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Prokinetic effect of Alka-Seltzer in healthy subjects

Sir

Alka-Seltzer (AS), a combination product of acetyl salicylic acid (ASA) (324 mg), sodium bicarbonate (1625 mg) and citric acid (965 mg), in an effervescent tablet, has analgesic and antacid effects, and is widely used for self-medication to relieve symptoms such as upset stomach and headache following overindulgence in food. The drug efficacy observed suggests that AS may affect gastrointestinal motility, but data on this issue are lacking.

In this study, approved by the local Ethics Committee, we evaluated the effect of AS on the gastric emptying of solids, assessed by ^{13}C-octanoic acid breath test (^{13}C-OBT) in 12 healthy volunteers (6 males and 6 females, aged 19-47 years, mean 30) [1 2]. ^{13}C-OBT was employed instead of scintigraphy to avoid repeated non-diagnostic radiation exposure. Each subject was studied twice with a 250 kcal test meal [1]. At the end of the meal, two tablets of placebo (Pl) or AS, dissolved in water, were given in double blind, randomized order. Pl consisted of effervescent tablets, identical to AS, but without antacid properties, containing sodium citrate (570 mg), citric acid (112 mg), tartaric acid (312 mg), talcum (60 mg) and polyethylene glycol (PEG) 4000 (75 mg). Breath samples were taken before the meal and at 15-minute intervals for 5 hours postprandially, and analysed by means of isotope selective non-dispersive infrared spectrometry (Wagner-Analysen-Technik, Worpswede, Germany). Two indexes were calculated: the time corresponding to peak $^{13}CO_2$ breath excretion, or lag-phase (T_{lagB}), and the half emptying time ($T_{1/2B}$). Mathematical analysis of the data was performed without correction factors, to avoid potential drawbacks [1 2]. Our reference values (mean±SD) for T_{lagB} and $T_{1/2B}$ were 138±29.4 and 191±44.1 minutes, respectively.

In a preliminary study, we found that Pl did not influence the gastric emptying rate (data not shown). AS significantly shortened both T_{lagB} [116±19.5 (mean±SD) vs 148±30.8 minutes, p=0.0034; Wilcoxon test] and $T_{1/2B}$ (165±23.3 vs 202±38.7 minutes, p=0.0049).

A prokinetic effect for AS has never been reported and the underlying mechanism should be elucidated. In humans and primates, aspirin per se does not influence [3] or may even delay the gastric emptying rate [4 5]. Such an inhibitory effect has been found when aspirin was given in very high single doses (150 mg/kg) [4] and long-term at low doses (75 mg/day) [5], and has been attributed both to the occurrence of gastric mucosal damage and the suppression of endogenous prostaglandin synthesis, since analogues of PGE_2 and $PGF_{2\alpha}$ are known to stimulate the gastric emptying rate [4]. On the other hand, AS solution contains sodium citrate as antacid, a substance known to accelerate gastric emptying of liquids [3 6] though its effect on gastric emptying of solids has, to our knowledge, never been studied. Furthermore, AS and Pl dissolved in water both produce carbon dioxide, which, however, does not influence gastric emptying rate [3].

In conclusion, the prokinetic activity of AS, probably due to sodium citrate, may well account for its efficacy in subjects who overindulge in eating. For occasional use, AS compares favourably with other prokinetic agents since it does not cause extrapyramidal reactions, hormone hypersecretion, or cardiac arrhythmias. However, long-term treatment with AS should be discouraged due to the possible gastric mucosal injury induced by aspirin.

List of abbreviations

^{13}C-OBT: ^{13}C-octanoic acid breath test; AS: Alka-Seltzer; ASA: acetyl salicylic acid; PEG: polyethylene glycol; Pl: placebo; $T_{1/2B}$: half emptying time; T_{lagB}: lag-phase.

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