Evidence for the ambiguity of the term constipation: the role of irritable bowel syndrome

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Abstract

A satisfactory definition of constipation is elusive. An important and measurable element is slow colonic transit. Whole gut transit time, a proxy for colonic transit time, can be estimated from self recorded data on stool form and frequency. Our aim was to compare whole gut transit time with subjective definitions in the context of the general population. In a community based sample of 731 women aged 25-69 years the estimated whole gut transit time was compared with two subjective assessments of constipation - the woman's own perception and a symptom based definition proposed by an international working team (Rome definition). We have defined slow whole gut transit time as >2 SD above the mean in women who seldom passed lumpy stools (that is, >92 hours). Slow transit was present in 9.3% of the sample. Similar numbers met the subjective definitions (8.5% and 8.2%). However, the overlap between the three definitions was poor. Of 68 women with estimated slow transit, 28 had self perceived constipation, 20 had Rome defined constipation, and only 11 had both. Of subjects classified as constipated by the subjective definitions only 37% had slow transit; they had a high prevalence of irritable bowel symptoms. In conclusion, this study showed that the term constipation is ambiguous and often misleading and that attempts to base a definition on symptoms are misguided. In epidemiological studies, conclusions about the prevalence of constipation should be based on records of stool type and timing. (*Gut* 1994; 35: 1455-1458)

The definition of constipation is contentious. Some would say it is difficulty in the act of defecation but such difficulty is subjective and has many causes. For most gastroenterologists, the essence is infrequent defecation or the passage of small or hard stools.¹ In this definition, all three adjectives imply slow colonic transit. Infrequency obviously does so, whereas smallness and hardness of the stools are closely associated with slow transit.² Ideally, therefore, any assessment of constipation should include the measurement of colonic transit time or, as a proxy, whole gut transit time. This is impracticable in ordinary clinical practice so doctors are forced to depend on patients' accounts and these are

fallible. People are inaccurate in recalling their bowel frequency,³ which is a poor guide to transit time anyway.^{4,5} Patients often equate straining at stool and feelings of incomplete evacuation with constipation but these symptoms occur in the irritable bowel syndrome.⁶

Despite these problems, doctors and research workers often accept patients' statements that they are constipated.⁷⁻⁹ An international working team felt obliged to include symptoms of straining and incomplete evacuation in its definition of constipation, called here the Rome definition.¹⁰ Earlier work^{6,11,12} led us to suspect that these subjective approaches confuse objective, slow transit constipation with the fruitless straining that occurs in irritable bowel syndrome. They also overlook asymptomatic slow transit, which could be important because slow transit and low faecal output have been linked with bowel cancer and gall stones.^{13,14}

To find out if these suspicions are justified requires the study of a large sample of the population in which self perceived constipation and Rome defined constipation are compared with a measurement of colonic transit time or faecal output. We became able to do this when we discovered that, in women, whole gut transit time can be predicted from a self made recording of three defecations combined with systematic questioning about bowel habit.¹⁵

Subjects and methods

The 731 women in this study were a subsample of 1059 volunteers who attended for a survey concerned primarily with the prevalence and causes of gall stones.¹⁶ The original subjects were a stratified random sample of women aged 25-69 from east Bristol. The subsample of 731 consisted of the 69% of volunteers who managed to keep a record of three consecutive defecations as well as answering a questionnaire about their bowel habit. The record included, for each bowel action, date and time, and stool form or appearance on the Bristol stool form scale, which reflects transit time.⁴ From the data on the record form whole gut transit time was calculated from a formula derived by multiple regression analysis¹⁵:

$$\text{whole gut transit time} = 103 - 1.23 (\text{DF}) - 4.69 (\text{SFS}) + 10.638 (\text{IDTI})$$

where DF was defecation frequency per week, SFS was stool form score (the sum of three

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Venn diagram showing the overlap between the three groups. ETT=estimated transit time.

stool form numbers), and IDTI was mean interdefecatory time interval. Whole gut transit time estimated in this way correlates with measured transit time in women ($r=0.74$, $p<0.001$).¹⁵

An agreed basis for defining normal whole gut transit time does not exist. We decided to base it on the findings in our subjects ($n=517$) who seldom passed lumpy stools (stool form score ≥ 9). These women had a normal distribution of whole gut transit times (mean (SD)=54 (19) hours). Transit time >2 SD above the mean was defined as slow, that is, >92 hours.

