

Constipation in Elderly Population and Its Appropriate Management

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ABSTRACT

Constipation is a gastrointestinal disorder commonly found in the community, especially in the elderly with various comorbidities. This problem culminates with the increasing incidence along with aging, increasing therapeutic cost, and decreasing the quality of life in this population. Some of the underlying causes are the difference in the terminology of constipation, shallow understanding of its pathophysiology, and poor management. The pathophysiology, including slow transit constipation, dyssynergic defecation, and normal transit constipation, is the most critical foundation in managing constipation accordingly. Diagnostic approaches should be made by history taking, including complaints based on Rome III, lifestyle, contributing factors, past medical history, and medications. Physical examination is considered incomplete without rectal examination. Thorough history taking and comprehensive physical examination have more diagnostic value than additional physiological workup. Management of constipation consists of non-pharmacological and pharmacological approaches, such as conventional laxative or more recent agents with better efficacy. Therapeutical management should correspond to the underlying pathophysiology. Therefore it is important to be able to recognize constipation and make the right management approach in the elderly.

Keywords: *constipation, elderly, therapy, management*

ABSTRAK

Konstipasi merupakan masalah gastrointestinal yang sering ditemukan di masyarakat, terutama pada orang tua dengan berbagai komorbid. Masalah ini makin berat dengan peningkatan insiden bersama dengan penuaan, peningkatan biaya terapeutik, dan penurunan kualitas hidup pada populasi ini. Beberapa penyebab yang mendasari adalah perbedaan terminology konstipasi, pemahaman yang rendah akan patofisiologi, dan manajemen yang buruk. Patofisiologi, seperti konstipasi transit lambat, disinergi defekasi, dan konstipasi transit normal, merupakan dasar paling penting dalam manajemen konstipasi. Pendekatan diagnostik sebaiknya dibuat dengan anamnesis, termasuk keluhan menurut Rome III, gaya hidup, faktor penyerta, riwayat penyakit dahulu, dan obat-obatan. Pemeriksaan fisik dianggap tidak lengkap apabila belum dilakukan pemeriksaan rektum. Anamnesis yang lengkap dan pemeriksaan fisik secara komprehensif memiliki nilai diagnostik yang lebih dibandingkan pemeriksaan fisiologi tambahan. Manajemen konstipasi terdiri dari pendekatan non-farmakologi maupun farmakologi, seperti laksative konvensional ataupun obat-obatan terbaru dengan efikasi yang lebih baik. Manajemen terapeutik sebaiknya disesuaikan dengan patofisiologi yang mendasari. Karena itu, penting untuk dapat mengenali konstipasi dan membuat pendekatan manajemen yang benar pada orang tua.

Kata kunci: *konstipasi, orang tua, terapi, manajemen*

INTRODUCTION

Constipation is a medical disorder that is often seen in the community, even in the elderly population, which accompanied by other risks and comorbidities that increased burdensome to patients.¹ A various constipation rate in the community was found approximately ~20-30% in the general patient population, but this number was found higher in the advanced age population, which is around 33.5%. Particularly for the elderly with specific circumstances, the prevalence will be much higher.^{1,2} Then, a high constipation number had lead to a high expenditure burden from new constipated patient management, the annual cost for laxative agents, outpatient visits and inpatient administration of constipation, and investment of laxative drugs over-the-counter.^{3,4} Constipation yielded not only huge expenditure but also decreased quality of life in the elderly population based on the assessment of Short-Form 36 (SF-36) and Psychological General Well-Being (PGWB) scores.⁵

The fundamental issues of the high constipation prevalence and in its accompanying high costs are different terminology of constipation between patient and practitioner, incorrect pathophysiology awareness, and unsatisfied management results. The terminology from patients and medical personnel was often contrasting, which should be adjusted with Rome III criteria. The recognition of pathophysiology is often incorrect so that management results, such as better symptoms control, long-term efficacy, and the prevention of potential side effects, are also poor.^{6,7}

Because constipation is a problem often encountered in society with its impact and underlying issues, which has been mentioned above, so in this review, it will be discussed the pathophysiology and management in diagnosis and therapy, both non-pharmacological and pharmacological, either conventional or modern, related to constipation in the elderly.

