Comparison of colonic transit time between patients with constipation-predominant irritable bowel syndrome and functional constipation

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Abstract

Background/Aim Functional constipation (FC) and constipation-predominant IBS (C-IBS) are two main subtypes of constipation. Using radio-opaque markers is an easy and cost effective method to measure colonic transit time (CTT). We designed this study to compare the CTT between these two groups of constipated patients.

Methods Patients with chronic constipation of no organic etiology were classified as having FC or C-IBS according to the Rome II criteria. All patients ingested 10 radio opaque markers daily for six days. A plain abdominal X-ray was taken on the seventh day. To calculate the total and segmental colonic transit time in hours, number of markers in right and left colonic and rectosigmoid area were counted and multiplied by 2.4. The mean total and segmental colonic transit time were compared between the two groups.

Results A total of 100 patients (50 FC and 50 C-IBS) were enrolled. The mean (SD) total CTT was not significantly different between FC patients (52.2 [35.5] h) and C-IBS patients (41.2 [31.6] h; p = 0.10). The mean rectosigmoid transit time was significantly slower in FC patients (19.9 [15.5] h) compared to C-IBS patients (11.9 [10.6] h; p = 0.003).

Conclusion Rectosigmoid transit time in FC patients is slower than in C-IBS patients.

Keywords Bowel motility · functional bowel disease

Introduction

Constipation is one of the most common gastrointestinal complaints. The presence of constipation is defined by stool frequency of less than 3 times a week, straining, passage of hard stools, feelings of anal blockage, prolonged defecation and manual disimpaction.1,2 Different organic disorders as well as a variety of medications can cause constipation. In the absence of an organic etiology, constipation is considered “functional” and is divided into two subtypes of functional constipation (FC) and constipation-predominant irritable bowel syndrome (C-IBS) by applying the Rome II criteria.2

Measuring colonic transit time (CTT) using radio opaque markers is an easy, cost effective and reproducible way to assess bowel motility.3–6 CTT is also a valuable tool in planning management and determining the necessity for further investigations in constipated patients.5 Data regarding colonic transit time of FC and C-IBS patients are conflicting and few studies have compared these two groups of patients. We aimed to compare the CTT of FC and C-IBS patients to see if the pattern of CTT differs in these two subtypes of functional constipation.

Methods

Patients

Patients referred to our center by gastroenterologists for unexplained constipation were prospectively evaluated for enrollment. Diagnostic work-up, including barium enema and/or colonoscopy as well as blood tests, was performed prior to referral. Defecography and manometry were performed to rule out evacuation disorders. Inclusion criteria were stool frequency of less than three bowel movements a week for at least the last three months. Patients with abnormal findings suggestive of an organic disease in any of the investigations were excluded. Enrolled patients were classified as having FC or C-IBS according to the Rome II criteria.
Comparison of CTT in FC vs. C-IBS patients

II criteria. Based on the Rome II criteria abdominal pain or discomfort must be present for a diagnosis of IBS to be made. Based on the mean CTT of FC and C-IBS patients in previous studies, a sample size of 50 patients in each group was calculated. A questionnaire containing subjective symptoms was completed for each patient (Table 1).

Colonic transit time

To measure colonic transit time, we used the saturation method described by Abrahamsson et al. Enrolled patients ingested 10 identical 5 mm × 2 mm cylindrical radio opaque markers at 9 a.m. every day for six consecutive days. A single plain abdominal X-ray was taken on the seventh day, 24 h after the ingestion of the last dose of markers. Patients were asked not to use laxatives during the study and to start taking the markers after a two week wash-out phase of laxatives. They were also asked to maintain their usual diet. Three straight lines were used to divide the X-ray. The spinous process of the fifth lumbar vertebra to the middle of the vertebral column in cranial direction was one straight line. Two additional lines were drawn in tangential direction from the spinous process of the fifth lumbar vertebra to the greater trochanter of each femur. The three segments are related to the right and left colonic segments and the rectosigmoid segment. To calculate the segmental colonic transit time in hours, the number of markers in the right and left colonic and rectosigmoid area were counted and multiplied by 2.4, a constant representing the ratio between the period in which the examination was performed (144 hours) and the number of markers ingested (n=60). The total CTT was the sum of the transit times in the three segments. The mean total and segmental colonic transit time were compared between the two groups.

Statistical analysis

Unpaired Student’s t-test was used to compare the mean transit time between the two groups. The Pearson correlation coefficient was used to assess the correlation between the total and segmental CTT.

All patients completed the informed consent form. The study protocol was approved by the ethics committee of our institute.

