

EFFECT OF PROLONGED ACTION OF COLD ON PERIODIC MOVEMENTS AND EVACUATORY FUNCTION OF THE STOMACH IN DOGS

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In dogs with a Basov's gastric fistula a sharp increase in periodic movements of the stomach and a disturbance of its evacuatory function were observed during prolonged cooling of one hind limb in water, and these changes had not completely disappeared two months after the end of cooling.

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When studying experimental healing of long bones after fractures when the injured limb was immersed for long periods in cold water, we repeatedly noticed dyspeptic disorders in the experimental animals.

To investigate the effect of moist cold on gastric motor activity experiments were carried out on 4 dogs with Basov fistulas. Having determined the initial level of periodic movements and evacuatory function of the stomach, we cooled one hind limb of the dog in water at a temperature of 7-9° for 4 h daily for one month. Cooling of the limb was repeated by the same method after 2 months. Altogether 180 experiments were carried out.

Cooling of the limb caused severe and lasting disturbances of gastric motor function in all experimental animals throughout the period of cooling. Most frequently the duration of the periods of motor activity was increased (Fig. 1). In some dogs it was increased from 15-20 min in control experiments to 150-245 min during cooling of the limb.

In many experiments the waves corresponding to individual gastric contractions were higher in amplitude and had a broader base than before cooling of the limb. Sometimes spasms of the gastric musculature were observed. At the height of periodic movements the dogs frequently developed vomiting movements. Disturbances of the rhythm of gastric contractions were detected on kymograms, and in some experiments they took place almost continuously while in others they occurred in separate series (2 or 3 in succession), while infrequent individual contractions at long intervals also were observed (Fig. 2).

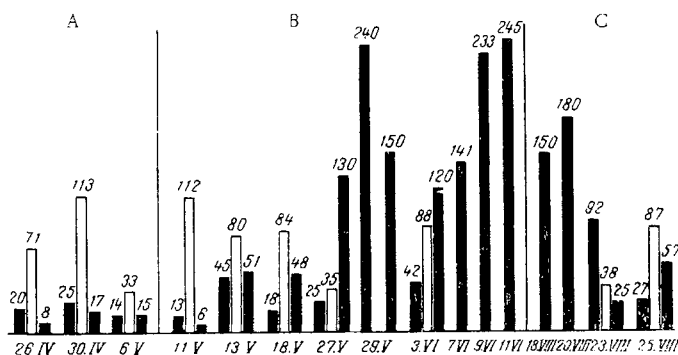


Fig. 1. Periodic movements of stomach before (A), during (B), and after (C) cooling of limb (the dog Ryzhik). Black columns denote duration of periods of contractions; unshaded columns duration of rest periods (in min).

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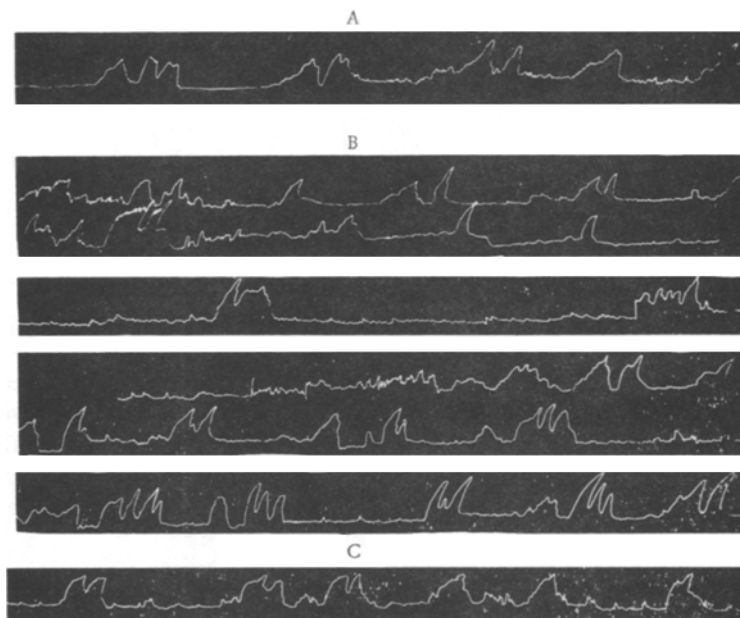


Fig. 2. Periodic movements of stomach before (A), during (B), and 2 months after end of cooling (C) (the dog Mal'chik).

Changes in the evacuatory function of the stomach in the experimental animals during cooling of the limb also were well marked. Often retention of the contents in the stomach for 1.5-2.5 h was observed, and in many experiments emptying of the liquid into the intestine took place very rapidly. Disturbances of the gastric motor function arising during cooling of the limb were persistent and had not completely disappeared 2 months after the end of cooling.

When prolonged cooling of the animals was repeated, the changes in periodic movements and evacuatory function of the stomach were even more marked than in the experiments of the first series. Often the "hunger movements" of the stomach did not cease for 2-4 h and were distorted and irregular in character. Evacuation of the gastric contents into the duodenum took place very irregularly.

Hence, moist cold is a powerful stimulus and may give rise to considerable changes in activity of the gastro-intestinal tract.