

# Primary Care Management of Chronic Constipation in Asia: The ANMA Chronic Constipation Tool

Kok-Ann Gwee,<sup>1\*</sup> Uday C Ghoshal,<sup>2</sup> Sutep Gonlachanvit,<sup>3</sup> Andrew Seng Boon Chua,<sup>4</sup> Seung-Jae Myung,<sup>5</sup> Shaman Rajindrajith,<sup>6</sup> Tanisa Patcharatrakul,<sup>3</sup> Myung-Gyu Choi,<sup>7</sup> Justin C Y Wu,<sup>8</sup> Min-Hu Chen,<sup>9</sup> Xiao-Rong Gong,<sup>1,9</sup> Ching-Liang Lu,<sup>10</sup> Chien-Lin Chen,<sup>11</sup> Nitesh Pratap,<sup>12</sup> Philip Abraham,<sup>13</sup> Xiao-Hua Hou,<sup>14</sup> Meiyun Ke,<sup>15</sup> Jane D Ricaforte-Campos,<sup>16</sup> Ari Fahrial Syam<sup>17</sup> and Murdani Abdullah<sup>17</sup>

<sup>1</sup>Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore; <sup>2</sup>Department of Gastroenterology, Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow, India; <sup>3</sup>GI Motility Research Unit, Division of Gastroenterology, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand; <sup>4</sup>Department of Primary Care and Gastroenterology, Gastro Centre Ipoh, Ipoh, Perak, Malaysia; <sup>5</sup>Department of Gastroenterology, University of Ulsan College of Medicine, Asan Medical Center, Seoul, South Korea; <sup>6</sup>Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka; <sup>7</sup>Division of Gastroenterology, Department of Internal Medicine, Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, South Korea; <sup>8</sup>Institute of Digestive Disease, The Chinese University of Hong Kong, Hong Kong SAR; <sup>9</sup>Department of Gastroenterology and Hepatology, The First Affiliated Hospital, Sun Yat-Sen University, Guangzhou, Guangdong, China; <sup>10</sup>Division of Gastroenterology, Taipei Veterans General Hospital; Institute of Brain Science, National Yang-Ming University Taipei, Taiwan; <sup>11</sup>Department of Medicine, Buddhist Tzu Chi General Hospital and Tzu Chi University, Hualien, Taiwan; <sup>12</sup>Asian Institute of Gastroenterology, Hyderabad, India; <sup>13</sup>P D Hinduja National Hospital and MRC, Mahim, Mumbai, India; <sup>14</sup>Department of Gastroenterology and Hepatology, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei, China; <sup>15</sup>Department of Gastroenterology, Peking Union Medical College Hospital, Chinese Academy of Medical Science, Beijing, China; <sup>16</sup>Section of Gastroenterology, Department of Internal Medicine, Medical Center Manila, Manila, Philippines; and <sup>17</sup>Division of Gastroenterology, Department of Internal Medicine, Cipto Mangunkusumo General Hospital/Faculty of Medicine, University of Indonesia, Jakarta, Indonesia

Chronic constipation (CC) may impact on quality of life. There is substantial patient dissatisfaction; possible reasons are failure to recognize underlying constipation, inappropriate dietary advice and inadequate treatment. The aim of these practical guidelines intended for primary care physicians, and which are based on Asian perspectives, is to provide an approach to CC that is relevant to the existing health-care infrastructure. Physicians should not rely on infrequent bowel movements to diagnose CC as many patients have one or more bowel movement a day. More commonly, patients present with hard stool, straining, incomplete feeling, bloating and other dyspeptic symptoms. Physicians should consider CC in these situations and when patients are found to use laxative containing supplements. In the absence of alarm features physicians may start with a 2-4 week therapeutic trial of available pharmacological agents including osmotic, stimulant and enterokinetic agents. Where safe to do so, physicians should consider regular (as opposed to on demand dosing), combination treatment and continuous treatment

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\*Correspondence: Kok-Ann Gwee, FRCP, PhD

Stomach Liver and Bowel Center, Gleneagles Hospital, Annexe Block 05-37, 6A Napier Road, Singapore 258500, Singapore  
Tel: +65-6474-6848, Fax: +65-6475-8285, E-mail: slbclinic@gmail.com

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for at least 4 weeks. If patients do not achieve satisfactory response, they should be referred to tertiary centers for physiological evaluation of colonic transit and pelvic floor function. Surgical referral is a last resort, which should be considered only after a thorough physiological and psychological evaluation.