Results

Fifty FC patients and 50 C-IBS patients were enrolled (Table 1). There was no difference between the age and sex ratio of two groups. The duration of constipation ranged between 8 months to 30 years in FC patients and 5 months to 20 years in C-IBS patients. Six (12%) FC patients and seven (14%) C-IBS patients reported that they did not have defecation without laxatives. Sensations of bloating and incomplete defecation were more prevalent in C-IBS patients (72% vs. 90%; p = 0.02 and 71.4% vs. 91.8%; p = 0.01, respectively). All C-IBS patients had abdominal pain. In the FC group the prevalence of abdominal pain was 36%. There was no difference in the prevalence of other subjective symptoms (Table 1).

The mean total CTT was slightly prolonged in FC patients compared to C-IBS patients, although the difference was not significant (52.2 vs. 41.2 h, p = 0.1; Table 2). The mean rectosigmoid transit time was slower in the FC group (p <0.05). There was no difference in the mean transit time of the left and right segments between the two groups (Table 2).

There was a positive correlation between the total CTT and the right and left colonic transit time in both FC patients (0.82 and 0.83, respectively) and C-IBS patients (0.76 and 0.79, respectively). There was a positive correlation between the total CTT and the rectosigmoid transit time of FC patients (0.70). There was no such correlation in C-IBS patients. There was no significant relation between any symptom and the pattern of CTT.

Discussion

This study shows that rectosigmoid transit time of FC patients was significantly slower than that of C-IBS patients. Other studies performed on patients with idiopathic constipation, FC and C-IBS, have shown variable results. In

Table 1  Baseline characteristics and symptoms of patients

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Functional constipation (n=50)</th>
<th>Constipation-predominant irritable bowel syndrome (n=50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>32.8 (12.8)</td>
<td>31.9 (10.2)</td>
<td>ns</td>
</tr>
<tr>
<td>Gender (M:F)</td>
<td>6:44</td>
<td>8:42</td>
<td>ns</td>
</tr>
<tr>
<td>Duration of constipation (months)</td>
<td>71.7 (87.4)</td>
<td>69 (77.6)</td>
<td></td>
</tr>
<tr>
<td>Days between two bowel movements</td>
<td>7.7 (3.5)</td>
<td>5.3 (2.8)</td>
<td>ns</td>
</tr>
<tr>
<td>Symptoms*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad taste in mouth</td>
<td>13</td>
<td>15</td>
<td>0.8</td>
</tr>
<tr>
<td>Headache</td>
<td>14</td>
<td>15</td>
<td>1.0</td>
</tr>
<tr>
<td>Nausea</td>
<td>7</td>
<td>15</td>
<td>0.09</td>
</tr>
<tr>
<td>Malaise</td>
<td>22</td>
<td>30</td>
<td>0.1</td>
</tr>
<tr>
<td>Fullness</td>
<td>36</td>
<td>43</td>
<td>0.1</td>
</tr>
<tr>
<td>Painful defecation</td>
<td>25</td>
<td>30</td>
<td>0.4</td>
</tr>
<tr>
<td>Difficult defecation</td>
<td>38</td>
<td>39</td>
<td>0.8</td>
</tr>
<tr>
<td>Anal or perianal pain</td>
<td>20</td>
<td>21</td>
<td>0.8</td>
</tr>
<tr>
<td>Bloating</td>
<td>36</td>
<td>45</td>
<td>0.02</td>
</tr>
<tr>
<td>Incomplete defecation</td>
<td>35</td>
<td>45</td>
<td>0.01</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>18</td>
<td>50</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Values are as mean (SD) or as * number of patients
a study on 64 Iranians with idiopathic constipation, 57.8% had slow total CTT, and of these 21.6%, 70% and 40.5% had slow transit in right, left and rectosigmoid segments, respectively. In this study, constipation was more common in females but there was no relationship between the pattern of CTT and the sex of patients. Mollen et al. showed that 71% of FC patients had abnormal total CTT, and no significant correlation was found between the presence of any symptoms and a prolonged CTT. Patients with IBS are often assumed to have normal colon transit time. However, slow colonic transit time is commonly seen in patients with C-IBS. A few studies have compared the CTT of FC and C-IBS patients and have shown variable results. Evans et al. showed that total CTT of FC patients was slightly prolonged compared with C-IBS patients but the delay was significant only in the rectosigmoid transit time. The results of our study confirmed this finding. In another study conducted by Zhan et al., 75% of C-IBS and 33% of FC patients had a prolonged CTT, and the mean transit time of C-IBS patients was much shorter than the FC group. The right CTT was longer in C-IBS patients while the abnormal segments in FC patients were the left colon and the rectosigmoid area.

Our study had some limitations. The normal range of colonic transit time in Iranians is not known and we were not able to compare our data with normal values.

In conclusion, the mean rectosigmoid transit time of FC patients was significantly slower than that of C-IBS patients. This suggests that outlet obstruction is more prevalent in FC patients as compared to C-IBS patients. Further studies are recommended to confirm our results.

References