

Causes of Idiopathic Constipation in Thai Patients: Associations Between the Causes and Constipation Symptoms as Defined in the Rome II Criteria

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The authors investigated 103 consecutive Thai patients (29M, 74F, age 50±20) with chronic idiopathic constipation (symptom duration; median 5yr, range 0.25-45 yr) as defined by Rome II criteria using colonic transit test, anorectal manometry, and balloon expulsion tests. Constipation symptoms were evaluated by a questionnaire.

Results: There were 30,14,11, and 48 patients who fulfilled the criteria of anorectal dysfunction, colonic inertia, anorectal dysfunction plus colonic inertia, and the normal transit constipation, respectively. The proportion of female gender in the normal transit constipation group (F:M=37:11) was significantly greater than the anorectal dysfunction group (16:14, $p<0.05$). Patients with colonic inertia and colonic inertia plus anorectal dysfunction had a higher prevalence of infrequent bowel movement compared to anorectal dysfunction and normal transit constipation ($p<0.001$). The prevalence of straining, hard stool, incomplete evacuation, sense of anal obstruction, and use of manual maneuver to facilitate defecation, were not different among the constipation subgroups ($p>0.05$).

Conclusions: Prevalence of pathophysiologic conditions associated with idiopathic constipation in Thai patients are similar to Western countries. 29%, 13%, and 11% of Thai patients with idiopathic constipation were associated with anorectal dysfunction, colonic inertia, and anorectal dysfunction plus colonic inertia, respectively. Among the 6 constipation symptoms defined by Rome II criteria, only infrequent bowel movements was associated with delayed colonic transit.

Keywords: Constipation, Anorectal dysfunction, Colonic inertia, Constipation symptoms

J Med Assoc Thai 2004; 87 (Suppl 2): S22-8

e-Journal: <http://www.medassothai.org/journal>

Constipation is a common problem, 2-28% of the general population in Europe and US reported to have constipation⁽¹⁻⁶⁾. Danvivat et al reported 23% of Thai people who described themselves as having constipation, 8% had a problem of straining at stool, and 3% had fewer than 3 bowel movements per week⁽⁷⁾ suggesting that the prevalence of constipation in Thai people is substantial and similar to that of Western countries.

According the Rome II criteria⁽⁸⁾, patients will have constipation if they have at least 12 weeks, which need not be consecutive, in the preceding 12 months of two or more of: 1) straining >25% of defecations, 2) lumpy or hard stool >25% of defecations, 3) sensation of incomplete evacuation >25% of defecations, 4) sensation of anorectal obstruction/blockage >25% of

defecations, 5) manual maneuvers to facilitate >25% of defecations, and/or 6) < 3 defecations/week⁽⁸⁾. The causes of chronic constipation, such as neurologic, metabolic, medication, and mechanical obstructions, are not identified in most constipation patients. The term idiopathic constipation is usually used to describe these patients. Physiologic studies of the colon and anorectum can identify 2 physiologic abnormalities in idiopathic constipation patients: 1) anorectal dysfunction or anismus and 2) delayed colonic transit or colonic inertia, and differentiate these patients into 3 subgroups: 1) anorectal dysfunction, 2) colonic inertia, and 3) normal transit constipation^(9,10). It is important to identify these 3 subgroups in patients with idiopathic constipation since the treatments are different^(10,11).

More than 60% of patients with chronic constipation caused by anorectal dysfunction will have long term responses to biofeedback therapy or can be cured from constipation⁽¹²⁻¹⁹⁾. Whereas, patients with colonic inertia usually need long term laxative or, sometimes, total colectomy in severe cases⁽²⁰⁾. Irritable bowel

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syndrome (IBS) should be considered in patients who have constipation with normal colonic transit and normal anorectal studies. Medical treatment with a 5-HT₄ agonist has been shown to be effective in these patients⁽²¹⁻²³⁾.