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### Key Words

Asia; Constipation; Management; Physicians, primary care

## Introduction

There is a perception that chronic constipation (CC) is an uncommon problem in Asia, and perhaps arising in part from this perception, the evaluation and management of this condition does not appear to be a priority in training programs for medical doctors. In 2 related global surveys, the prevalence of self-defined constipation in Asia (represented by South Korea, China and Indonesia) was estimated to be 15-23% in women and about 11% in men.<sup>1,2</sup> In comparison, the same survey found a lower prevalence in Germany, Italy and the UK for both women (7-11%) and men (< 5%). In China, the health-related quality of life scores for community subjects with (against those without) CC were poorer across all domains.<sup>3</sup> In Taiwan, significantly more doctor visits and absenteeism for gastrointestinal (GI) complaints were found in those with CC than those without.<sup>4</sup> In Singapore, elderly men with CC were found to suffer more from lower urinary tract symptoms and erectile dysfunction than those without.<sup>5</sup> Both in the West and in Asia, there are reports that a substantial number of constipation sufferers are dissatisfied with fiber supplements and over-the-counter laxatives.<sup>6-10</sup>

There are also important potential differences between Asia and the West in terms of patient perception and self-management, dietary practices, intestinal physiology and health-care infrastructure, that warrant the development of management guidelines based on Asian perspectives. In India patients, self-perceived constipation report a median of 2 bowel movements a day; here there is also a high level of dietary fiber intake in the general and patient population.<sup>11-13</sup> People in China and India, both those who report and do not report constipation, appear to have relatively shorter colonic transit times than in the West.<sup>11,14-16</sup> There is also a high level of lactase deficiency across all the major ethnic groups in Asia.<sup>17-19</sup> In part, these dietary differences influence how people in Asia self-manage their constipation.<sup>1,2,20</sup>

Therefore, the Asian Neurogastroenterology and Motility Association (ANMA) felt that there was a need for practical guidelines in the management of CC which take into account the disease epidemiology, socio-cultural factors and health-care infrastructure of Asia. As they are expected to be the first point of medical contact for most patients, these guidelines were developed with primary care physicians foremost in mind. The emphasis of our paper is on clinical practice, and as such, only the key relevant information will be presented to support our management recommendations. An in-depth review of the relevant literature will be presented in a follow-up publication.

## Methodology

In the first phase, 8 experts were assigned to perform a detailed review of the literature on epidemiology (including symptoms, stool form), pathophysiology (including motility, organic causes), psychosocial (including diet and lifestyle) and treatment (including guidelines, pharmacological and non-pharmacological) related to constipation. These experts were tasked to pay particular attention to the Asian literature. The findings of these reviews were presented to 20 members of ANMA (representing 11 countries, including primary, secondary and tertiary care physicians) on September 30, 2011. In the course of these presentations, we identified aspects of the Asian patients' experiences of constipation which were not consistent with those in the West, and how these may have impacted on how physicians manage CC in Asia. A specific example was that the experts shared their common experience that a substantial number of patients referred to them for further management of bloating or fullness were found to have underlying CC that was untreated. The proceedings of this meeting were then reviewed again by the 8 experts. Finally a meeting was held on April 21-22, 2012 and an updated review of the key aspects of the Asian CC was presented to 14 ANMA members. From May to December 2012, email reviews and face to face discussions and presentations were made on the major

points of the guidelines among the co-authors. All in all the work involved review and presentation involving 20 experts from China, India, Indonesia, South Korea, Thailand, Taiwan, Malaysia, Sri Lanka, the Philippines, Hong Kong and Singapore. These guidelines are intended as a practical approach for clinical management of CC in Asia, to provide relevant information to primary and secondary care physicians, and for CC, and may not be applicable to recent or occasional constipation. For the purpose of these guidelines, CC is defined as the presence of recurrent or persistent symptoms of constipation occurring over a 3-month period or longer. This definition does not assume to differentiate functional from organic causes of constipation. The term functional here encompasses the diagnoses such as slow transit constipation, irritable bowel syndrome (IBS) and pelvic floor dysfunction; it does not imply the Rome definition of functional constipation.

