

LETTER TO THE EDITOR

EFFECT OF PEPPERMINT OIL ON GASTRIC EMPTYING IN MAN: A PRELIMINARY STUDY USING A RADIOLABELLED SOLID TEST MEAL

Sir,

( Received on May 16, 1991 )

Carminatives such as peppermint oil (PM oil) are used to obtain symptomatic relief in flatulence. In the present study, we have tried to confirm the effect of PM oil on gastric emptying by using an accurate, safe, reproducible noninvasive radionuclide method (1). A solid test meal labelled with  $^{99m}$  Technetium Sulphur Colloid ( $^{99m}$  TC) was used. Study was carried out in healthy male volunteers of two different age groups and in patients with dyspepsia.

The study was approved by the Ethics Committee of K.E.M. Hospital, Bombay and informed written consent was obtained. None of the subjects had anaemia, diabetes or abnormalities of liver and kidney functions. Medication if any were omitted 48 hours before the study period. No smoking was allowed 12 hours prior to and during the study period.

Normal 20 male volunteers belonging to 2 different age groups were selected. In the first group there were 10 male healthy medical students aged 21 to 23 years (mean age  $\pm$  SE  $21.4 \pm 1.61$  yrs) and in the second group of 10 volunteers the age range was 35-45 (mean age  $\pm$  SE  $39.45 \pm 4.89$  yrs). The study was extended to 6 non-ulcer, non-obstructive dyspepsia patients as confirmed by fibre optic endoscopy. There were 5 male and 1 female, aged 32-55 years (mean  $\pm$  SE  $40.16 \pm 10.02$  years). Age range of dyspepsia patients was similar to that of 2nd group of volunteers. Only those patients who had 6 or more for the following common symptoms of dyspepsia of over 2 yrs of duration were selected for the study. These symptoms were feeling of fullness after meals or persistent even on empty stomach, excessive belching (eructations), abdominal distention

(bloating), epigastric burning pain, retrosternal discomfort (heartburn), inability to finish a normal sized meal, regurgitation of sour/bitter fluid, nausea, vomiting and weight loss (2).

The study was carried out between 8.30 a.m. and 12.30 p.m. after overnight fasting. On day-1, 25 ml water was given at 8.30 a.m. and half an hour later radiolabelled solid test-meal consisting of jam sandwiches clubbed together (60 gm jam mixed with 250- $\mu$ ci  $^{99m}$  TC sulphur colloid applied over 4 bread slices) were given along with 100 ml of water. The meal was consumed in 2-5 mins after which gastric emptying was assessed.

After an interval of 2 days, i.e. on day-3, the subjects received 25 ml of water in which 0.2 ml PM (BD) oil was added (3). The rest of the procedure was similar to that of day-1.

*Gastric emptying time measurement:* Method of Read et al (1) was used using jam instead of mashed potatoes. Immediately after completion of test-meal, the subjects were made to lie supine under the detector of Picker Dyna-4 Gamma Camera having a computer (MD A<sup>2</sup> Meditronic) on line. Stomach was identified by its configuration on image screen and scanning was done by recording counts manually as well as by computer. The investigator was blind to the treatment given. The region of interest selected was the whole stomach (fundus to pylorus) as displayed on the image screen. The remaining part of the abdomen was covered with a lead sheet.

Counts were recorded for 30 seconds by an au-

tomatic counting system at interval of 5 mins for 3 hrs or till the count reached 50% of initial count. Serial images were obtained at 5 min interval. In most of the cases an initial rise in count was obtained. This was regarded as directly proportional to the amount of isotope present in the stomach and after that there was an exponential fall in count rate. Gastric emptying time (GE t 1/2) was calculated by linear regression of log of counts/30 seconds vs time in minutes on a programmable calculator. Statistical analysis was carried out by using paired 't' test for the effect of peppermint oil on gastric emptying rate before and after its administration in same individual and unpaired 't' test for comparison between the groups.

Basal gastric emptying rate was slower in older group of normal volunteers in comparison with younger group (Table I). In dyspepsia patients the rate of gastric emptying was significantly slower than both the groups of volunteers ( $P < .001$ ). After administration of PM oil gastric emptying rate accelerated in both the groups of volunteers and in patients with dyspepsia. Acceleration was remarkable in dyspepsia group and the rate became comparable to that of basal GE t 1/2 of age matched normal 2nd group of volunteers.

TABLE I: Effect of peppermint oil on gastric emptying t 1/2 (min) mean  $\pm$  SEM in normal volunteers and dyspepsia patients.

	Volunteers		Dyspepsia patients (n=6) (Age 40.16 $\pm$ 10.02 yrs)
	1st group (n=10) (Age 21.4 $\pm$ 1.61 yrs)	2nd group (n=10) (Age 39.45 $\pm$ 4.89 yrs)	
Basal	100.6 $\pm$ 5.77	159.678 $\pm$ 9.325	226.9 $\pm$ 28.56
After PM oil	81.41 $\pm$ 10	109.88 $\pm$ 5.860	147.48 $\pm$ 28.90
*P Value	<.05	<.02	<.001

n = number of subjects

\*P = value for differences between GE t 1/2 basal and GE t 1/2 after peppermint oil.

Use of isotope has proved to be a powerful tool for investigations of gastric physiology and for studies of gastroduodenal diseases (4). In this study 250-300  $\mu$ ci of radioactive  $^{99m}$ Tc sulphur colloid was used as it is not absorbed by gastrointestinal tract. Radiation exposure to the gonads with this

dose of  $^{99m}$ Tc was calculated to be 30-40 rads. This amount of radiation is much less than the radioactivity received during an abdominal radiograph (1). None of the volunteers complained of any side effects. It was observed that the GE t 1/2 in older group of volunteers was significantly more than that in the younger group ( $P < .01$ ). Horowitz et al (5) have demonstrated that increasing age is associated with a reduction in GE t 1/2 of both solid and liquid meals but in his study volunteers included in the younger age group had a wide age range, viz. 21-62 years and in the older group 70-84 years. We confirmed the findings of Horowitz et al (5) in volunteers even with a narrow age range. This observation suggests that along with decreased oesophageal peristalsis, atrophic changes in gastric mucosa and reduction in gastric acid secretion, the GE t 1/2 also alters with age.

Etiology of dyspepsia is not clear. It has been postulated to be the result of delayed gastric emptying. The observation that the basal gastric emptying time of dyspepsia patients after solid test meal was significantly longer than in control groups may support this view. The markedly prolonged GE t 1/2 in dyspepsia patients may be attributed to both the disease process and age. The usefulness of any potential antidyspepsia drug may possibly be predicted from its effect on gastric emptying and motility (2). Drugs which have been shown to accelerate gastric emptying rate like dopamine antagonists may be useful in relieving symptoms of dyspepsia (2). PM oil reduced the GE t 1/2 in dyspeptics to the basal GE t 1/2 in healthy, age-matched volunteers. This indicates a possible therapeutic benefit of PM oil in dyspepsia. The antispasmodic action of PM oil may be explained by its recently discovered calcium channel blocking property (6,7). However, its action in shortening gastric emptying time cannot be easily explained through such a mechanism. PM oil has already been shown to relax the lower oesophageal sphincter (8) though its effect on pyloric sphincter has not been evaluated.

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