Magnetic stimulation affect gastric motility in rat


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1. Introduction. Functional magnetic stimulation has been applied by neurophysiologists as a safe and non-invasive method for stimulation of nervous tissue (1,2). Patients who underwent abdominal surgery often require electrical pacing of the stomach. The electrical pacing which is very effective however remains invasive in its nature. The remote induction of GI motility may be also possible by stimulation of gastric autonomic nerves with local magnetic field (3).

The Aim of this study was to estimate effects of the magnetic stimulation on the tonic and phasic activity of the rat stomach.

2. Material and methods. Male Wistar rats (n=8, 250-350 g) were anaesthetised with pentobarbital (Vetbutal 0.25 mg/kg i.p. Biowet, Poland) and underwent surgical implantation of the plastic gastric fistula (GF) in the distal stomach. After ten days of recovery fasted rats were placed in the plastic cage with vertically positioned induction coil. The catheter with latex balloon (1cm³) was placed via the GF in the body of the stomach and connected to the pressure transducer and amplifier (PowerLab system). The fasting recordings of gastric motility during and between the generation of single magnetic impulse of with parameters: 2250V, 56 μF were done in conscious rats. The parameters of magnetic impulse were tested gradually from 2250, 56 μF to 4500V, 100 μF and were chosen the lowest and most effective. The magnetic stimulation was used during the period without gastric contractions.

3. Results. The impulse caused first tonic contraction with basal pressure increased of 3,1 ± 0,9cmH2O which was followed with high amplitude phasic contraction. The mean frequency of gastric contractions reached 10 ± 3 /10 min and their mean amplitude was 12,3 ± 9,6 cmH2O. The amount of the phasic contractions and their amplitude did not depend upon intensity of the used magnetic field in chosen range. The stimulatory effect of the magnetic field on gastric motility lasted about 10 minutes. The timing and amplitude of the observed contractions was similar to spontaneous phase III of gastric MMC.

References