### Early Recognition of Chronic Constipation

Physicians commonly perceive constipation to mean infrequent bowel movements. However, for people in the community with constipation, the commonest symptoms were either having hard stools or having to strain at bowel movement.<sup>5,9,21</sup> A feeling of incomplete evacuation and bloating were reported more commonly than infrequent bowel movements. Studies from China have also observed that the presence of dyspepsia, in particular, fullness was associated with an increased risk of CC.<sup>3,22</sup> Among sufferers with constipation, bloating appears to be particularly bothersome and difficult to treat.<sup>6-9,23</sup> Preliminary results from an ongoing study undertaken by ANMA in patients with CC criteria presenting for treatment at primary and secondary care clinics in India and China, suggest that these patient had frequently received proton pump inhibitor agents in their previous treatment.<sup>23</sup> When we analyzed their symptomatology, bloating was found to be both the most common and the most bothersome complaint. It is unclear whether these patients had concomitant acid reflux or dyspepsia, however, only 26.2% patients reported satisfaction with their previous treatment, while 46.3% felt no change and 7.5% felt worse in their symptoms.<sup>23</sup> In a study from the US, the highest dissatisfaction rating was for ineffective relief of bloating with fiber treatment.<sup>6-9</sup> Dissatisfaction and inappropriate treatment may stem from failure to adequately recognize constipation and its manifestations. Recognition of constipation is challenging given that physicians, patients and physiologists disagree on what is constipation. Community studies from Singa-

pore and from the US found that among subjects who fulfilled the same stringent criteria for CC, one fifth or less actually perceived that they were constipated.<sup>5,24</sup> A study from the UK has even found that the majority of women with evidence of slow colonic transit did not perceive constipation.<sup>25</sup> In a study from India, 99% of people in the community passed one or more stools a day, and patients with a diagnosis of constipation had a median stool frequency of twice a day.<sup>12</sup>

To improve the efficiency of recognizing constipation, it is important to appreciate that some patients may not present with obvious defecation related complaints. Therefore, we have drawn up a list of *alert symptoms* which while they may not be part of standard international criteria for CC, are nonetheless frequently associated with underlying constipation. In addition to the usual constipation symptoms, the list of *alert symptoms* (set out in Fig. 1) includes bloating, fullness, complaints of difficulty to pass stools, and the need for laxative containing medications or supplements. The alert symptoms list is different from the alarm symptoms list set out in Table 1. The *alarm features* checklist is to help physicians screen patients for possible organic disease or secondary causes of constipation (details discussed in the next section). If clinical evaluation has reasonably excluded organic disease, the physician should enquire specifically for the presence of any of

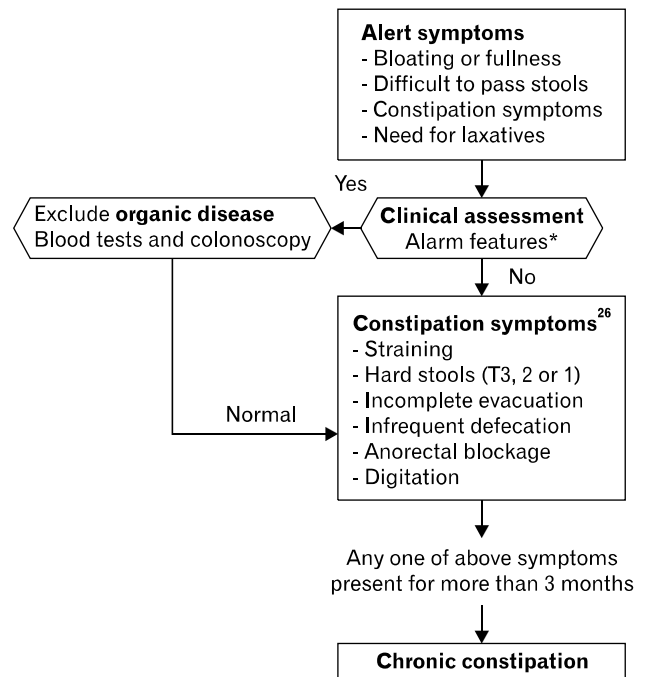


Figure 1. Diagnostic algorithm for chronic constipation. \*See Table 1.

