

SHORT COMMUNICATION

EFFECT OF COINGESTION OF PARACETAMOL ON GLYCAEMIC RESPONSE

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Abstract: Rate of gastric emptying is a frequently measured variable in glycaemic response studies. One of the indices employed for measurement of the gastric emptying rate is the blood level of paracetamol at frequent intervals of time following coingestion of paracetamol with the meal. But the effect of paracetamol itself on glycaemic response is not known. The present study was performed on ten healthy and five NIDDM subjects. Each subject underwent two meal tolerance tests in random sequence. On one occasion the meal was white bread; on the other occasion, the meal consisted of the same quantity of white bread and 1.5 g paracetamol. The postprandial glycaemia following the two meals was not significantly different. Thus the results validate the use of the paracetamol technique for gastric emptying in glycaemic response studies.

Key words: paracetamol gastric emptying glycaemic response meal tolerance test

INTRODUCTION

Postprandial glycaemia depends on several characteristics of the food ingested (1-3). Some of these characteristics influence postprandial glycaemia by modulating the rate of gastric emptying (4,5), and consequently the rate of delivery of nutrients to the small intestine. Therefore studies on glycaemic response frequently measure the rate of gastric emptying as one of the variables. One of the indices employed for measurement of the gastric emptying rate is the blood level of paracetamol at frequent intervals

of time following coingestion of paracetamol with the meal (6, 7). However, it is not certain whether paracetamol itself affects the glycaemic response. The present study was performed to investigate whether coingestion of paracetamol affects the glycaemic response to white bread.

METHODS

The study was performed on ten healthy subjects and five subjects having non-insulin dependent diabetes mellitus (NIDDM). The age, sex and physical characteristics of subjects are given in Table I.

TABLE I : Characteristics of volunteers.

Health status	Sex	n	Age (years)	Body weight (kg)	Height (m)	Body mass index
Healthy	M	9	23-68	56-87	1.55-1.75	20.1-28.4
	F	1	59	57	1.56	23.4
NIDDM	M	5	57-72	39-88	1.54-1.73	14.3-30.1

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Each subject underwent two meal tolerance tests. On one occasion the meal was white wheat bread providing 50 g carbohydrate; on the other occasion, the meal consisted of the same quantity of white bread and 1.5 g paracetamol. The two types of meals were administered in a random order. As a result, out of the 15 subjects, 9 received the meal without paracetamol first, and 6 received the meal with paracetamol first.

Meal tolerance test

The subjects reported after an overnight fast between 9 a.m. and 10 a.m. on two mornings at one or two week's interval. After a fasting venous sample had been drawn they were administered either a 50 g carbohydrate portion of white wheat bread alone (control meal) or with paracetamol (test meal). Each meal was provided with 200 ml water.

The meal was consumed within 10 min at a steady rate. The midpoint between starting and finishing the meal was taken as zero time. Venous blood samples were drawn at 0.5, 1.0, 1.5, 2.0 and 3.0 h. The blood was analysed for measurement of plasma glucose by the o-toluidine method.

Calculations

Serial estimations of blood glucose and insulin were further used to derive the following indices: area under the 3 h glucose curve (AUC-G) and incremental area under the 3 h glucose curve (Δ AUC-G). The areas were calculated using a portable computer (Casio PB 100F).

Statistical analysis

The response to the test meal was compared to the corresponding response to the control meal by the Student's t-test for paired observations. Differences were considered significant if $P < 0.05$.

Ethical considerations

The protocol of the study had the previous approval of the Ethics Committee of the All India Institute of Medical Sciences. The participation was on a strictly voluntary basis and the subjects knew that they could withdraw from the study at any stage. Every volunteer gave his informed written consent before being admitted to the study.

RESULTS & DISCUSSION

The glycaemic responses to the meals with and without paracetamol have been given in Table II and Fig. 1. Neither the plasma glucose levels at different points in time nor the AUC-G or Δ AUC-G were significantly different in response to the two meals studied. Hence it may be concluded that coingestion of paracetamol does not affect the glycaemic response to the white bread meal. Bread meal is a suitable meal for this study because white bread is now possibly the commonest reference food in glycaemic response studies after Jenkins and his coworkers advocated it in 1984 (8). Thus the results validate the use of the paracetamol technique for gastric emptying in glycaemic response studies.

TABLE II : Glycaemic response to the meals studied.

