Management of Chronic Constipation in The Elderly

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ABSTRACT

Constipation is a common complaint among the elderly. Constipation can be defined as the passage of small hard stool infrequently and with difficulty. Definitions of constipation vary widely, and therefore Rome III criteria was recommended to be used in defining constipation. Constipation in the elderly is not simply related to the aging. It is a major feature of disorders of colorectal motility. The symptom of constipation could also arise secondary to other conditions. The management of chronic constipation in the elderly should include a detailed medical history and physical examination to exclude secondary causes for constipation. Laboratory evaluation should be performed in the initial assessment of the patient. If the initial investigations are normal, empiric therapy should be initiated. Patients not responding to the initial therapy are considered to have refractory constipation. Thus, diagnostic tests need to be performed in these patients. Further management such as newer medications, biofeedback and surgery might provide new hope to patients with refractory constipation. This review article focuses on the approach and treatment of chronic constipation in the elderly.

Key words: chronic constipation, elderly, management.

INTRODUCTION

Constipation is considered as one of the common problems in the elderly. It can be defined as the passage of small hard stool infrequently and with difficulty. The frequency of constipation is quite low (<2%) in the non-elderly population. However, the frequency tends to increase within aging, as it affects approximately 26% of men and 34% of women over 65 years of age. It has been postulated that age-related problems, including decreased mobility, depression, and polypharmacy, may predispose to the development of constipation in the elderly. Furthermore, several studies have demonstrated that the presence of constipation in the elderly is also associated with several medical conditions such as diabetes mellitus, hypothyroidism, diverticular disease, irritable bowel syndrome, and hemorrhoids.

In the management of chronic constipation, it is essential to search for the underlying causes, as most of the causes are correctable. Furthermore, it is also necessary to exclude the secondary causes of constipation. Thus, a detailed medical history and complete physical examination should be performed. Occasionally, invasive examinations, such as colonoscopy, could also be performed in difficult, refractory, or complicated cases. The presence of constipation may also be associated with the consumption of several medications. Opioid agents have been reported as the most common medication which may predispose to the development of constipation. However, other medications, including beta-blockers, calcium-channel blockers, anticholinergic agents, and diuretics, may also play a role in the development of constipation.

DEFINITION OF CONSTIPATION

Several studies have reported that physicians and patients usually use different definitions of
constipation. Clearly defining what is meant by the term constipation is critical to accurately assess the problem. Most physicians tend to use objective measures in defining constipation, including measurement of the stool frequency. In normal persons, the range of stool frequency is anywhere from one to three times per day to three times per week. Therefore, constipation is defined by most physicians as having less than three bowel movements per week.\(^2,3\)

Paradoxically, most patients tend to use subjective measures in defining constipation, as they most often focus on the symptoms, such as hard stools, infrequent stools, the need for excessive straining, a sense of incomplete evacuation, excessive amount of time spent on the toilet or in unsuccessful evacuation, rather than the stool frequency. The different perception between physicians and patients resulted in significant discrepancies in defining constipation, which may affect the diagnostic strategies and the treatment options. Thus, in order to overcome this problem, it is recommended to use the Rome III criteria in defining constipation.\(^2\)

Functional constipation is defined as a functional bowel disorder, which is characterized by persistently difficult, infrequent, or incomplete defecation, and does not fulfill the Irritable Bowel Syndrome (IBS) criteria. Functional constipation is diagnosed in patients who do not have organic abnormalities and present with at least two of the symptoms listed in Table 1, having the symptoms for at least three months, with symptom onset at least six months prior to diagnosis, and do not fulfill the IBS criteria (Table 2). However, functional constipation is not the same as IBS with constipation. Thus, it is essential to differentiate between these terms. It should be noted that there is no abdominal pain in patients with functional constipation.\(^4\)

**PATHOPHYSIOLOGY**

Within ageing, several changes have occurred in the gastrointestinal tract, including changes in the structure and function of the colon and defecatory mechanism. All of these changes may predispose older people to have constipation. However, constipation could not be considered as a part of natural aging, as it is not caused by ageing itself. Constipation usually has a multifactorial etiology. Several factors (Table 3) may contribute to the development of secondary constipation.\(^2,6,7\)

Several medical literatures have reported that there are no significant changes in the total gut transit time in healthy older persons. However, occasionally, significant prolonged colonic transit times could occur in a few older patients. Thus, in this group of patients, there would be an increased absorption of water, which may lead to the production of harder stools, as well as difficulty in evacuation.\(^2,7\)

