperpyrexia.

Summary. Kymographic tracings are shown which clearly indicate that hyperpyrexia causes relaxation of the common bile duct sphincter and of the cardiac sphincter in the human.

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Bisulfite Binding Substances (B.B.S.) in the Blood and Cerebrospinal Fluid.*

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(Introduced by N. Jolliffe.)

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The bisulfite binding substances (total aldehydes and ketones) have been the subject of much recent investigation, and their relationship to Vitamin B₁ deficiency has been both confirmed¹ and denied.²

The present study of B.B.S. in the blood and cerebrospinal fluid was undertaken in order (1) to compare the levels of bisulfite binding substances in the blood and cerebrospinal fluid, (2) to study the level of bisulfite binding substances in the blood and cerebrospinal fluid in various neuropsychiatric disorders, (3) to determine the relationship of any increase in these carbonyl compounds (B.B.S.) to clinical evidences of Vitamin B₁ deficiency.

Method. Blood and spinal fluid were taken from patients fasting and at rest and delivered into bottles containing dried potassium oxalate. In almost every case, duplicate samples were analyzed without

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¹ Sherman, W. C., and Elvehjem, C. H., *Am. J. Physiol.*, 1936, **117**, 142; Sherman, W. C., and Elvehjem, C. H., *J. Nutrition*, 1936, **12**, 321; Thompson, R. H. S., and Johnson, R. E., *Biochem. J.*, 1935, **29**, 694; Johnson, R. E., *Biochem. J.*, 1936, **30**, 31; Platt, B. S., and Lu, G. G., *Proc. Phys. Soc. Third Gen. Congress Chinese Med. Assn.*, 1935; Wilson, H. E. C., and Ghosh, B. C., *Indian Med. Gaz.*, 1937, **72**, 47.

² Wilkins, R. W., Taylor, F. H. L., and Weiss, S., *Proc. Soc. Exp. Biol. and Med.*, 1937, **35**, 584; Jong, S., *Arch. Neerland Phys.*, 1936, **21**, 465.