Anorectal manometry, balloon expulsion test, and colonic transit study are recommended in patients with chronic constipation⁽⁹⁾. These tests can divide patients with idiopathic constipation into: 1) anorectal dysfunction, 2) colonic inertia, 3) anorectal dysfunction plus colonic inertia, and 4) normal transit constipation or IBS⁽⁹⁾. Although, it has been reported that 13-27% of idiopathic constipation patients had colonic inertia, 25-35% had anorectal dysfunction, 10-15% had anorectal dysfunction plus colonic inertia, and 27-59% had normal transit constipation or IBS^(11,24), the prevalence of these conditions have not been explored in Thai patients.

The aim of this study was to identify the prevalence of physiologic causes of idiopathic constipation in Thai patients. Furthermore, the authors explored the association between each physiologic cause of idiopathic constipation and constipation symptoms in the Rome II criteria.

Materials and Methods

Constipation Patients

Patients with constipation as defined by Rome II criteria⁽⁸⁾ who presented at the Gastrointestinal Motility Unit, Division of Gastroenterology, Department of Internal Medicine, King Chulalongkorn Memorial Hospital, were included. Patients with alarm features including anemia, abdominal pain, significant weight loss (>10%), recent onset of constipation, age >45 years, and a positive stool occult blood test, underwent colonoscopy or double contrast barium enema before being included into this study. Patients who had colorectal cancer, Hirschsprung's disease, anal stricture, rectal intussusception or prolapse, rectocele, hypothyroid, hypercalcemia, previous colonic and anorectal surgery, severe neurologic diseases, age <15 years, and pregnant patients were excluded. Diabetic patients without evidence of late diabetic complications were not excluded.

All patients underwent anorectal manometry, balloon expulsion test, and colonic transit study. Thyroid function tests and tests for serum calcium levels were performed if patients had delayed colonic transit. All patients were interviewed about their bowel habits, constipation symptoms, underlying medical conditions, current medications, using of laxatives, and surgical history using a questionnaire. Patients who could not stop medications that affect colonic motility 3 days

before anorectal manometry and during colonic transit studies were excluded. All patients gave written informed consent before entering the study. The studies were approved by the Institutional Review Board of Faculty of Medicine, Chulalongkorn University.

Anorectal Manometry

All patients fasted at least 6 hours before undergoing the anorectal manometry studies. Studies were performed in a quiet, private room with subjects in the left lateral position with flexed knees and hips. A manometric assembly (Zinetics AMC Anorectal Catheter, Medtronic, Inc. Saltlake city, Utah, USA, outer diameter 4.5 mm) consisted of 8 side holes (inner diameter 0.8 mm) and a latex balloon at the tip inflatable by a central lumen (inner diameter 1.8 mm). The side holes were staggered 45° around the catheter and located at 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, and 6.5 cm from the tip. The rectum was cleaned by an enema one hour prior to insertion of the manometric assembly. All channels were perfused with sterile distilled water at a rate of 0.5 ml/min by a pneumohydraulic pump (Dentsleeve Pty Ltd, Wayville, South Australia, Australia). Manometry data was recorded and analyzed using a commercially available manometric system (Medtronic, Inc. A/S, Skovlunde, Denmark).

Defecation dynamics were studied while the manometric side holes were located at 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, and 4.0 cm from the anal verge. If the manometric tracing of the inner most side hole did not demonstrate the rectal pressure the catheter position was adjusted until the rectal pressure was observed. Patients were asked to strain like they did at home when they had a bowel movement for 15 second X 3 times. Recto-anal inhibitory reflex were evaluated by inflation of the balloon manually at 10, 20, 30, 40, 60, 80, 100, and 120 ml, respectively, to exclude Hirschsprung's disease.

Balloon expulsion test

The balloon expulsion test was performed using a nasogastric tube incorporated with a 3-cm long latex balloon and filled with 50ml water after inserting into the rectum. This technique was described previously⁽²⁵⁾. The patient was asked to sit on a commode and expel the balloon, in privacy. The balloon expulsion time, the time that the patient spent for expelling the balloon were recorded. After 5 minutes of straining, if the patient failed to expel the balloon, it was deflated and removed.