Furthermore, the ability to defecate normally is also determined by the adequate response of rectal and perianal sensation. However, within ageing, there could be a reduced response of rectal and perianal sensation. Thus, older persons may be at higher risk to have constipation, as a significant increase in the volume of bowel materials are needed to stimulate rectal sensation and promote the normal urge to defecate in the elderly.\(^2,7\)

Several studies have reported that pudendal nerve injury may also play a role in the pathophysiology of constipation in the elderly, particularly in elderly women, as it can lead to the development of abnormal perineal descent and cause a partial prolapse of the anal canal by the anterior rectal mucosa. As a result of these conditions, rectal emptying could be impaired.\(^2,7\)

**Table 1. Rome III criteria for defining functional constipation\(^4,5\)**

<table>
<thead>
<tr>
<th>Presence of two or more of the following symptoms:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straining during at least 25% of the defecations</td>
</tr>
<tr>
<td>Lumpy or hard stools in at least 25% of defecations</td>
</tr>
<tr>
<td>Sensation of incomplete evacuations for at least 25% of defecations</td>
</tr>
<tr>
<td>Sensation of ano-rectal obstruction/blockage for at least 25% of defecations</td>
</tr>
<tr>
<td>Manual maneuvers to facilitate at least 25% of defecations (such as digital evacuation, support of the pelvic floor)</td>
</tr>
<tr>
<td>Fewer than three bowel movements per week</td>
</tr>
</tbody>
</table>

Loose stools are rarely present without the use of laxatives
Insufficient criteria for irritable bowel syndrome
Criteria fulfill for the last 3 months, and symptom onset > 6 months prior to diagnosis

**Table 2. Rome III criteria for defining irritable bowel syndrome (IBS)\(^4,5\)**

<table>
<thead>
<tr>
<th>Recurrent abdominal pain or discomfort for at least 3 days per month in the last 3 months associated with 2 or more of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement with defecation</td>
</tr>
<tr>
<td>Onset associated with a change in frequency of stool</td>
</tr>
<tr>
<td>Onset associated with a change in form (appearance) of stool</td>
</tr>
</tbody>
</table>

**CLINICAL SUBGROUPS**

The development of constipation is determined by various processes in the colon. Constipation in the elderly could be categorized into three different types, such as normal transit constipation, slow transit
Management of Chronic Constipation in The Elderly

Table 3. Etiology of secondary constipation in the elderly

| 1. Cardiac disorder: congestive heart failure |
| 2. Endocrine and metabolic disorder: diabetes mellitus, hypothyroidism, hypercalcemia, hypokalemia, hyperparathyroidism |
| 3. Gastrointestinal disorder: Anal fissure, external compression (e.g. from a tumor), diverticular disease, strictures, (inflammatory, post diverticulitis, post ischemic, post radiotherapy), irritable bowel disease, rectal prolaps, rectocelectomy, volvulus, megacolon |
| 4. Neurologic disorder: dementia, autonomic neuropathy, cerebrovascular disease, multiple sclerosis, parkinson’s disease, spinal cord lesion (tumour, injury) |
| 6. Psychological disorder: anxiety and depression |
| 7. Lifestyle: dehydration, low calorie diet, low fiber diet, immobility |
| 8. Iatrogenic: medications |

constipation, and pelvic floor dysfunction, based on the pattern of colonic transit time.

Normal transit constipation

Normal transit constipation is considered as the most common subtype of primary constipation.

It is also considered as a functional gastrointestinal disorder, as the colonic transit time is not impaired in this group of patients. It is important to differ normal transit constipation from irritable bowel syndrome with constipation (IBS-C), as patients in both groups may have similar symptoms. The main difference between normal transit constipation and IBS-C is the presence of abdominal pain or discomfort in patients with IBS.

Slow transit constipation

Slow transit constipation is another subtype of primary constipation. In slow transit constipation, there might be a slower rate than normal movement of bowel contents from the proximal segment to the distal segment of colon and rectum. The history of dietary factor should be sought in this group of patients, as dietary factor may play a role in the development of slow transit constipation in some individuals. However, in others, slow colonic transit may have a true pathophysiologic basis. The exact mechanism responsible for this condition has not been widely studied. Several studies have demonstrated that there are two mechanisms of slow colonic constipation.

It has been known that the high-amplitude propagating contractions (HAPCs) are mainly involved in the movement of bowel contents from the proximal to a more distal segment in the colon. In the first mechanism, the number of HAPCs may be decreased, particularly in the postprandial period. As a result, there might be a reduction in the number of bowel material movements, which may lead to the development of slow transit constipation. In the second mechanism, the number of HAPCs is not impaired. However, there might be inappropriate and uncoordinated contractions in the movement of bowel contents from one segment to another segment of the colon. However, it is not easy to assess this condition, as specific technique, such as colonic manometry not widely available, is needed.

