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Relationship between interdigestive motor complex and electrogastrography in healthy subjects and patients with functional dyspepsia

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Abstract

AIM: To investigate whether different phases of interdigestive migrating motor complex (MMC) can be recognized *via* cutaneous electrogastrography (EGG) and whether EGG abnormalities exist in patients with functional dyspepsia (FD), who have been found to have gastric emptying delay and abnormalities of interdigestive gastric motility.

METHODS: Thirteen FD patients and 7 healthy subjects, all male, aged 18-30 years, with a mean age of 25 years, entered this study. Simultaneous recordings of antral contractions and EGG were made preprandially for 3 h and postprandially for half an hour. The antral contrations were recorded using an intraluminal pressure tube with one small balloon placed in the antrum. The tube connected pressure transducer and electric bridge amplifier was attached to polygraph system. EGG was measured using WCDF4B electrogastroanalyser (made in Hefei, China), and cutaneous electrodes were placed on the abdoman over the antrum localized by X-ray. The test meal consisted of two boiled eggs, 200 g bread and 150 mL water, with 410 kcal, 19.4% protein, 27.3% fat, 53.3% carbohydrate. Parameters of EGG in the study were Fp (dominant or peak frequency, cpm), Ap (amplitude, uv), DPIC and DFIC (dominant power and frequency instability coefficient, %), and PGF (percentage of normal range 2.4-3.7 cpm) of gastric frequency.

RESULTS: (1) Visual inspection of relation between MMC and EGG: Among 6 MMCs recorded in healthy group, at the changeover from phase Ⅱ to phase Ⅲ increase in Ap could be distinguished in 2 MMCs, while at the change over from phase Ⅲ to phase Ⅰ decrease in Ap could also be seen. Among 9MMCs recorded in FD group, at the changeover from phase Ⅰ to phase Ⅱ increase in Ap was seen in one MMC, at the changeover to phase Ⅲ an obvious Ap increase could be recognized in 3MMCs, and at the changeover from phase Ⅲ to phase Ⅰ Ap decrease was also seen in the same 3 MMCs. However, Ap increase from phase Ⅰ to phase Ⅱ or from phase Ⅱ to phase Ⅲ was not as high in FD group as in healthy group. (2) Comparison between MMC and running spectrum analysis of EGG in healthy subjects: In healthy group, Fp was higher during phase Ⅲ (2.29 ± 0.83) than during phase Ⅰ ($P < 0.05$), Ap levels were 168.5 ± 65.2 in phase Ⅰ, 181.3 ± 72.8 in phase Ⅱ and 233.3 ± 96.5 in phase Ⅲ. Although there was a trend of phase Ⅰ < phase Ⅱ < phase Ⅲ in Ap levels, no statistical significance among them. Both DPIC and DFIC during phase Ⅱ were 38.1 ± 10.0 and 35.7 ± 11.3, respectively, which were lower than those during phase Ⅰ (79.9 ± 31.5 and 46.5 ± 13.7, respectively) ($P < 0.05$). There was no difference in PGF values among different phases of MMC. Ap and Fp were higher after meal (247.3 ± 82.6 and 2.65 ± 0.88, respectively) than during phase Ⅰ ($P < 0.05$). DPIC increased more obviously in fed state (85.2 ± 35.0) than during phase Ⅲ ($P < 0.05$), but DFIC (35.2 ± 13.3) decreased more obviously than during phase Ⅰ ($P < 0.05$). PGF after meal was 58.4 ± 11.4, higher than those during phase Ⅰ (46.1 ± 16.4) and during phase Ⅲ (46.0 ± 10.6, respectively) ($P < 0.05$). (3) Comparison of EGG between FD group and healthy group: During phase Ⅱ, Fp was lower in FD (2.06 ± 0.50) than in healthy group (2.17 ± 0.60) ($P < 0.05$). Both in phase Ⅱ and in phase Ⅲ, PGF levels in FD were 37.4 ± 9.5 and 29.9 ± 7.2, respectively, which were lower than those in healthy group (55.5 ± 15.0 and 46.0 ± 10.6, respectively)($P < 0.05$). The result suggested that there was a high incidence of dysrhythmias during interdigestive period in FD patients. Half an hour before and after meal, the postprandial to fasting Ap ratio was decreased in FD patients (1.01 ± 0.03) as compared to healthy group (2.05 ± 0.82) ($P < 0.01$). DPIC increase from phase Ⅲ to the postprandial period and DFIC decrease from phase Ⅰ to the postprandial were more obvious in FD group than in healthy group ($P < 0.05$).

CONCLUSIONS: (1) Although there are differences of some of EGG parameters during different phases of MMC, in general, it is difficult to precisely identify the gastric motility phases only *via* the cutaneous EGG, either actual waveforms or running spectrum analysis. (2) Some abnormal EGG parameters were found during fastintg cycle and postprandially in FD patients, which were in agreement with gastric motor disorders. This suggested that EGG can reflect gastric motility.

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