**Table 1.** List of Alarm Features

List of alarm features
Age $\geq$ 45 years
Change in stool caliber
Blood in stool
Unintended weight loss
Fever
Abdominal mass
Family history of gastrointestinal cancer
Iron-deficiency anemia
Recent onset constipation
Rectal bleeding
Rectal prolapse
Vomiting
Loss of appetite

the symptoms associated with CC according to the Rome III criteria.<sup>26</sup> In addition, we encourage all physicians to show their patients the Bristol stool scale. We observed that in a number of studies from Asia, about 20-50% of patients with either functional constipation or IBS with constipation, perceived Bristol type 3 stool form to be hard stool.<sup>23,27,28</sup> Therefore, we advise that patients who report Bristol types 1 to 3 stool forms should be carefully assessed for the other symptoms of constipation. We have found this to be an extremely useful tool to help patients and doctors recognize the association between dyspeptic symptoms and bowel disturbance.

## Clinical Evaluation

Clinical evaluation should be based on a detailed history and a careful physical examination. Particular care should be taken to document the absence of alarm features, to record all drugs taken (in particular, use of opiates and codeine should be sought), and to include a digital rectal examination. However, secondary causes of CC are uncommon and the yield from laboratory investigations is likely to be low. We recommend that investigations should be carried out only for patients with identified risk factors. Thyroid hormones should only be measured if the patient shows overt signs of hyper- or hypo-activity, as it is extremely rare for thyroid dysfunction to be a cause of CC.<sup>29</sup> Among constipated patients who visited a tertiary hospital in Korea, the prevalence of overt and subclinical hypothyroidism were respectively 0.41% (men, 0.36%; women, 0.53%), and 1.76% (men, 1.28%; women 2.03%).<sup>30</sup> We suggest that the elderly especially those who have concomitant medical conditions and medications, and those who

have been prescribed a restrictive diet should be checked for hyponatremia and hypokalemia. With regards to colorectal cancer, a number of systematic reviews as well as prospective studies from the West provide evidence that constipation is not a predictive factor.<sup>31,32</sup> Nonetheless, constipation is not a protective factor, and, there are data that severe constipation may impose an increased risk for colorectal cancer.<sup>33,34</sup> Therefore we recommend an earlier age threshold for colonoscopy of age  $\geq$  45 years for Japanese, Koreans and Chinese, and age  $\geq$  50 years for Indians and Thais to align with the Asian IBS Consensus, and the Asia-Pacific colorectal cancer screening guidelines.<sup>35,36</sup>

## Dietary and Lifestyle Advice

Community based as well as healthy volunteer studies generally support an effect for dietary fiber, fluid intake and physical exercise, on stool consistency and frequency.<sup>37,38</sup> However, a distinction should be made between healthy subjects and patients with CC. When dietary fiber and fluid intake were measured objectively, studies have consistently demonstrated no significant differences between patients with CC and healthy controls.<sup>39-42</sup> Furthermore, in the limited number of randomized controlled studies in idiopathic CC, the benefit of fiber treatment was inconclusive compared to placebo.<sup>43</sup> We wish to highlight also that excessive fiber intake is expected to aggravate bloating, flatulence and possibly abdominal cramps.<sup>41</sup> In a study, 80% of constipated patients who received fiber were not completely satisfied with the ability of fiber to relieve their bloating while 50% thought fiber did not completely relieve their constipation.<sup>9</sup> It is likely that most patient suffering with CC will already have received advice to increase intake of dietary fiber and fluids, and to undertake regular physical exercise. Therefore we advise that a formal evaluation of dietary fiber and fluid intake to be carried out, before recommending further increases in dietary fiber. The generally recommended daily dietary fiber intake in adults is 20-30 g, and in children is calculated as age (in years) + 5 g.<sup>44</sup> Bulking agents (e.g., isphagula, psyllium and polycarbophil) have similar physico-chemical properties to dietary fiber. These agents have been reported to produce better formed stool, but as with dietary fiber, the global response for patients with CC is expected to be similar to placebo, although they may be better tolerated.<sup>43</sup> A number of studies have examined the effects of probiotic containing food supplements on GI transit and their potential for treating CC, but the interpretation of these studies is confounded by heterogeneity in dose of probiotics, species of bacterium used, the evaluated