Pelvic floor dysfunction

Pelvic floor dysfunction is another subtype of chronic constipation in the elderly. In pelvic floor dysfunction, the colonic transit is normal or just slightly impaired. According to some recent studies, pelvic floor dysfunction can be defined as a prolonged stagnation of bowel contents in the rectum, which may be caused by an impaired relaxation of internal anal sphincter or impaired contraction of external anal sphincter during defecation. The prevalence of this disorder is commonly higher in women. Several different terms have been used in defining pelvic floor dysfunction, including pelvic floor dyssynergia, paradoxical pelvic floor dysfunction, anismus, obstructed defecation, functional recto-sigmoid obstruction, and functional fecal retention. However, the exact mechanism underlying this disorder is still unknown.

Approach to the Elderly with Primary Constipation

In assessing elder patients with chronic constipation, it is necessary to take a careful history and perform a complete physical examination, as all of these efforts may be helpful in determining the nature of the symptoms and finding any underlying causes.

History

1. Nature of symptoms

Historical features are considered as the cornerstone in establishing the diagnosis of primary constipation. Thus, it is important to take a careful and complete history. At first, it is essential to define what patients mean when they say they are constipation. Furthermore, other important data, including stool consistency, stool frequency, need for straining or performing manual maneuvers, should also be assessed. The symptoms that occurred between altered bowel movements, such as pain, bloating, and malaise, should also be assessed, as the presence of these symptoms may indicate IBS rather than primary constipation.

The bowel pattern can be differed from one to another person. Thus, it is essential to obtain the information about the bowel pattern individually, including the defecation frequency in a week, before the
diagnosis of constipation was established. In addition, the information about laxative usage should also be obtained. 9

Stool consistency is considered as the most important data that must be obtained, as it is a reliable indicator in assessing the colonic transit. The pattern of stool consistency could be categorized based on the Bristol Stool Chart (Figure 1). This chart categorized constipated patients into seven types. Type 1 is considered as the slowest colonic transit, since the colonic transit takes about approximately 100 hours. On the other hand, type 7 is considered as the fastest colonic transit, since the colonic transit only takes about 10 hours. The Bristol Stool Chart is widely used in assessing colonic transit, as it has been validated, based on several studies, to have a significant association with the stool output, straining and urgency. 5

In assessing patients with primary constipation, it is important to recognize the presence of pelvic floor dysfunction early by taking a careful history, because this disorder would not give a good response to the standard therapy of constipation. A history of prolonged straining before stool evacuation is suggestive for pelvic floor dysfunction. Furthermore, the need for manual maneuvers in stool evacuation, such as vaginal splinting or perineal body pressuring, also indicates the presence of this disorder. 9

The history of drug use should also be taken into consideration, as many medications commonly used by the elderly may increase the risk of constipation. The usage of opioid agents in alleviating pain is strongly associated with the development of constipation in the elderly. Furthermore, other drugs may also increase the risk of constipation in the elderly, including anticholinergic agents, tricyclic antidepressants, calcium-channel blockers, aluminum-containing medications, calcium supplements, diuretics, iron salts, anti psychotics, anti histamines, and anti parkinsonian agents. 2

3. Onset of symptoms

The onsets of constipation should also be taken into consideration, as it may affect the assessment of constipation. Constipation which has occurred for a long time, e.g. since childhood, is highly likely a congenital origin. On the other hand, constipation which occurs abruptly may indicate organic disorders, which has to be studied further. The history of prior surgery, such as abdomen, colon, or anorectal surgery, should also be sought. 2,6

4. Alarm features

Constipation in the elderly is associated with higher risk of having organic disorders. Therefore, the presence of alarm symptoms should be sought carefully in the assessment of older people with constipation. A family history should also be sought, with an emphasis on inflammatory bowel disorder or colon cancer. The presence of several symptoms, such as new onset or worsening of constipation, blood in the stools, weight loss, persistent fever, anorexia, nausea, or vomiting, may warrant further investigation. 4

