9841 P

Effects of Morphine on the Motility of the Human Ileum.

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The opportunities for direct study of intestinal peristalsis in the living human are necessarily limited. The usual methods of investigation have consisted of radiographic procedures or of the introduction of various mechanisms into the bowel, the very presence of which in the bowel may create abnormal reactions. Advantage was taken of a case of intestinal prolapse or bowel externalization (involving lower portion of the ileum) in an otherwise healthy male to record daily the activity of circular and longitudinal muscle. The loop of bowel was approximately 12 inches in length with an artificial anus at its summit so that the lower limb of the loop was constantly empty.

The method of recording described by Alvarez[1] was adapted in the following manner: Two Wiggers myocardiographs were fastened to permanent non-absorbable sutures loosely encircling a common mass of circular or longitudinal muscle. Lines joining points of attachment of the myographs to either circular or longitudinal muscle crossed each other at their mid-points. Attachment was made to the loop of bowel being traversed by intestinal contents. The apparatus was so arranged that it could be set up in working order without altering the position of the patient and might be used with the patient in a lying or semi-sitting position. While conducting the experiments, the bowel was kept covered with normal saline, and kept warm by a 75 Watt drop light. A thin rubber dam was placed over all to prevent evaporation.

The following precautions were observed in all experiments: The patient was prepared in no way for the experiment with the exception that any medication he might have been taking was discontinued the night before. To obviate reactions to the mechanical stimulus, tracings were not taken until at least 20 minutes after the hook-up. No disturbance of any kind was allowed, either to the patient or to the bowel while recording. The experiment was usually discontinued when the patient began to complain of fatigue.

Continuous tracings of circular and longitudinal muscle activity were thus taken in 25 experiments before, during, and after the

[1] Alvarez, W. E., *Mechanics of the Digestive Tract*, 2nd Ed., 1928.

administration of pharmacopeal and clinical doses of a drug. The observance of drug effects was continued for approximately an hour and a half. The effects of recorded activity were also visually observed with regard to expulsion of fecal contents from the visible anus thereby allowing intestinal activity to be classified as being propulsive or non-propulsive in nature.

Morphine sulphate was given intramuscularly in ⅛ grain doses and continuous tracings were taken in the manner described. There were 10 separate administrations of morphine.

The number of peristaltic waves (propulsive activity) and mixing waves (non-propulsive activity) during the preinjection period serves as a satisfactory basis for comparison of pharmacodynamic effects on intestinal muscle.

A complete suppression of the peristaltic wave with an increase in the frequency of the mixing wave followed ⅛ grain of morphine in all trials. The effects first appear 2 to 4 minutes after administration. Circular and longitudinal muscle tone was increased in half the trials. ¼ grain of morphine decreased the frequency and amplitude of contraction of the mixing wave, and increased the tone of both muscle coats in all experiments. Depression of propulsive and non-propulsive activity was still more complete when a total of ⅜ grain of morphine had been given. Increases in tone did not progress beyond that following ⅛ or ¼ grain of morphine.

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Persistence of Sylvatic Plague.

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In June, 1916, sylvatic plague was first demonstrated in San Mateo County by gross anatomical examinations of squirrels *(Citellus beecheyi)*. During the next 4 years infected rodents were again discovered by dissection. Between 1921 and 1931 no surveys were conducted. In 1932 to 1935 annually, a few hundred squirrels and rats were shot and autopsied; no gross anatomical lesions suggestive of plague were observed. During August and September of 1936, a total of 863 beecheyi squirrels were again examined with negative results. The fleas, which had been killed with chloroform, were re-