EPIDEMIOLOGY AND BURDEN

Beforehand, epidemiological data showed that the prevalence rate of constipation was quite varied around ~20-30% depending on the research design, care setting, underlying conditions, and concepts that were used to explain what was called normal bowel function.⁸ Overall, the average prevalence of constipation in adults was 16%, of which 33.5% accounted for the group aged between 60-110 years.⁹ However, most studies showed that constipation would increase in consonance with age and sex. In

Asia, there was a high prevalence of constipation in China, South Korea, and Indonesia, about 15-23% in women and 11% in men.¹⁰ In contrast, in North America, the prevalence of constipation was showed about 26% in women compared to 16% in men from the population aged over 65 years. However, the prevalence in the group over 80 years was found 34% in women compared to 26% in men. Moreover, in the elderly, this number could escalate up to 50% in community-dwelling settings, 70% in nursing homes setting, or even 80% in the elderly population with long-term care.^{5,11}

The arising problems in concordance with the increased prevalence of constipation in the elderly were cost issues and quality of life. The economic impact due to constipation was found quite significant in the United States, which showed by 2.5 million visits and 100 000 inpatients annually.¹² The average expenditure incurred for patients with constipation in the United States was between \$250 to \$500 per patient. At the same time, in European countries, the expenses for a new constipated patient were relatively €310, €951, and €441, in Netherland, Sweden, and Belgium, respectively.^{3,13,14} A considerable amount of expenses was also found in Romania regarding the annual cost for the laxative agents group was showed to be 15 million euros.¹⁵ Those numbers mentioned above showed that constipation bears a massive annual expenditure.

For the quality of life, it was found that patients with constipation were showed higher numbers of depression, anxiety, somatization, psychological distress, and other psychological status compared to younger subjects.¹⁶ Besides, with the SF-36 questionnaire and PGWB, it was found that the scores of quality of life were significantly worse in elderly patients with constipation than patients with healthy bowel. Moreover, improved quality of life was noted following constipation treatment. Therefore, patients with constipation, especially in advanced age populations, which had various comorbidities, had a higher risk of social and quality of life disruptions so that it will result in their daily activities.¹⁷

PATHOPHYSIOLOGY

The pathogenesis of constipation was varied from genetic, socioeconomic status, low fiber diets, lack of fluid intake, lack of mobility, hormonal imbalance, side effects of drugs, et cetera. Nevertheless, in primary constipation in the elderly without warning alarm or secondary causes, two essential processes

could result in constipation, such as slow colon transit and dyssynergic defecation. The following will further explain these two points that underlie primary constipation in the elderly.¹⁸

Slow Transit Constipation

Slow transit constipation (STC) is characterized by a prolonged transit time for stool through the colon. STC itself has been mentioned as one of the main factors of constipation in the elderly, as several studies had shown a decrease in colonic transit from the elderly population.¹⁹ STC in these elderly often occurred secondary to several conditions, as shown in Table 1.²⁰ In physiological conditions, motor activity is irregular. It increases after eating and waking up and decreases during sleeping. In physiological conditions, the motor of the colon will be regulated by propulsive waves consisted of high (HAPC) and low amplitude propagated contraction (LAPC). However, patients with STC were showed significantly decreased in HAPC.^{5,7} Then, patients with STC had also shown not only disturbances in intestinal coordination and motor function, including intrinsic and extrinsic innervation of smooth muscle but also loss of innervation of Interstitial Cells of Cajal.²¹ It is showed that in the elderly, there was a loss of intestinal neurons by 37% in older people combined with an increase in collagen and elastic fibers in the mesenteric ganglia compared to the younger population.²² Then, in the elderly, some factors aggravated STC consisted of increased collagen in the ascending colon that will disrupt coordination and motor intestine, and secondly, the existence numbers of the binding site of plasma endorphins.⁵

Dyssynergic Defecation

Dyssynergic Defecation (DD) is characterized by impaired normal coordination between the abdominal muscles and pelvic floor muscles in the process of straining during defecation. DD can initially begin as

the altered evacuation of the rectum, which could be generated by a lack of propulsive strength and increased resistance of the stool release that will further increase the anal sphincter pressure, incomplete relaxation, and paradoxical contraction or dysynergy.⁹ The etiology of DD is currently unclear. There are several concepts proposed, including the maladaptive process of anal sphincter contraction, which may be resulted from pain or trauma, pelvic floor muscle dysfunction, or enteric nervous system disorders.^{12,23,24} Moreover, in elderly patients, it was also showed a decrease in the elasticity of the rectum wall with fibro-adipose degeneration, which yielded an increase in internal anal sphincter thickness.⁵ While in the elderly, there were also anatomical problems that generated several pelvic floor abnormalities (rectocele, sigmoidocele, or intussusception), thus explaining the divergences of constipation between women and men.¹²