clinical end points and study design.<sup>45-52</sup> A potentially important confounding factor that has not been adequately addressed is whether fundamental differences in indigenous gut flora exists between peoples from different regions given differences in diet, hygiene levels and prevalence of lactose malabsorption. There are very few studies from Asia and their poor methodology do not allow us to discern whether the improvements reported derive from the presence of lactose malabsorption and from addition of fiber in the probiotic formulation. In south China, Yang et al<sup>45</sup> randomly allocated 135 adult female patients with functional constipation, to consume either fermented milk product containing *Bifidobacterium lactis* DN-173 010 and yogurt starters (test product) or acidified milk containing non-living bacteria (control) for 2 weeks. During the first week of treatment, consumption of the test product appeared to be associated with a superior improvement in stool frequency and consistency, but during the second week of treatment, both treatments appeared to produce improvement in stool consistency. In South Korea, Choi et al<sup>46</sup> randomly allocated 142 patients with constipation predominant IBS to receive either a multi-strain probiotic fermented milk with *Streptococcus thermophilus*, *Lactobacillus acidophilus* and *Bifidobacterium infantis* mixed with dietary fiber or the same probiotic fermented milk without fiber for 4 weeks. Superior improvement in stool frequency and straining were reported for the fiber-enhanced treatment.

## Pharmacological Treatments

In patients where attention has already been given to possible

contributing factors, it is reasonable to prescribe a course of pharmacological treatment before further evaluation. The main aim of the treatment trial is to achieve regular complete bowel movement. Secondary aim includes the relief of associated symptoms such as bloating, fullness, anorexia and abdominal pain. To ensure an adequate first line trial of treatment, key considerations include the duration of treatment, the dosing schedule and the type of agent used. The 3 major classes comprise osmotic, stimulant and enterokinetic agents. A fourth class known as colonic secretagogues, is new, and there are at least 2 agents (lubiprostone and linaclotide) undergoing clinical trials. One (lubiprostone) has been approved in the US, but its availability in the rest of the world is limited to a small number of countries. Table 2 presents a summary of the various agents, the dosing ranges and treatment durations reported in clinical trials.

### Osmotic Agents

Lactulose, an osmotic laxative has long been available as a safe alternative for the treatment of CC in pregnant or lactating women, children and the elderly. Lactulose was superior to placebo in terms of mean bowel movement frequency per week in the 3 trials.<sup>53-55</sup> Lactulose was also superior to ispaghula in terms of mean bowel movement frequency per week and a trend of causing less abdominal pain was observed.<sup>56</sup> Recently it has also been appreciated that lactulose possibly has a prebiotic effect (i.e., supports the development of probiotic bacteria in the colon) that could contribute to improvement in bowel function.<sup>57</sup> In an old study, it was observed that after one week treatment with lactulose 15 mL twice daily, consistently more patients continued to pro-

**Table 2.** Summary of the Various Agents of Chronic Constipation

Category	Laxative	Population	Range of dosage	Duration of treatment
Osmotic	PEG	Adults	13-39 g/day	Upto 6 mo
		Children	1-1.5 g/kg/day (disimpaction dose)	Upto 7 day
			0.3-0.8 g/kg/day (maintenance dose)	Upto 6 mo
	Lactulose	Adults	15-60 mL	1-12 wk
		Children (11-18 yr)	15 mL twice daily	4 wk
		Children (6-10 yr)	10 mL twice daily	4 wk
Children (1-5 yr)		5 mL twice daily	4 wk	
Stimulant	Magnesium hydroxide	Elderly (> 65 yr)	25 mL/day	8 wk
	Bisacodyl/picosulfate	Adults	5-10 mg/day	4 wk
		Children (6-14 yr)	2.5-5 mg/day	No data <sup>a</sup>
Enterokinetics	Prucalopride	Adults (> 65 yr)	1 mg/day	12 wk
		Adults (18-65 yr)	2 mg/day	12 wk

<sup>a</sup>For children, bisacodyl/picosulfate was only used as part of preparation to cleanse bowel. PEG, polyethylene glycol.

duce normal stools than when they had received stimulant laxatives.<sup>58</sup> This suggests the potential for a “carry-over” effect with lactulose; it would be interesting to explore whether this arises from a prebiotic effect. Lactulose treatment may be associated with cramps, bloating and flatulence.<sup>59</sup>

