

## Colonic Transit Time. A Useful and Low-Cost Tool in the Study of Constipation

Alexander Forero-Torres<sup>1\*</sup> and Reyes Bañeres-Visedo<sup>2</sup>

<sup>1</sup>General and Gastrointestinal Surgery Department, Colorectal Division, La Paz University Hospital, Madrid, Spain

<sup>2</sup>Dietitian and Nutritionist Private Clinic, Mental Health Nurse, Madrid, Spain

**\*Corresponding Author:** Alexander Forero-Torres, General and Gastrointestinal Surgery Department, Colorectal Division, La Paz University Hospital, Madrid, Spain.

**Received:** June 13, 2020; **Published:** July 06, 2020

### Abstract

Constipation is a common gastrointestinal disorder. Only one-fifth of constipated individuals seek health-care advice and less than half of the people treated are satisfied with the treatment. Defecations is an intricate viscerosomatic process and the differentiation of the subtypes constipations need more tests. The measurement of colonic transit time (CTT) has a particular interest in patients with constipation. It is very important an accurate diagnosis to focus on appropriate treatment. A lifestyle change including dietary change is the initial treatment before the pharmacological management. This article reviews the clinical symptoms, diagnosis and treatment of constipations and defecations disorders.

**Keywords:** Constipation; Gastrointestinal Motility; Diagnosis; Colonic Transit Time; Management; Dietary Change

### Introduction

Constipation is a common gastrointestinal disorder. It symptoms are reported by 10 - 20% of adults worldwide [1]. The prevalence in adults older than 60 years is 33% and the overall prevalence in adults of all ages is about 16% [2]. Only one-fifth of constipated individuals seek health-care advice [1]. The transit through the colon is determined for the total time taken for food residues to pass the gut. The measurement of colonic transit time (CTT) have special interest in patients with chronic constipation.

### Materials and Methods

The constipations is a heterogeneous disorder. The patients report a variety of symptoms, they feel like they are not able to have a complete bowel movement and have hard stool, stomach pain, bloating, or swelling [3], also excessive straining, sense of anorectal blockage during defecation and the need for manual maneuvers. For the Physicians the chronic constipation is an infrequent bowel movements usually less than 3 per week, for at least 3 of the prior 12 months [2].

The chronic constipation can be divided into primary and secondary.

The primary constipation could be functional, defecation disorders and pelvic floor dysfunction and slow transit constipation:

- Functional constipation is diagnosed using the ROME III criteria (Table 1 and 2).
- Defecation disorders and pelvic floor dysfunction including the presence of an anal stricture, anal fissure, hemorrhoids, enterocele, rectocele, dyssynergic defecation and impaired descent.
- Slow transit constipation is a prolonged stool transit through the colon (more than 3 days).

<b>Functional constipation: Rome III criteria</b>
<ol style="list-style-type: none"> <li>1. Must include 2 or more of the following:                             <ol style="list-style-type: none"> <li>a. Straining during at least 25% of defecations</li> <li>b. Lumpy or hard stools in at least 25% of defecations</li> <li>c. Sensation of incomplete evacuation for at least 25% of defecations</li> <li>d. Sensation of anorectal obstruction/blockage for at least 25% of defecations</li> <li>e. Manuel maneuvers to facilitate at least 25% of defecations (e.g. digital evacuation, support of the pelvic floor)</li> <li>f. Fewer than 3 defecations per week.</li> </ol> </li> <li>2. Loose stools are rarely present without the use of laxatives.</li> <li>3. Insufficient stools are rarely present without the use of laxatives.</li> <li>4. Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis.</li> </ol>

**Table 1:** Rome III criteria: Functional constipation.

<b>Irritable bowel syndrome: constipation predominant</b>
<p>Recurrent abdominal pain or discomfort (uncomfortable sensation not described as pain) at least 3 days per month in the last 3 months associated with 2 or more of the following:</p> <ol style="list-style-type: none"> <li>1. Improvement with defecation</li> <li>2. Onset associated with a change in frequency of stool</li> <li>3. Onset associated with a change in form (appearance) of stool</li> <li>4. Less than 25% of bowel movements were loose stools</li> <li>5. Criterion fulfilled for at least 6 months prior to diagnosis.</li> </ol>

**Table 2:** Rome III criteria: Irritable bowel syndrome with constipation predominant.

The secondary constipation is secondary to diet, medications and underlying medical conditions as neurological and myopathic disorders.

Recent investigations have been shown that abnormalities of ion channels within the intestine affect secretion, absorption, motility, and sensation and potentially resulted in constipation, diarrhea and irritable bowel syndrome (IBS) [1].

The evaluation of constipation need a detailed history with a dietary and defaecatory diary and a physical examination, including a visual and digital anal examination. This initial assessment will help identify primary and secondary causes of constipation and helps to initiate the first step of treatment.

Diagnostic testing is not recommended in the absence of warning features (suspected colon cancer) or another disease (hypothyroidism). When alarm symptoms are present, a total evaluation of the colon with colonoscopy should be performed.