Colonic transit test

Colonic transit was measured using 20 solid

radiopaque markers (poly urethane markers containing 40% barium sulfate, P.&A. Mauch, Munchenstein). An x-ray of the abdomen was taken at 120 hours (day 5) after an ingestion of the 20 markers. Patients were informed to stop all laxatives and medications which affected colonic motility 3 days before and during the studies. Digital evacuations and rectal enemas were prohibited. Retention of markers more than 20% (> 4 markers) in the abdomen on the x-ray taken on day 5 was considered delayed colonic transit^(10,26).

Constipation subgroups

Patients were classified into 4 constipation subgroups based on the results of colonic transit time and ano-rectal function.

1) Patients will be classified as colonic inertia if they had delayed colonic transit and did not fulfill the criteria of anorectal dysfunction⁽⁹⁾.

2) Patients will be classified as anorectal dysfunction if they had normal colonic transit with 2 or more of the following physiologic criteria^(9,19,25,27,28): a) dyssynergic or obstructive pattern of defecation, which is defined as paradoxical increase of anal sphincter pressure or less than 20% relaxation of the resting anal sphincter pressure during attempted defecation or straining, b) a defecation index, which was defined as rectal pressure during straining divided by anal residual pressure during straining of less than 1.2, and c) Inability to expel a 50 ml water filled balloon within 3 minutes.

3) Patients will be classified as combined anorectal dysfunction and colonic inertia if they had both delayed colonic transit and fulfilled the criteria of anorectal dysfunction⁽⁹⁾.

4) Patients will be classified as normal transit constipation if they had normal colonic transit and did not fulfill the criteria of anorectal dysfunction⁽⁹⁾.

Statistical analysis

Data were expressed as mean $\pm$ SD except state otherwise. Analysis of variance (ANOVA) was used to compare ages among constipation subgroups. A chi-squared test was used to evaluate sex and symptom distributions among constipation subgroups. A *p* value of <0.05 was considered statistical significance.

Results

One hundred and three patients (29M, 74F, mean age 50 ± 20 years) fulfilled the inclusion criteria and finished all 3 physiologic studies. No patient reported any adverse events during the tests. The median duration of constipation was 5 years (range 3 months-45

years). The most common symptom of idiopathic constipation was difficulty defecation or straining (93%), followed by a sense of incomplete evacuation (87%), and hard stool (77%). Forty eight percent of patients had a sense of anal blockage, 45% used manual maneuvers to facilitate defecations, and 57% had fewer than 3 bowel movements/week. Thirty-five percent of the patients reported regular uses of rectal enema to relieve their symptoms. The percents of patients who used to or currently use of psyllium, milk of magnesia, lactulose, bisacodyl, senokot, and traditional medicine to relieve of constipation symptoms were 31%, 36%, 5%, 44%, 48%, and 5%, respectively. Forty-four percent of patients reported no bowel movement within one week without laxative treatments.

Colonic inertia, anorectal dysfunction, anorectal dysfunction plus colonic inertia, and normal transit constipation were found in 14 (13%), 30 (29%), 11 (11%), and 48 (47%) patients, respectively (Fig. 1). Patients with chronic constipation caused by colonic inertia, anorectal dysfunction plus colonic inertia, and normal transit constipation were predominantly female whereas, the prevalence of male and female patients in anorectal dysfunction were similar as shown in Table 1. The proportion of female patients was higher in normal transit constipation compared to anorectal dysfunction ($p < 0.05$). The duration of constipation symptoms or age at presentation was not significantly different between each group (Table 1, $p > 0.05$).