Another group of osmotic laxatives are the formulations containing polyethylene glycol (PEG). High doses of PEG based formulations were originally used primarily for colon cleansing prior to colonoscopy. They have also been shown to be useful for fecal disimpaction in both children and the elderly.<sup>59-61</sup> These formulations are now also used to treat CC. Daily doses of upto 17 g have been given for up to 6 months in adults.<sup>62,63</sup> These are generally safe for use in children, pregnancy and the elderly. The most common side effect is diarrhea with liquid stools, which appears to be a function of the dose, occurring in upto 17% with single dose and upto 36% with double dose; thus patients have to be taught to titrate the dose according to their response.<sup>64</sup> Some formulations contain sodium and potassium; it is unknown whether the small quantities present may give rise to hypernatremia and hyperkalemia in elderly and those with impaired renal functions.<sup>64</sup>

Milk of magnesia (Magnesium hydroxide) is an osmotic laxative where the poorly absorbable magnesium ions cause water to be retained in the intestinal lumen; stimulation of cholecystokinin release and activation of constitutive nitric oxide synthase might also contribute to its laxative actions.<sup>65,66</sup> The evidence for its efficacy from randomized control trial is limited. One crossover study in 64 chronic constipated patients aged 65 years or older revealed that magnesium hydroxide at mean dose of 25 mL daily for 8 weeks produced significantly more normal stool consistency, more frequent bowel movements and reduced requirement for bisacodyl treatment compared with bulk-laxative.<sup>67</sup> Reporting of adverse events is limited. In view of the risk of hypermagnesemia, it should not be used in patients with renal impairment.

## Stimulant Agents

For stimulant laxatives, the most well studied are bisacodyl and sodium picosulfate. Picosulfate is converted to the same active moiety as bisacodyl (bis-[*p*-hydroxyphenyl]-pyridyl-2-methane, BHPM)<sup>68</sup> and is available in a liquid form that allows dose titration. However, as picosulfate requires activation by intestinal bacteria action, its effect is less predictable than bisacodyl. In 2 recent high quality randomized clinical trials both picosulfate and bisacodyl have been given at an average dose of 10 mg every night

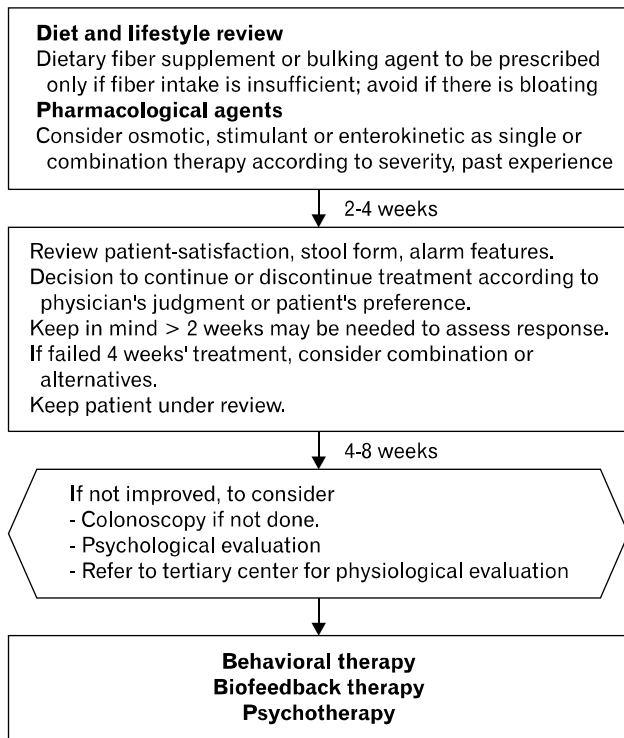
for upto 4 weeks, involving a total of 735 primary care patients with a mean 20 years history of constipation.<sup>68,69</sup> Both compounds produced significantly more complete bowel movements per week than placebo. With bisacodyl, patients were able to achieve an impressive 5 complete spontaneous bowel movements per week, compared with 2 for placebo.<sup>69</sup> Diarrhea was reported by about half of the patients on active treatment, but only 18% discontinued bisacodyl; hyponatremia was observed in only 1 patient (0.4%). Improvement in quality of life, in terms of psychosocial discomfort, anxiety and physical discomfort, was superior on active treatment compared to placebo. Despite the widespread use of senna, there is actually no well-designed randomized controlled trial comparing its efficacy with placebo. In all the three published controlled trials, senna was given in combination with fiber.<sup>70-73</sup> It should be noted that senna is a common ingredient in over the counter ‘herbal teas,’ which may account for the finding of melanosis coli in patients on what they perceive to be a harmless food supplement.