Physical Examination

Physical examination should be performed carefully, as a complete physical examination may reveal the presence of a systemic disorder that may play a role as a cause of constipation (Table 3). Abdominal examination should be performed completely. In the inspection, the abdominal skin should be observed carefully, as previous abdominal surgery could impair
several nerves, such as ANS, ENS, and pudendal nerves, that may have a critical role to the colonic and pelvic floor function. Furthermore, the bowel sound must be listened carefully, as the abnormalities of the bowel sound may indicate the presence of organic diseases. Finally, the palpation of the abdomen should be performed carefully, as it is needed to detect the presence of a mass or skibala in the investigation of constipation, particularly in the elderly.2

Rectal examination should always be involved in the assessment of elder constipated patients. The patient should be relaxed and placed in the left lateral recumbent position, if possible. At first, the perianal area should be observed carefully, as the presence of fissures, hemorrhoids, or masses should be sought before performing rectal examination. Furthermore, a careful inspection of the perianal area may also reveal the presence of other disorders, such as fecal impaction and overflow incontinence.2

In performing rectal examination, both the internal and external anal sphincters should be examined carefully in various aspects. The tone of internal anal sphincter is important to be assessed, as the abnormalities of this sphincter, including elevated tone or incomplete relaxation, may indicate pelvic floor dysfunction. Moreover, the strength of external anal sphincter is also important to be assessed, and can be performed by asking the patient to contract it voluntarily.

It is also necessary to check the reflex of external anal sphincter by stroking of the perianal skin, as the absence of this reflex may indicate a neurologic impairment.2

During rectal examination, the patients were instructed to look for the presence of their bowel movement, and to strain when they feel it. This maneuver is useful in assessing the internal anal sphincter. Furthermore, it is also important in detecting the presence of several anorectal abnormalities, including pelvic floor dysfunction, descending perineum syndrome and rectal prolapse.2

Initial Evaluation

It is important to perform various initial examinations, as it is useful the exclude underlying disorders which may contribute to the development of constipation in the elderly. Initial examinations are also needed to recognize serious disorders, including malignancy, in the early stage. However, there is no consensus suggesting which tests need to be done. Most studies suggest to check several laboratory tests, including complete blood cell count, serum glucose, thyroid stimulating hormone level, creatinine, and electrolytes as an initial screening evaluation.

In addition, several tests are also recommended to be performed in elder constipated patients, especially in chronic cases, such as fecal occult blood test and abdominal x-ray.9

The presence of structural abnormalities in the colon should be considered in elder constipation patients. Therefore, it is necessary to perform several investigations, including colonoscopy, flexible sigmoidoscopy or barium enema, to look for structural abnormalities in the colon, such as lesions or masses. Empiric therapy could be given if the suggestive initial evaluations had been done and showed normal results. Furthermore, if the response is not adequate after initial therapy had been given, further investigations should be taken into consideration. However, as further investigations tend to be more expensive, or even invasive, the British Society of Gastroenterology suggested that these examinations should only be performed in the speciality care.9

TREATMENT APPROACHES

The management of chronic constipation in the elderly is aimed to relieve the symptoms associated with constipation, to restore normal bowel habit, which is defined as passage of a soft, formed stool at least three times a week, without straining, and to restore the quality of life without any significant adverse effects.5

Actually, there is no difference in the treatment of constipation between the elderly and the younger adults. Treatment should be started with non pharmacological approaches, including lifestyle changes, dietary changes and physical activity. Within the pharmacological approaches, fiber and laxatives are the most common used as the initial treatment, according to several recent studies. However, there is no consensus suggesting which one is better to be used as initial treatment in chronic constipation. Furthermore, treatment should also be directed to look for the underlying causes of constipation and to correct it, if possible.6,10

Non Pharmacological Treatment

1. Fluid therapy

Elder constipated patients should be informed to drink at least two liters of water daily (approximately eight glasses of water), except in special circumstances, such as in conditions where fluid intake need to be restricted. Furthermore, elder constipated patients should also be advised to avoid drinks that may have diuretic effects, including coffee, tea, or alcohol, as
the consumption of these drinks may predispose elder people to have constipation.5

2. Dietary therapy

Dietary therapy should also be involved in the management of constipation in the elderly. Increasing fiber intake is associated with an improvement of constipation in the elderly, as fiber intake may play a role in the motility of the colon, by increasing water absorption, as well as stool weight. The recommended dose of fiber is 20 to 30 g per day, based on some recent studies. To give an optimal effect, several studies have also recommended to give fiber supplementation before taking a meal.10