In a subsample of 60 women whole gut transit time was actually measured¹⁵ using a modification of the radio-opaque marker technique.¹⁷

The Rome definition of constipation¹⁰ requires two or more of the following criteria to be reported (when not taking laxatives): (a) straining on $\geq 25\%$ of bowel movements, (b) feeling of incomplete evacuation after $\geq 25\%$ of bowel movements, (c) hard or pelleted stools on $\geq 25\%$ of bowel movements, (d) stools passed $<3/\text{week}$. The definition requires that the Rome criteria for diagnosing irritable bowel syndrome¹⁸ are not met.

Of the four criteria for constipation, (a) and (b) were identified by a questionnaire in which subjects were asked how often they strained or had feelings of incomplete evacuation and had to choose from: never, occasionally ($<25\%$ of occasions), often ($\geq 25\%$ – 50% of occasions), usually ($\geq 50\%$ – $<100\%$ of occasions) or always. Criterion (c) was taken as an answer of type 1 or 2 to the question ‘What is your usual or commonest stool type?’, when the subject was

shown a list of the first six types of the Bristol scale.⁴ Criterion (d) was obtained by asking ‘How many times in the week do you usually open your bowels?’.

Symptoms of irritable bowel syndrome were identified from the same questionnaire, which incorporated the six Manning criteria¹⁹ plus questions on straining, urgency, and runny stools, the answer choices being as before.

Self perceived constipation was identified from the subjects’ answer of often, usually or always to the question ‘Do you consider yourself to be constipated?’, this question being asked, in nearly all cases, immediately before the bowel recording. To calculate the number of these subjects who could be expected to have prolonged transit during the bowel recording we assumed that ‘usually’ meant 50–100% of occasions and ‘often’ meant 25–50%. Thus, the expected number included all those who said always, 75% of those who said usually, and 37.5% of those who answered often.

Venn diagrams were used to show the extent of agreement between the three definitions – self perception, slow transit, and Rome definition.

The prevalence of irritable bowel symptoms²⁰ in subjects meeting each definition of constipation was calculated and expressed as the odds ratio (versus subjects who did not meet them).

Duplicate estimates of transit time were available in 47 women and were compared to assess whether intrasubject variation in transit time may have biased our results.

Results

The numbers of subjects defined as constipated by the three methods were similar: 68 by slow transit, 62 by self perception, and 60 by the Rome definition (9%, 9%, and 8% respectively). There was poor agreement, however, between the definitions (Figure). Of the women with slow transit, 41% perceived themselves as constipated and 29% met the Rome definition; 16% were identified by both subjective definitions. Conversely, of 101 women classed as constipated by one or both of the subjective definitions 37 had slow transit.

With each Rome criterion transit time was longer in those who fulfilled it than in those who did not (Table I). There was much overlap in interquartile ranges, however, with regard to straining and incomplete evacuation. Slow transit (>92 hours) was present in only 23% of 101 women who often strained and in only 24% of 83 who had incomplete evacuation. Subjects who met the Rome definition only because they had straining and incomplete evacuation ($n=18$) had normal whole gut transit time (64 hours, SD 25 *v* 63 hours, SD 22 in subjects without these symptoms). The Rome criteria also agreed poorly with self assessed constipation – with one exception; 13 of 24 (54%) of women with infrequent defecation thought themselves constipated. The equivalent figure, however,

TABLE I Transit time of women with and without symptoms thought to reflect constipation

Symptom	Median estimated transit time in hours (interquartile range)		p Value
	With symptom	Without symptom	
Straining	76.9 (64 to 90) (n=101)	59.2 (49 to 73) (n=630)	<0.001
Incomplete evacuation	66.3 (53 to 90) (n=83)	61.3 (50 to 75) (n=648)	<0.05
Stool type 1 or 2	78.9 (63 to 88) (n=184)	57.4 (47 to 69) (n=547)	<0.001
Bowels open <3/week	98.4 (90 to 129) (n=19)	61.0 (50 to 75) (n=712)	<0.001