## Prokinetic Agents

Among prokinetic compounds, domperidone, erythromycin, mosapride, itopride, cinitapride and levosulpiride, have activity predominantly on the upper GI tract, and at present there are no high quality trials that support a role for these agents in treating constipation. Only cisapride, tegaserod and prucalopride have clinically meaningful activity on the lower GI tract; these are more accurately described as enterokinetic agents. Unfortunately cardiovascular side effects have been associated with cisapride and tegaserod, and their availability is presently restricted. Prucalopride is a new enterokinetic agent that has been shown in clinical trials to produce significant improvements in bowel transit, bowel function, GI symptoms, and quality of life.<sup>74-76</sup> The benefits were maintained with continued use for up to 24 months.<sup>77</sup> Prucalopride’s high selectivity for the 5-hydroxytryptamine 4 receptor may explain its favorable safety and tolerability profiles, so that it has been approved in some countries for use in the elderly and in subjects with stable cardiovascular disease. A recent randomized clinical trial has demonstrated that the efficacy in Asian subjects is similar to the pivotal studies.<sup>28,74-76</sup> Based on secondary endpoint analysis of data derived from the pivotal studies, it appears that prucalopride may have particular effect to improve bloating.<sup>78</sup>

## Definition of Pharmacological Non-responder

Patients who fail pharmacological treatment should be re-



**Figure 2.** Chronic constipation treatment algorithm.

ferred to specialized centers for physiological laboratory evaluation (see Fig. 2). In the literature, there is no consistent definition of a non-responder. However, best quality data for currently available pharmacological treatment relates to bisacodyl and prucalopride. Therefore, we propose to extrapolate from the reported treatment protocols, ie bisacodyl at 10 mg every night for at least 4 weeks, with consideration given to a total treatment period of up to 12 weeks if access to specialized centers is limited, or prucalopride at 2 mg daily for up to 12 weeks.<sup>28,69,74-76</sup> Combining a stimulant or prokinetic agent with an osmotic agent may also be considered.

## Non-pharmacological Treatments

### Biofeedback and Behavioral Therapy

Biofeedback is a training technique which aims to teach patients to relax, instead of contracting, their pelvic floor muscles during straining at stool. There are several variations of the method; involving in some, the use of visual or auditory signals from surface or electromyographic electrodes or anal probes, to inform patients whether they are performing the appropriate muscular

action. In its most basic form, patients may also be trained to evacuate rectal contents by using a balloon, or even oatmeal porridge, in the shape of a stool, introduced into the rectum to simulate defecation.<sup>79,80</sup> Currently biofeedback therapy is applied primarily to patients with pelvic floor dyssynergia (PFD) (alternative terms are anismus or obstructed defecation disorder). Patients with this condition demonstrate paradoxical contraction or inadequate relaxation of the pelvic floor muscles during attempted defecation; this is believed to be an acquired behavioral disorder of defecation. The prevalence of PFD among patients in Asia with severe intractable constipation is estimated to be between 21.7-34% based on reports from specialist centers in Bangkok and Seoul.<sup>81,82</sup>

Overall, biofeedback is a safe treatment which may produce durable improvement beyond the active treatment period. Randomized controlled trials in refractory CC patients with PFD have reported 70-80% success rates for upto one year.<sup>83-85</sup> Improvement was reported for constipation symptoms, overall symptoms as well as dyssynergic pattern of defecation. However, the impact on quality of life or psychological state had not been clearly assessed. No uniform treatment protocol has been established as a wide variety of biofeedback techniques have been employed with insufficient data to determine the most effective modality.<sup>71,79,86-90</sup> Limitations to its use in more patients include the limited availability of this resource; due in part to its requirements for equipment and trained therapist, and in part to reimbursement considerations. An important consideration is the ability of the therapist to communicate and interact well with the patient to establish a supportive relationship, as well as the time needed for instruction and learning. Few data of biofeedback therapy from Asian countries have been published with comparable response rate to the western studies.<sup>71,79,86-93</sup>

In view of its limited availability, we suggest that biofeedback is offered to patients with proven PFD as the most consistent benefits have been reported for this group. Symptoms and physical examination including digital rectal examination do not accurately predict which patient has PFD. Therefore, patients have to be referred to tertiary centers that have expertise to perform physiological laboratory evaluation of colonic transit time and pelvic floor function.