However, fiber supplementation is also associated with several adverse effects, including bloating, flatulence, and abdominal discomfort. Thus, fiber supplementation should be initiated in small dose, and could be increased gradually to the maximum dose. To reduce the adverse effects, newer, synthetic preparations of fiber, such as methylcellulose, has also been widely available. The symptoms of constipation will be improved after 1-2 weeks of fiber supplementation. However, to achieve a maximum effect, fiber intake should be continued until at least 4-6 weeks of supplementation. It should be noted that fiber supplementation could not be given in special circumstances, including megacolon, obstructive lesions, and obstructed fecal impaction.10

Currently, probiotics have been introduced in the management of chronic constipation. According to the FAO, probiotics have been defined as live microorganisms, which when administered in adequate amounts, will bring a health benefit on the host. Two genera of probiotics, Bifidobacterium and Lactobacillus, which could be found in yoghurt, have been studied widely in their role in improving the symptoms of constipation. Recent studies have demonstrated that the administration of Bifidobacterium lactis DN-173 010 and Lactobacillus casei Shirota Strain may improve colonic transit time in elder constipated patients. Although the use of probiotics has showed promising results, their clinical relevance is still unclear. Thus, further studies are needed to confirm these findings.11

3. Physical activity

The risk of constipation is strongly associated with the level of physical activity. Constipation commonly occurs in older persons with low physical activity, such as in those who are immobile or bedridden. Therefore, elder constipated patients should be advised to have daily regular exercises.5

4. Bowel training

Bowel training should be taken into consideration in the management of constipation in the elderly. Defecation is considered as a conditioned reflex, as most people will have defecation at approximately the same time every day. Thus, elder people should be motivated to have defecation at an exact time regularly, particularly in the morning or after meals, when the bowel movement is adequate. In addition, a proper bowel training is also useful in preventing hard stools, which may also predispose to constipation, particularly in the elderly.5

Pharmacological Treatment

1. Bulk-forming agents

Bulk forming agent is commonly used in the treatment of constipation, as they may cause an increase in the weight of stool, as well as, the water absorbent properties. The use of bulk forming agents may increase the colonic motor activity, thereby alleviating the symptoms of constipation. Furthermore, stool consistency is also improved with the use of this agent.

Although considered safe, bulk forming agents may have an interaction with other drugs which are taken concomitantly. Several studies have reported a reduced efficacy of several medications, including warfarin, digitalis, potassium-sparing diuretics, salicylates, and antibiotics, when consumed at the same time with the bulk forming agents.2,12,13

2. Osmotic laxatives

Osmotic laxatives have also been widely used in the treatment of constipation. It has been suggested that these drugs may improve the colonic transit time, by causing a retention of water in the lumen of the gut. However, many studies have demonstrated that these drugs could only be used in a short time of treatment (less than two weeks), as a long time use of these agents may cause several serious adverse effects, including diarrhea, fluid and salt overload, and electrolyte imbalance, particularly hypokalemia. These drugs should also be used cautiously, based on a strong indication, in patients with fluid overload, such as congestive heart failure, and chronic renal insufficiency.2,12,13

3. Stimulant laxatives

Stimulant laxatives could also be involved in the treatment of constipation. These agents, when used alone or in combination with other agents, may cause an improvement in several parameters, such as overall symptoms, stool frequency, and stool consistency, when compared to placebo or osmotic agents. Therefore,
several studies have suggested the use of these agents in refractory constipation, when other conservative therapy have failed to give an adequate response. It has been postulated that these agents may directly stimulate the smooth muscle of the gut, as well as the colonic intramural plexus. However, the use of these agents in the elderly has not been widely studied. \(^{2,12,13}\)

It should be noted that these agents are recommended to be used in a short term only, as long term use of these agents is strongly associated with several adverse effects, such as hypokalemia, salt overload, and protein losing enteropathy. Thus, monitoring of fluid and electrolyte is very important in the use of these agents in the elderly. Stimulant laxatives may also caused a unique adverse effect called melanosis coli. This adverse effect could be developed in patients who take stimulant laxatives containing anthraquinolones. However, melanosis coli is not dangerous, as it does not predispose to the development of cancer. \(^{2,5,12}\)

In the past few years, stimulant laxatives have not been widely used, because former studies have suggested that these agents may cause a devastating effect, as it might possibly cause a damage to the enteric nervous system. However, some recent studies and several animal studies have not confirmed this suspicion. \(^{2,5,12}\)

### 4. Enemas

Enemas are the other agents used in the treatment of constipation. They have been widely used, particularly in combination with other agents, such as mentioned above. Enemas may cause an improvement in symptoms and stool consistency in elder constipated patients, when compared to the placebo. Enemas are considered safe to be used in the treatment of constipation in the elderly. Therefore, they could be used occasionally in elderly patients, particularly in those who have higher risks to develop constipation, such as bedridden patients or patients who have serious mobility problems. \(^{2,5,13}\)

#### INVESTIGATION

Some patients might show a lack of response to the initial treatment of constipation. These patients are categorized as having refractory constipation, and need to be further evaluated. Thus, this group of patients should be referred to the specialty consultation for further evaluation. Currently, various diagnostic tests are widely available in the investigation of refractory constipation. The American Gastroenterological Association has developed a diagnostic algorithm into a step-wise progression based on the patient’s response to earlier steps of diagnostic tests (Algorithm 1: American Gastroenterological Association).