Volunteers	Meal	Plasma glucose (mg/dL)						AUC-G (mg.dl ⁻¹ 3h)
		0 h	0.5 h	1.0 h	1.5 h	2.0 h	3.0 h	
Healthy	Control	94.9 ±2.6	142.2 ±10.8	159.4 ±13.8	149.2 ±12.5	124.0 ±9.4	101.0 ±5.8	392.8 ±24.5
	With paracetamol	101.1 ±4.4	156.2 ±10.7	168.5 ±13.6	154.0 ±12.9	131.8 ±8.9	107.1 ±6.6	417.1 ±25.7
NIDDM	Control	234.8 ±67.0	323.2 ±66.5	371.4 ±60.7	369.6 ±63.8	326.2 ±74.1	280.2 ±79.0	975.6 ±204.0
	With paracetamol	207.0 ±39.5	275.2 ±43.4	330.0 ±50.4	324.8 ±47.8	313.8 ±57.1	286.0 ±61.1	895.0 ±151.3

All values are Mean \pm SEM

AUC-G, area under the 3 h plasma glucose curve.

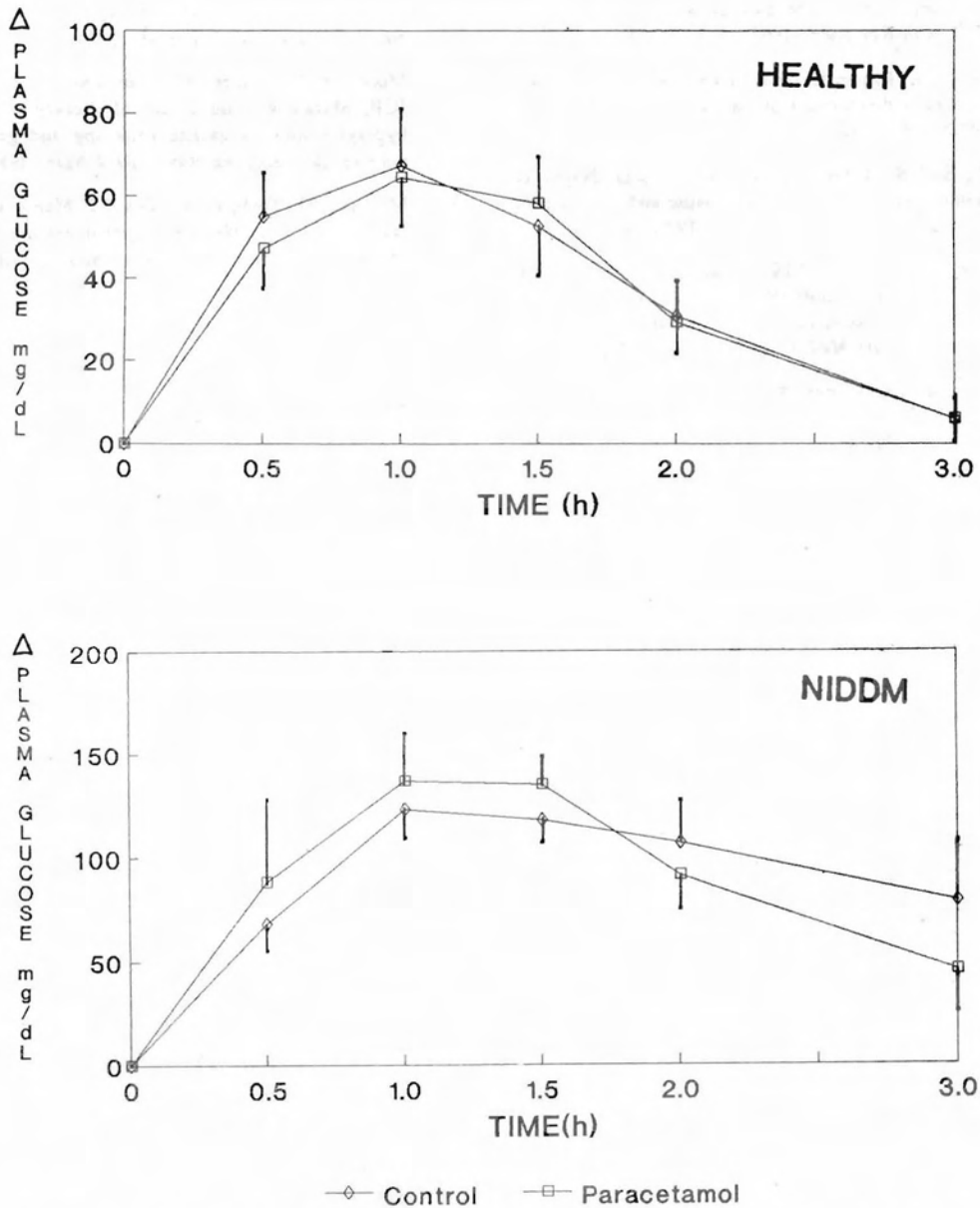


Fig. 1: Incremental plasma glucose level in response to the meals administered in healthy and NIDDM subjects.

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