### Surgery

A review of the literature (January 1995 to April 2012) from Asia carried out by this panel, has identified a total of 55 publications<sup>94,95</sup> involving 2,545 patients, reporting the outcomes of

surgical treatment for CC. The procedures described included subtotal colectomy with antiperistaltic cecoproctostomy, total colectomy with ileoproctostomy, laparoscopic total colectomy with cecorectal anastomosis for slow-transit constipation, and stapled transanal rectal resection for obstructed defecation syndrome associated with rectocele and rectal intussusception.

We advocate that enthusiasm for these surgical approaches should be tempered by observing the trends from the West, where our colleagues have informed us that in recent years they have almost never had to resort to surgery for their patients with functional constipation.<sup>96</sup> Some of this reluctance is reflected in recent thoughtful reports from the West that suggests the possibility of a Munchausen phenomenon operating in patients willing to subject themselves to an ablative procedure like colectomy. In a recent study from the US, it was reported that patients with constipation who had a history of sexual abuse had a ten-fold increased risk of surgery, and significantly poorer outcome if they underwent colectomy.<sup>97-100</sup> In our review of Asian publications, it was disturbing to note that only 5 out of the 55 papers reported pre-operative psychiatric evaluation.<sup>101-105</sup> Similarly, the most enthusiastic advocates from the West do not provide any psychiatric data on their patients.<sup>106,107</sup>

A number of recent studies found that the majority of patients with severe slow-transit constipation had evidence of small bowel motor abnormalities.<sup>108,109</sup> We would also highlight the risk that some patients with CC who undergo colectomy may subsequently develop small intestinal obstruction possibly relating to small intestinal dysmotility.<sup>110,111</sup> Our position is that any patient with functional constipation who is being considered for surgical intervention must undergo a formal psychiatric evaluation and an evaluation of upper GI motility, with at the minimum, measurement of small intestinal transit time.

## The Child and Adolescent Patient

Abdominal pain is an important presenting complaint in children.<sup>112</sup> Physicians should also enquire for presence of pain while passing stools, large diameter stools, stool withholding behavior and fecal incontinence.<sup>113</sup> Several risk factors have been identified in children including low fiber diet,<sup>114</sup> high consumption of junk food,<sup>115</sup> stressful life events<sup>116</sup> and living in urban areas.<sup>112</sup> The majority of children have functional constipation and therefore laboratory investigations are usually not helpful unless features of organic diseases are evident in the clinical evaluation. Hypothyroidism presenting as isolated constipation

is extremely rare.<sup>117</sup> Although diet low in fiber has been identified as a risk factor, clinical trials have failed to demonstrate a clinically meaningful effect with fiber supplement.<sup>118,119</sup> Medical management plays an important role specially in children as biofeedback therapy and behavioral intervention do not show any advantage over the conventional management.<sup>120,121</sup> Unlike adults, over 90% of children with CC present with chronic fecal impaction.<sup>122</sup> Therefore, the first step will usually require the withdrawal of dietary fiber while high dose PEG solutions (1-1.5 g/kg/day for 3-4 days) are given to achieve disimpaction.<sup>122,123</sup> This should be followed by judicious use of combination of osmotic and stimulant laxatives for the next 3-6 months to achieve regular bowel movements. Long-term follow-up is essential as about 15% of children progress to adulthood constipation.<sup>124</sup>

## Conclusion

We have distilled the key practice-relevant information derived from a detailed study of the Asian literature as well as important mechanistic studies. These findings were then examined by our panel of physicians with experience practicing at primary and secondary care settings for their relevance to the health-care infrastructure in different parts of Asia. We have developed quick-reference flowcharts, safety checklists and prescription reference guide, to help clinicians make an early diagnosis of CC, institute first-line treatment and plan for follow-up actions. For future reference, this clinical tool will be named as the ANMA CC Tool.

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