The prevalence of difficult defecation, hard stool, sense of incomplete evacuation, sense of anal obstruction, or use of manual maneuver to facilitate

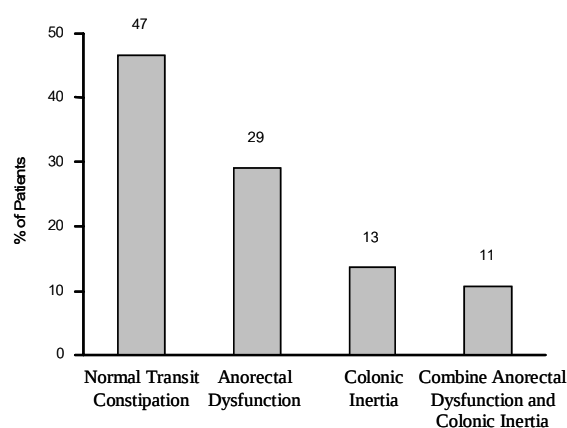


Fig.1 Causes of idiopathic constipation in Thai patients. Normal transit constipation, anorectal dysfunction, colonic inertia, and anorectal dysfunction plus colonic inertia were found in 47%, 29%, 13%, and 11%, respectively

Table 1. Patients characteristics in each constipation subgroup

Constipation subgroups	Symptom duration (years)	Age (years)	Sex (M:F)
Normal transit constipation	4 (0.25-45)	50 ± 18	11:37
Anorectal dysfunction	6 (0.25-40)	50 ± 20	14:16*
Colonic inertia	3 (0.25-20)	50 ± 24	2:12
Anorectal dysfunction plus colonic inertia	9 (1-20)	49 ± 24	2:9

* p < 0.05 vs normal colonic transit

defecation, was not significantly different among constipation subgroups ($p>0.05$, Fig. 2). However, the prevalence of infrequent bowel movements ($<3/\text{week}$) was significantly different among the constipation subgroups ($p<0.01$, Fig. 2). When each subgroup was compared, patients with constipation caused by normal transit constipation and anorectal dysfunction had significantly less prevalence of infrequent bowel movements (50% and 39%, respectively) compared to anorectal dysfunction plus colonic inertia (100%, $p<0.01$). Patients with anorectal dysfunction also had significantly less prevalence of infrequent bowel movement

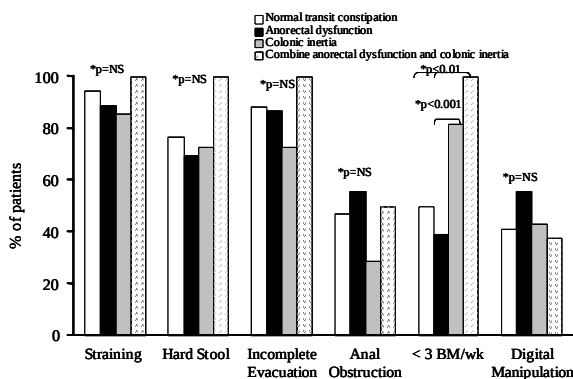


Fig. 2 Prevalence of constipation symptoms in each subgroup of chronic idiopathic constipation. Only infrequent bowel movements ($<3/\text{wk}$) were associated with delayed colonic transit. Patients with normal transit constipation and anorectal dysfunction had significantly less prevalence of infrequent bowel movements compared to anorectal dysfunction plus colonic inertia ($p<0.01$). Patients with anorectal dysfunction also had significantly less prevalence of infrequent bowel movement compared to colonic inertia ($p<0.001$). The prevalence of difficulty defecation, hard stool, sense of incomplete evacuation, sense of anal obstruction, and use of manual maneuver to facilitate defecation, were not significantly different among the constipation subgroups ($p>0.05$)

compared to colonic inertia (82%, $p<0.001$). Infrequent bowel movement had 90% sensitivity and 54% specificity for diagnosis of delayed colonic transit.

Discussions

The guideline of the American Gastroenterology Association recommends that colonic and anorectal physiology tests including anorectal manometry, balloon expulsion test, and colonic transit should be performed in patients with idiopathic or functional constipation who do not respond to fiber or simple laxative treatment^(9,29). The guideline also recommends that treatments of constipation should rely on the physiologic test results⁽⁹⁾.