### Table 4. Summary of medications commonly used for constipation in the elderly\(^2\)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset of action</th>
<th>Dosage</th>
<th>Adverse effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulk-forming agents</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Psyllium</td>
<td>12 to 72 h</td>
<td>10-20 g on water</td>
<td>Flatulence, abdominal cramps</td>
</tr>
<tr>
<td>- Methylcellulose</td>
<td>12 to 72 h</td>
<td>3-6 g daily with water</td>
<td>Same as psyllium but less flatulence</td>
</tr>
<tr>
<td>- Polycarbophyl calcium</td>
<td>24 to 48 h</td>
<td>4-8 g daily</td>
<td>Less flatulence than other bulk-forming agents</td>
</tr>
<tr>
<td>- Osmotic laxatives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Magnesium hydroxide</td>
<td>1 to 3 h</td>
<td>30-60 ml daily</td>
<td>Flatulence, hypermagnesemia, hypokalemia</td>
</tr>
<tr>
<td>- Lactulose</td>
<td>24 to 48 h</td>
<td>10-30 mg daily/bid</td>
<td>Flatulence, abdominal cramps, hypokalemia</td>
</tr>
<tr>
<td>- Sorbitol</td>
<td>24 to 48 h</td>
<td>10-30 mg daily/bid</td>
<td>Flatulence, abdominal cramps, hypokalemia</td>
</tr>
<tr>
<td>- Polyetilen glycol</td>
<td>24 to 48 h</td>
<td>10-30 mg daily/bid</td>
<td>Rarely flatulence, abdominal pain</td>
</tr>
<tr>
<td><strong>Stimulant laxatives</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Bisacodyl</td>
<td>6 to 12 h</td>
<td>10-30 mg daily</td>
<td>Flatulence, abdominal cramps, rectal burning with suppository form</td>
</tr>
<tr>
<td>- Anthraquinolones</td>
<td>8 to 12 h</td>
<td>12-30 mg daily</td>
<td>Abdominal cramps, melanosis coli, hypokalemia</td>
</tr>
<tr>
<td>(senna, cascarra)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Enemas</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Phospat enema</td>
<td>5-15 min</td>
<td>1 U per rectum</td>
<td>Disturbances of water and electrolyte in vulnerable patients (cardiac or renal disease), mechanical trauma</td>
</tr>
<tr>
<td>- Mineral oil retention enema</td>
<td>6-8 min</td>
<td>100-250 ml daily per rectum</td>
<td>Incontinence, mechanical trauma</td>
</tr>
<tr>
<td>- Tap water enema</td>
<td>5-15 min</td>
<td>500 ml per rectum</td>
<td>Mechanical trauma</td>
</tr>
<tr>
<td>- Soapsuds enema</td>
<td>2-15 min</td>
<td>1500 ml per rectum</td>
<td></td>
</tr>
</tbody>
</table>
Gastroenterological Association, 2000). These tests should be performed in a comfortable setting, as patient’s cooperation plays an important role in these diagnostic tests. However, the sensitivity and specificity of these tests have not been well validated yet.\textsuperscript{4,9}

**Balloon Expulsion Test**

This test is useful to assess the ability of the patients to evacuate. A water-filled balloon (approximately consists of 50 ml of water) is used as a material in this test. Furthermore, this test can also be used as a screening test to detect the impairment in evacuation, if present. Normally, the water-filled balloon can be expelled in one minute or less. Impairment in evacuation is suggested when the patient needs more than one minute to expel the balloon.\textsuperscript{4,9,14}

**Defecography**

There are two methods to assess the defecatory functions, as it can be measured either by the scintigraphic or radiographic method. The scintigraphic method is useful in assessing the anorectal angulation and measuring pelvic floor descent during defecation. It is considered to be safe as it is associated with a minimal radiation exposure. Unfortunately, it could not be used to evaluate the anatomical location carefully. Thus, it is less sensitive in detecting anatomical defects, when compared to the radiographic method.\textsuperscript{9}