Defecations is an intricate viscerosomatic process and the differentiation of the subtypes constipations will need more tests:

- Rectoanal manometry: Quantifies internal and external anal sphincter function at rest and during defecatory maneuvers, compliance and rectal sensation. Can identify rectoceles, intra-anal intussusception, and rectal prolapse.

- Barium defecography is used to exclude or diagnose rectocele, intra-anal intussusception, and pelvic organ prolapse.
- Magnetic resonance imaging (MRI) defecography it is a radiation-free alternative with similar performance characteristics of Barium defecography, but can diagnose enterocele with the exception of internal intussusception and retentive rectoceles.
- Colonic transit time study (CTT). Measure of the speed of stool movements throughout the colon.

### Results and Discussion

Measurement of colonic transit time (CTT) has been of particular interest in patients with constipation. The use of radiopaque particles markers and abdominal X-ray is the standard approach for determining CTT. It is a simple, inexpensive, safe, reliable and reproducible technique. There are two main ways for the assessment of total and segmental CTT: to follow the transit after ingestion of a single bolus of radiopaque particles with bolus sizes of 20 - 50 particles (tracer) with repeated X-ray examinations (Figure 1-3) or daily dose administration of the tracer that could be for 3 days followed by one single X-ray examination on day four [4] or the consumption of the tracer for six consecutive days, creating an equilibrium between incoming and outgoing markers, followed by an abdominal X-ray on day 7 [5].

The number of tracer that can be identified on the X-ray is the result of CTT following the equation:

$$CTT: n * (t/N)$$

n: Numbers of markers that is observed on X-ray.

t: Time between the ingestion of markers in hours.

N: Total number of markers that is ingested each day.



**Figure 1:** X-ray on day 7.



**Figure 2:** X-ray on day 7.



**Figure 3:** X-ray on day 15.

For example, if markers are consumed at 24 hour intervals and the number of markers per day is 24, CTT equals the total marker count on the X-ray [5].

With this method we can diagnose different constipation subtypes: those with normal transit time and those with slow transit time. Into the slow transit time subtype we can be subdivided in colonic inertia, hindgut dysfunction and outlet obstruction.

Another method to measure the transit of the colon is the wireless mobility capsule or SmartPill, this capsule is a data recording device that provides information about the intestinal pH and the transit times of the stomach, small intestine and colon, which can help to exclude a more global gastrointestinal transit disorder, but this test is expensive and not all centers have it.

The treatment of constipation has two fundamental pillars, the Nonpharmacologic and Pharmacologic management.

The nonpharmacological treatment is the first line management. It consists in the change of strategies of lifestyle as an increased exercise, high-fiber diets and toilet training.

The dietary changes is one of the most important and initial phases of the treatment. Increased fiber consumption and hydration is the first line of therapy. The recommended dose of fiber intake per day is 25 to 30g and almost always the intake it is insufficient; the patients should incorporate foods as prunes, bananas, kiwis, other fruits, vegetables, grains and bran. It is important when initiating fiber, it should be titrated up slowly as to not cause abdominal cramping and bloating, and a Dietitian and Nutritionist is very helpful to control the dietary changes in the patients. Patients with slow transit constipation or refractory pelvic floor dyssynergia do not respond well to high fiber, and should be minimized, and probably use the biofeedback. Also, we have to instruct to recognize and respond to the urge to defecate, specially in the morning.

The pharmacological treatment should be initiated when lifestyle, dietary changes and nonpharmacological interventions are not enough to relieve the symptoms. In this line of treatment we can use bulk fiber, stimulant laxatives, stool softeners, lubricants, osmotic laxatives, Chloride-Chanel Activator, Guanylate Cyclase C Activator and serotonin agonist [6].

### Conclusion

Constipation is a common disorder in all age groups, especially in western society. Less than half of the people treated are satisfied with the treatment [1]. Accurate diagnosis is very important to focus on appropriate treatment, and CTT is a useful and inexpensive test to determine patients with slow transit. To have into the team a Dietitian and Nutritionist is very helpful to control the dietary changes in the patients and we do not have to hesitate to begin with pharmacological treatment when the first line does not work enough.

### Bibliography

1. DO Prichard and AE Bharucha. "Recent advances in understanding and managing chronic constipation". *F1000Research* 7 (2018): 1640.
2. VC Costilla and AE Foxx-Orenstein. "Constipation: Understanding Mechanisms and Management". *Clinics in Geriatric Medicine* 30.1 (2014) 107-115.
3. "Treating and Preventing Constipation". *American Family Physician* 92.6 (2015).
4. H Abrahamsson and S Antov. "Accuracy in assessment of colonic transit time with particles: how many markers should be used?" *Neurogastroenterology and Motility* 22.11 (2010): 1164-1169.

5. Alvin Ibarra., *et al.* "Correcting for non-compliance when determining colonic transit time with radio-opaque markers". *World Journal of Gastroenterology* 23.4 (2017): 740-742.
6. Consentino M., *et al.* "Defaecography and colonic transit time for the evaluation of female patients with obstructed defaecation". *La Radiologia Medica* 119.11 (2014): 813-819.

**Volume 7 Issue 8 August 2020**

**©All rights reserved by Alexander Forero-Torres and Reyes Bañeres-Visedo.**