Colonic inertia or slow transit constipation is a condition associated with a primary defect slower than normal movement of contents from the proximal to the distal colon and rectum^(11,30,31). Laxative is the first line therapy for colonic inertia patients. Surgical treatment is indicated in patients with medically refractory severe slow transit constipation^(20,29). Total colectomy with ileoanal anastomosis is the procedure of choice^(11,32,33). Studies have shown that when surgery was performed in severe constipation patients regardless of the underlining physiologic etiology the successful rates were variably low (58-79%)⁽³⁴⁻³⁹⁾. Where as when the surgery was performed in colonic inertia patients in whom the diagnosis was confirmed by colonic and anorectal function tests the successful rates were higher (88-100%)^(32,33,40-42). Thus, colonic transit and anorectal function studies such as anorectal manometry and balloon expulsion test are indicated in patients undergoing surgical treatment for severe constipation to confirm the diagnosis of colonic inertia. If anorectal dysfunction is present, biofeedback therapy should be performed to correct anorectal physiologic abnormalities before under-going the surgery.

In the present study, the authors have shown for the first time that 13% of Thai patients with idiopathic constipation who have no organic causes have colonic inertia, 29% have anorectal dysfunction, and 11% have anorectal dysfunction plus colonic inertia. The results of the present study are comparable to studies in Western countries reported in the literature^(11,24). It is important for physicians who take care of constipation patients to be aware of anorectal dysfunction since this condition is curable. Studies have shown that biofeedback therapy was effective with a low recurrent rate in most of these patients⁽¹²⁻¹⁹⁾. Injection of botulinum toxin into the anal sphincter complex has also been shown to be effective in these patients in small studies

(43-45) and may be an alternative therapy. Although biofeedback therapy for constipation have been well recognized for more than a decade, it is not widely used in Thailand. Currently only a few medical centers in Thailand, including King Chulalongkorn Memorial Hospital, employ this technique for treating patients with anorectal dysfunction.

Since anorectal manometry and biofeedback therapies are not widely available in Thailand, most constipation patients who have symptoms which interfere with their quality of life in community hospitals need to be transferred to a center where tests are available. However, transferring patients to a tertiary care center is very costly. Screening patients by clinical symptoms or a simple test that can identify patients who have anorectal dysfunction is crucial. The presents results suggest that clinical symptoms alone could not differentiate anorectal dysfunction from colonic inertia or normal transit constipation. Thus, colonic and anorectal physiologic tests are needed to identify constipation subgroups. Only infrequent bowel movements are associated with delayed colonic transit. Although the sensitivity of infrequent bowel movement was high (90%) for diagnosis of delayed colonic transit, the specificity was low (54%). The present results agree with previous studies, which showed that constipation symptoms were not helpful in differentiating among the pathophysiologic sub-groups of constipation (46). The present results also agree with Glia et al who reported that only infrequent bowel movements were associated with delayed colonic transit (47). The balloon expulsion test is a simple test, easy to perform at every level of the hospitals. A recent study suggests that the balloon expulsion test is a good test to identify patients who suffered from anorectal dysfunction (48). The authors recommend that a balloon expulsion test should be performed in idiopathic constipation patients who have symptoms which interfere with their daily activities. If the test is abnormal the affected patient should be referred to a center that has anorectal manometry and biofeedback therapy available.

In summary, 29%, 13%, 11%, and 47% of idiopathic constipation patients who presented at King Chulalongkorn Memorial Hospital were suffering from anorectal dysfunction, colonic inertia, anorectal dysfunction plus colonic inertia, and normal transit constipation, respectively. Constipation symptoms as defined by Rome II criteria are not good enough to differentiate the pathophysiologic conditions underlying chronic idiopathic constipation in Thai patients. Since anorectal dysfunction is a treatable condition referring patients

who are suspected of having this condition to a center that has anorectal physiologic tests and biofeedback therapy is strongly recommended.