The radiographic method is useful in evaluating the function of rectal muscle, such as contraction and relaxation. It can also be used in detecting anorectal abnormalities. At first, a man-made stool was inserted into the rectum. After that, the patients were instructed to sit on an x-ray toilet and evacuate the “stool”. Normally, the stool can be eliminated completely. Thus, an impairment in stool elimination suggested an underlying abnormality. In addition, to evaluate the defecation function completely, both anatomically and functionally, this test could also be performed in conjunction with barium enema.\textsuperscript{4,9,14}

**Colonic Transit**

Based on the colonic transit time, stool form can be categorized into several groups, including liquid, semi-formed, and pellety stools. Colonic transit time can be defined as the rates of fecal material movement from one segment to another segment through the colon. The colonic transit time is commonly measured by the radiographic method, using radioopaque markers. The measurement of colonic transit time is useful in determining the underlying cause of constipation, either colonic or pelvic floor impairment.\textsuperscript{4,9,14}

The radioopaque markers is packed into a capsule. The constipated patients are instructed to consumed the radioopaque contained-capsule, once daily (best taken in the morning), for three days. To identify the trace of radioopaque markers, abdominal x-rays are taken on the fourth and seventh day. However, it should be noted that the consumption of laxative should be avoided prior to this test. In normal conditions, the upper limit of colonic transit time is approximately 67-93 hours. Slow transit constipation is suggested when there is a delayed in bowel material movement, particularly in the right colon. Pelvic floor dysfunction is suggested when retention of radioopaque markers occured, particularly in the rectum.\textsuperscript{14,15}

The colonic transit time could also be measured by radionuclide gamma scintigraphy. The results of colonic transit time measurement using radiographic
and scintigraphic method are equal. However, several studies suggested that scintigraphic method is better than the radiographic method, as it only needs 24-48 hours for completion, whereas the radioopaque technique need 5-7 days for completion. Both techniques are considered safe, thus these tests are recommended for elder constipated patients.  

Anorectal Manometry  
Anorectal manometry is commonly used to measure the rectal force, which is needed to evacuate the bowel materials. It can also be used in assessing the ability of anal sphincter to contract and relax properly. A catheter or air-filled balloon is used as a material in this test. The material was inserted gradually into the patient’s anus. After inserted completely, the material was pulled back slowly. Within this process, the anal sphincter can be assessed, including its muscle tone and contraction.

In normal condition, the anal sphincter can perform the contraction and relaxation properly. Impairment in the anal sphincter is suggested when the anal sphincter has failed to relax properly. Furthermore, impairment is also suggested when there is a paradoxical contraction of the anal sphincter. Anorectal manometry can also be used in detecting the presence of several organic diseases, such as Hirschprung’s disease or megarectum, as the impairment in rectoanal inhibitory reflex may indicates underlying diseases, which need to be further evaluated.

FURTHER MANAGEMENT  
Newer Medications  
Serotonergic agents  
Some recent studies have demonstrated that serotonin (5-HT) plays an important role in the work of gastrointestinal system, including gastrointestinal motility, through several receptors. Furthermore, other studies have suggested that 5-HT concentrations are reduced in patients with constipation. Thus, many efforts have been made to increase the 5-HT concentrations, using various drugs, such as agonists at the 5-HT4 receptor, to improve the symptoms of constipation.

1. Tegaserod  
Tegaserod is a selective partial 5-HT4 receptor agonist, which was widely used in the treatment of chronic constipation, in the past few years. Several randomized controlled trials have shown that tegaserod can promote the gut motility, both in the small bowel and in the colon. Furthermore, some recent trials have demonstrated that tegaserod may also improve the symptoms of constipation, as well as the quality of life, when compared to the placebo.

Formerly, tegaserod was considered safe, as it is associated with several mild adverse effects, particularly diarrhea. However, post marketing studies have revealed that tegaserod is associated with a significant increase in the number of cardiovascular ischemic events, including myocardial infarction, unstable angina, and stroke, when compared to the placebo. These adverse effects particularly occured in patients who have cardiovascular risk factors, as well as prior cardiovascular disease.

However, aging itself is associated with an increase risk of having cardiovascular disorder. Therefore, since 2007, tegaserod is not recommended to be used in the management of constipation in the elderly. The Food and Drug Administration (FDA) has recommended that tegaserod can only be used in chronic constipated patients younger than 55 years old without any cardiovascular risk factor or prior cardiovascular problem.