These two things often co-occurred, but constipation could appear without those two factors, which is normal transit constipation. Therefore, it is necessary to consider irritable bowel syndrome, where symptoms usually improved after an evacuation, although IBS was more common in the younger population.⁵

DIAGNOSTIC MANAGEMENT

History and Physical Examination

Patients with constipation often presented with diverse symptoms, so practitioners should be scrutiny in history taking regarding complaints by patients.¹² The definitions of constipation between patients and practitioners are often different, so it is necessary to explore deeply about patient complaints, which, if appropriate, will be more beneficial than functional examinations.⁶ Establishing patients with constipation by using Rome III criteria will help to diagnose (Table 2).² Then, it is also important to explore other histories that could relate to constipation. These included particular drug consumption, the presence

Table 1. Common factors of constipation in elderly ^{5,8,11}

Medication	Analgesic (opioid, NSAID), tricyclic antidepressant, antihistamine, anticholinergic, anticonvulsant, diuretic (furosemide and hydrochlorothiazide), iron Supplement, calcium supplement, antipsychotic, antiparkinsonian antacids (calcium and aluminium), chemotherapy, resins antihypertensive, and antidiarrheal
Endocrine and metabolic disease	Diabetes mellitus, hypothyroidism, hyperparathyroidism, and chronic renal disease
Electrolyte imbalance	Hypercalcemia, hypokalaemia, and hypermagnesemia
Intestinal disorder	Cancer, anorectal abnormality, haemorrhoids, hernia, diverticulosis
Myopathy and neurologic disorder	Scleroderma, amyloidosis, dementia, stroke, Parkinson disease, spinal Cord Lesion, autonomic neuropathy, multiple sclerosis
Intestinal abnormality	Carcinoma, radiation fibrosis, surgical complication, adhesion
Psychological	Depression, anxiety, eating disorder
Other	General disability

of metabolic disorders such as diabetes mellitus, which is increasing in number, and other conditions that can affect the transit time of the colon (Table 1).^{11,25} Medication history is critical in the elderly, a polypharmacy population. Therefore, further consultation for drug replacement should be conducted to the expert, who provides the drug, if medication is suspected as the primary cause of constipation.²⁶ Constipation itself could be accompanied by other symptoms in the urinary tract, such as urine retention, sexual dysfunction, and dyspareunia.¹² Additionally, it is also necessary to ask about the amount of diet, fiber and water consumption, the history of laxatives use as well as physical activity, psychosocial problems, and functional capabilities. Alarm symptoms are a sudden change in bowel habit after 50 years, occurring in acute time, bloody stool, anemia, nausea, vomiting, inflammatory bowel disease, familial history of colon cancer, and significant pain.^{11,27}

Table 2. Rome III criteria for constipation diagnosis²

Criteria for functional constipation
1. Must include two or more of the following: <ol style="list-style-type: none"> Straining during at least 25% of defecation Lumpy or hard stool in at least 25% defecation Sensation of incomplete evacuation in at least 25% of defecation Sensation of anorectal obstruction/blockage in at least 25% of defecation Manual maneuver to facilitate in at least 25% of defecation Fewer than three defecations per week. These criteria must be fulfilled for the previous three months. The symptom onset must be at least six months prior to diagnosis.
2. Loose stools are rarely present without the use of laxatives
3. There are insufficient criteria for irritable bowel syndrome

In the case of fecal impaction and incomplete evacuation, these problems were often diagnosed furthermore with fecal incontinence. Following the diagnosis, the patients were often given an anti-diarrhea drug, which will worsen the patient's condition with fecal impaction and secondary incontinence due to obstruction of the fecal material. Fecal impaction would also further cause bleeding in the rectum and stercoral ulcer, which potentially lead to fatal complications.^{12,28,29}

A thorough physical examination would not be considered complete if a rectal examination had not been performed. Examination of the rectum will be useful in assessing not only the mass in the rectum but also in assessing the presence of strictures, fissures, and masses due to impaction from the fecal material as well as assessing the function of the pelvic floor function.^{30,31}