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สาเหตุของท้องผูกเรื้อรังที่ไม่ทราบสาเหตุในผู้ป่วยไทย: ความสัมพันธ์ของสาเหตุกับอาการท้องผูกที่นิยามในเกณฑ์ Rome II

สุเทพ กลชาณวิทย์, ฐนินสา พัทธตระกูล

ผู้ป่วยท้องผูกเรื้อรังที่ไม่ทราบสาเหตุซึ่งวินิจฉัยตามเกณฑ์ Rome II จำนวน 103 คน (ชาย:หญิง = 29:74, อายุเฉลี่ย 50±20 ปี) ได้รับการตรวจดูการเคลื่อนไหวของลำไส้ใหญ่ การทำงานของทวารหนักและกล้ามเนื้อหูรูดทวารหนัก และการทดสอบการเบ่งลูกโป่ง ค่ากึ่งกลางของระยะเวลาที่มีอาการท้องผูกเท่ากับ 5 ปี (ระยะเวลาที่มีอาการ = 3 เดือน-45 ปี)

ผลการศึกษา : พบมีผู้ป่วยกลุ่มที่ีการทำงานไม่ประสานกันของทวารหนักและกล้ามเนื้อหูรูดทวารหนัก กลุ่มที่ลำไส้ใหญ่เคลื่อนไหวช้า กลุ่มที่ีการทำงานไม่ประสานกันของทวารหนักและกล้ามเนื้อหูรูดทวารหนักร่วมกับลำไส้ใหญ่เคลื่อนไหวช้า และกลุ่มที่ตรวจไม่พบความผิดปกติจำนวน 30 คน, 14 คน, 11 คน, และ 48 คน ตามลำดับ กลุ่มที่ตรวจไม่พบความผิดปกติมีสัดส่วนของเพศหญิง (หญิง:ชาย=37:11) มากกว่ากลุ่มที่ีการทำงานไม่ประสานกันของทวารหนักและกล้ามเนื้อหูรูดทวารหนัก (16:14, $p<0.05$) ผู้ป่วยกลุ่มที่ลำไส้ใหญ่เคลื่อนไหวช้าและกลุ่มที่ีการทำงานไม่ประสานกันของทวารหนัก และกล้ามเนื้อหูรูดทวารหนักร่วมกับลำไส้ใหญ่เคลื่อนไหวช้ามีความชุกของอาการถ่ายอุจจาระน้อยกว่า 3 ครั้งต่อสัปดาห์เท่ากับ 82% และ 100% ตามลำดับ มากกว่าผู้ป่วยกลุ่มที่ีการทำงานไม่ประสานกันของทวารหนักและกล้ามเนื้อหูรูดทวารหนัก และกลุ่มที่ตรวจไม่พบความผิดปกติ ซึ่งมีความชุกของอาการเท่ากับ 39% และ 50% ตามลำดับ ($p<0.01$) ความชุกของอาการเบ่งอุจจาระลำบาก อุจจาระแข็ง ถ่ายอุจจาระไม่สุด รู้สึกมีสิ่งอุดตันที่ทวารหนักและการใช้นิ้วมือช่วยขณะถ่ายอุจจาระไม่มีความแตกต่างกันระหว่างผู้ป่วยทั้ง 4 กลุ่ม ($p>0.05$)

สรุป : ความผิดปกติที่สัมพันธ์กับภาวะท้องผูกเรื้อรังที่ไม่ทราบสาเหตุในคนไทยมีความชุกคล้ายคลึงกับความผิดปกติที่ตรวจพบในรายงานจากประเทศทางตะวันตก โดยผู้ป่วย 29%, 13%, และ 11% มีอาการท้องผูกอันมีสาเหตุมาจากการทำงานไม่ประสานกันของทวารหนักและกล้ามเนื้อหูรูดทวารหนัก ลำไส้ใหญ่เคลื่อนไหวช้า และการทำงานไม่ประสานกันของทวารหนักและกล้ามเนื้อหูรูดทวารหนักร่วมกับลำไส้ใหญ่เคลื่อนไหวช้า ตามลำดับ ในอาการท้องผูก 6 อาการของเกณฑ์ Rome II มีเพียงอาการถ่ายอุจจาระน้อยกว่า 3 ครั้งต่อสัปดาห์เท่านั้นที่สัมพันธ์กับการเคลื่อนไหวช้าของลำไส้ใหญ่ ส่วนอาการอื่น ๆ ไม่สามารถแยกผู้ป่วยท้องผูกเรื้อรังกลุ่มต่าง ๆ ออกจากกันได้