2. Prucalopride  
Constipation is a common problem in the elderly. As tegaserod is not recommended to be used in the management of constipation in the elderly, the search for newer medication of constipation in the elderly is still on going. A few years ago, prucalopride, a full 5-HT4 receptor agonist, was introduced in the management of constipation with minimal cardiovascular-related adverse effects.

Several randomized controlled trials have demonstrated that prucalopride can be used in the management of constipation, as it may cause an improvement in the bowel movements, when compared to the placebo. Furthermore, other trials have also shown that prucalopride can also improve the symptoms of constipation, even in the severe chronic constipation, which is defined as having at least six months of constipation.

In the past few years, prucalopride was considered safe, as the most common side effect is mild diarrhea, which occured only in the first days of treatment. Unlike tegaserod, prucalopride is a high selective 5-HT4 receptor agonist, which does not have a strong relationship with other protein receptors that may lead to the development of cardiovascular disorder. Thus, former studies have suggested that prucalopride is not associated with any cardiovascular adverse effects.
However, some recent studies have found that prucalopride is strongly associated with several cardiovascular disorders, particularly cardiac arrhythmias. It has been postulated that although prucalopride is categorized as a full 5-HT4 receptor agonist, these adverse effects may be caused from its specific chemical structure, benzofuran. As mentioned above, aging itself is associated with an increased risk of having cardiovascular disorder. Therefore, like tegaserod, currently, prucalopride is not recommended by the Food and Drug Administration to be used in the management of constipation in the elderly.19

Lubiprostone
Nowadays, lubiprostone, a locally acting chloride channel activator, has been suggested to be used in the treatment of constipation. As aging is associated with an increased risk of having cardiovascular disorder, the use of medications that may bring a negative impact to the cardiovascular system, including tegaserod and prucalopride, is prohibited in the elderly. The withdrawal of these agents left lubiprostone as the only novel drug that is recommended by the Food and Drug Administration to be used in the treatment of constipation in the elderly.4,14

Several placebo-controlled trials have demonstrated that lubiprostone is strongly associated with improvement of the bowel movement, as well as the patient’s symptoms, such as bloating, discomfort, and straining, when compared to the placebo. However, higher dose of lubiprostone is associated with several adverse effects, especially diarrhea and nausea, which may lead to the discontinuation of the treatment in some cases. Therefore, it is recommended to give lubiprostone in its optimal dose. Lubiprostone is best given at the dose of 16 mcg/day, based on several reports. However, further studies are needed to confirm its efficacy and safety, particularly in the elderly.4,14,20

Biofeedback
Currently, biofeedback therapy should be taken into consideration in the management of pelvic floor dysfunction. In biofeedback therapy, patients are trained to perform a proper contraction and relaxation of pelvic floor muscles and anal sphincter during straining to achieve a defecation. Some recent studies have demonstrated its efficacy in improving symptoms of chronic constipated patients, with success rate varies from 50% to 90%. The biofeedback therapy can be given alone, or in combination with other diagnostic tests, such as anorectal electromyography or a manometry catheter.4,5,13,21

Surgery
Surgery is another option in the treatment of constipation, including colectomy and ileo-rectal anastomosis. However, it should only be performed in patients who have a strong indication, such as only after other forms of therapy have failed to improve the symptoms of patient with chronic and severe constipation.4,5,14

However, before surgery is performed, there are several criteria which are essential to be met:3
• A chronic and severe constipation which are unresponsive to other forms of therapy.
• Chronic constipation, slow transit constipation subtype, particularly in the inertia pattern.
• Other contraindications, including intestinal pseudo-obstruction, have been ruled out, as demonstrated by investigations using radiologic examinations or manometric studies.
• Other organic diseases, such as persistent abdominal pain, have been excluded.

It should be noted to make sure that other gastrointestinal organs, including oesophageal, gastric, small intestine, and anorectal, have a normal function, as an impairment in one of these organs will bring an unsatisfactory result of surgery. Therefore, a series of investigation should be performed, before surgery is scheduled. Finally, the benefit of surgery in older patients must be weighed against possible risks and complications, as older patients are more prone to develop complications after invasive procedures.5,14

CONCLUSION
Chronic constipation is one of the commonest gastrointestinal disorders in the elderly. However, its definitions vary widely. Thus, Rome III criteria was recommended to be used in defining constipation. In the elderly with chronic constipation, initial investigations should be performed. If the results are normal, an empiric therapy could be given. Patients who fail to respond to this approach are appropriate candidates for more specialized diagnostic testing (Figure 2). Nowadays, further advances in the management of constipation bring new hope to patients with refractory constipation.

REFERENCES