Additional Examination

The initial additional examinations that should be performed are laboratory tests to rule out the diseases

listed in Table 1. Additional examinations such as colonoscopy or barium enema could be used to rule out anatomical abnormalities in the intestine that might result in constipation.³² If these test results cannot explain the cause of constipation, then constipation should be suspected due to functional problems. Therefore, additional physiological examinations, such as anorectal manometry (ARM), balloon expulsion test (BET), and colonic transit study, should be considered.²⁷

Anorectal manometry

ARM will provide an overview of the pressure on the rectum and sphincter ani, as well as rectal sensations, anorectal reflexes, and rectal compliance. This examination will be beneficial to reveal patients with myopathy, neuropathy, and motor patterns disorders of the intestine.³³ Under normal circumstances, pressure on the rectum will increase and followed by a decrease in pressure on the anal sphincter. Abnormality in this coordination would be the basis of the pathophysiology in the patient with dysynergic defecation. Rectal sensation in these patients would also be abnormal. These results indicate a higher threshold for sensation and drive for defecation.²⁷

Balloon expulsion test

BET is a test that is often used in conjunction with ARM, in assessing the function of a pelvic floor. This examination is carried out in the left lateral position, by inserting a 4 cm long balloon made from silicon with 50 mL of warm water into the rectum. Under normal circumstances, this tool will be expelled in one minute. If the balloon has not come out for more than one minute, then there is a high suspicion of dysynergic defecation.³⁴ However, one study reported that this examination only managed to show abnormalities from 23% to 67%, which indicated that this examination needed to be accompanied by other methods.³³

Colonic transit study

This examination can be performed with radiopaque markers, colonic scintigraphy, and wireless motility capsules. Examination with a radiopaque marker begins with the patient swallowing a capsule containing radiopaque material, which will be followed for 120 hours and re-evaluated on an X-ray. Normal transit time is established when the remaining number of markers is five or less or less than 20%, while the prolonged transit time is diagnosed when the number of markers

is six or more or more than 20%.^{27,35} This examination is considered cost-effective but has limitations due to radiation exposure for several days. Scintigraphy has the advantage of lower radiation exposure and shorter examination time (24-48 hours).³⁶ Most recently, there was a wireless motility capsule that could be used to replace the radiopaque material. This examination provides an overview of not only the time of colonic transit but also on the stomach and small intestine. This examination was also free of radiation regardless of its high price and availability.³⁷

THERAPY MANAGEMENT

Non-pharmacologic

Non-pharmacological therapy must be comprehensive, from lifestyle changes such as mild physical activity, daily recognition of urge to defecate, fluid and fiber intake, the probiotics use, and biofeedback therapy. Lifestyle changes and daily defecation routines could improve defecation patterns, which are considered as the first step of the therapy program. The best time to practice defecation is mainly in the morning after light physical exercise and breakfast, which would be assisted with a gastrocolic reflex.⁵

Intake of fluid and fiber up to 30 g/day has been recommended. Nevertheless, in the elderly, it is necessary to consider any heart and kidney disease. Fiber intake, as a bulk laxative, had shown improvement in symptoms. However, fiber administration will not be useful in constipated patients due to STC or DD.³⁸ Presently; the fiber could be obtained from a diet of vegetables, fruits, nuts, and seeds, or in ready-to-use forms, including psyllium seeds, methylcellulose, or calcium polycarbophil. Side effects of excessive fiber administration are stomach discomfort, flatulence, and bloating, which may be induced by intestinal microbiota fermentation.^{39,40} Fiber from vegetables and fruits that are recommended for constipation with mild symptoms was 20 to 35 g/day, which must be increased slowly from small doses. In contrast, for ready to use, psyllium is the best in improving symptoms.⁴¹

Probiotics are now widely used, based on alteration in normal gut flora that will occur in advanced age population. Probiotics had shown a slight increase in accelerating bowel transit, although they still required large and further randomized studies due to their inconsistent results. The advantage of probiotics administration over pharmacologic therapy was fewer side effects.⁴² Biofeedback therapy is the

most effective therapy for dyssynergic defecation compared to other therapies because this method re-teaches adequate defecation efforts. This method was reported to be efficient without side effects by modulating neuromuscular pelvic floor muscles of patients. Patients were taught breathing techniques with the diaphragm to build impulse force from the stomach accompanied by synchronization to anal relaxation, which is evaluated using a probe inserted in the rectum.^{27,38}