TABLE II Odds ratio (95% confidence intervals) of having symptoms of irritable bowel syndrome* in subjects identified as constipated by three definitions

	Slow transit	Rome definition	Subjects' perception
One or more symptoms†	2.7 (1.5 to 4.9)	13.1 (5.1 to 33.8)	5.5 (2.7 to 11)
Two or more symptoms†	1.8 (0.9 to 3.4)	2.3 (1.2 to 4.5)	4.1 (2.2 to 7.7)
Three or more symptoms†	1.9 (0.9 to 4.2)	1.1 (0.4 to 2.9)	6.9 (3.5 to 13.4)
Recurrent intestinal pain‡	1.1 (0.5 to 2.2)	NA	3.4 (1.9 to 6.1)

*The six Manning criteria plus watery stools, urgency, and straining to finish, all or ≥ 1 in 4 occasions.²¹ †In the 79% of constipated women who provided data on all symptoms (n=51, 43 and 47 respectively) v those who did not fulfil the definition of constipation (n=528, 536, and 532 respectively). ‡n=60, 68, and 62 respectively, v 663, 671, and 669 respectively. Recurrent defined as >6 times in the past year; intestinal pain defined as pain fulfilling any of the Manning criteria (relief with defecation on ≥ 1 in 4 occasions, association with looser stools, association with more frequent stool). NA=Not applicable.

for straining was 38%, for incomplete evacuation 33%, and for passing lumpy stools 19%.

Overall, people with self assessed constipation had longer transit times than those without (median 89 hours v 60 hours). The number found to have prolonged whole gut transit time was less, however, than expected (28 v 43; $\chi^2_1=5.2$, $p<0.05$).

The likelihood of having irritable bowel symptoms was significantly increased in subjects who met the Rome definition of constipation and in those who perceived themselves as constipated (Table II). So, too, was the likelihood of having recurrent intestinal pain in women with self assessed constipation.

Among the women whose whole gut transit time was measured directly, 36 (60%) also provided sufficient details to be classifiable by the Rome definition. Of these, four had prolonged transit; only one of them was recognised as constipated by either the Rome definition or self perception. Three of them thought they were constipated and three were by the Rome definition, but only one of either group had prolonged transit. Such small numbers preclude statistical evaluation but they agree with the earlier data.

Regarding intrasubject variability, no difference was found between the two estimates of transit time ($z=-0.9$, $p=0.92$).

Discussion

A limitation of this study is that a single measurement of transit time was assumed to be representative for each subject. Intrasubject variation is well recorded,²¹ even on a constant diet,²² and could have resulted in some misclassification into normal and slow groups. Such variation is less, however, than inter-subject variation,^{22 23} and was comparatively minor in this study.

We have compared a validated estimate of whole gut transit time with self perceived constipation and the Rome definition and found little agreement. Both these subjective definitions classified many people as constipated though their transit times were normal. The reason seems to be that the subjective definitions are biased by symptoms of irritable bowel syndrome. Many subjects satisfied the Rome definition simply because they had feelings of incomplete evacuation and strained (the one possibly causing the other^{6 18}). The data call into question the

validity of the Rome definition and any other definition based on symptoms except for infrequency of defecation.

The finding that many people who think they are constipated have normal intestinal transit has been made before, but only in the context of patients referred to specialist clinics,^{3 24} not in the context of the general population. We did not ask our subjects what made them think they were constipated but their perceived constipation was weakly related to two symptoms commonly presumed to be caused by constipation, namely straining and incomplete evacuation. Elderly people who think they are constipated tend to be psychologically distressed and to report more illnesses.²⁵ Whether this applies to other age groups needs to be investigated.

Subjective criteria for constipation failed to detect almost half the women with slow transit. As slow transit is now believed to predispose to gall stones and bowel cancer,^{13 14} attempts to identify subjects at risk for these diseases should not rely on subjective criteria for constipation. We suggest that future epidemiological studies in this area should include prospective records of stool form as well as of stool frequency. We also recommend that physicians never take patients' complaints of constipation at face value but ask them to keep a record of several defecations. From this it will be clear whether the stools are lumpy or infrequent, either of which imply that transit is slow.

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