Pharmacologic

The first-line drug in patients with constipation in the elderly is laxative.⁴³ There are three types of laxative: bulk, osmotic, and secretory. Bulk has been explained above, while the other two will be explained here. Although laxative administration should be gradual from bulk, followed by osmotic and then stimulant, it is important to note that laxative use should be individualized.⁴⁰ An osmotic laxative is an agent that binds to the H₂O component in the intestine. This group consists of magnesium, lactulose, and polyethylene glycol (PEG). This class of drugs is the most given one to the elderly due to good results and quite safely in its long-term uses.⁵ The next group is stimulant laxative (such as bisacodyl and senna), which increases secretory activity, thereby increases water composition in the intestinal lumen and also increases enteric innervation so that motor activity is also increased. This drug is proven to be more effective than osmotic groups. Although it is beneficial, this drug should be kept as a reserve if laxative osmotic fails because studies of this drug in the elderly are still lacking.¹² Beyond the price and the availability advantages of laxatives, these drugs have side effects such as abdominal discomfort, electrolyte imbalance, allergic reactions, and special attention to magnesium-based laxatives.^{22,44}

However, in cases where fecal impaction occurs, treatment with laxatives would not provide many benefits; in fact, bulk laxatives will only make things worse. In this case, manual disimpaction could be performed with lidocaine gel or enema. For maintenance, lifestyle changes accompanied by osmotic laxative administration such as lactulose or PEG could be applied.¹¹ In the case of constipation induced by opioids, which is an agent that is often used in this population, a class of peripherally acting μ -opioid receptor antagonists (PAMORAs) such as metilnaltrekson and naloxegol, could be employed if laxative does not work. PAMORAs act on μ -receptor in gastrointestinal without penetrating

the blood-brain barrier so that these groups do not reduce any analgesic effects.^{8,45}

Nowadays, there are modern laxative preparations, such as the type 2 chloride channel activator (Lubiprostone), guanylate cyclase C receptor agonist (linaclotide, plecanatide), serotonin 5HT₄ receptor agonists that work as prokinetics (prucalopride, norcisapride, velusetrag), enantiomer of 1.5 benzothiazepines (elobixibat).^{39,46} The mechanism of action and the side effects of these agents are summarized in Table 3.

Lubiprostone is a bicyclic fatty acid that performs on type 2 chloride channels in the apical membrane of intestinal epithelial cells. This agent yields chloride secretion so that fecal mass increases, intestinal wall stretching, and peristalsis activation without a direct effect on smooth muscle.⁴⁷ Several studies had shown that this drug worked effectively in increasing bowel movements in the elderly population with side effects such as headache because of its similar structure to prostaglandins.⁴⁸⁻⁵⁰ Nevertheless, this report is quite rare compared to the younger population.⁵⁰ Linaclotide, an agonist of cyclic cyclase C in apical intestinal cells, is the drug of choice for overcoming secondary problems related to constipation such as stool consistency, abdominal pain, and quality of life.^{51,52} In two studies, it was found that this agent was able to eliminate severe stomach complaints and improve the quality of life in the entire population.^{53,54} Even though its side effect was only diarrhea, but this drug was still not widely tested and needed to be considered in the elderly population.⁵² Prucalopride, an agent of the 5-hydroxytryptamine receptor group 4, accelerates bowel movement by its effect on the mesenteric plexus.^{55,56} In contrast to drugs in this group such as tegaserod and mosapride, prucalopride has a low affinity for human Ether a-go-go Related Gene (hERG) proteins, which are known to cause undesirable cardiovascular effects.⁵⁷ Furthermore, two studies showed that prucalopride was beneficial in the case of constipation in the elderly population, particularly those who lived in nursing homes. The

most common adverse effects are headaches and gastrointestinal problems without any report of prolonged QT like other drugs in this group.^{58,59}

Elobixibat is an inhibitor of ileal bile acid transporters so that it could increase bowel movement with all dosages, 5 mg, 10 mg, and 15 mg. The study also found that bowel movement will increase along with dosage elevation, but this agent has side effects consisted of diarrhea and abdominal pain.^{60,61} Colchicine, an anti-inflammation drug, could be used as its side effects of diarrhea at high dosage. This drug has been proven to improve in STC. However, this agent has a narrow therapeutic index and has also been associated with serious adverse effects.^{62,63}

These more modern medicines have proven to be more effective than conventional laxatives or placebo in reducing complaints and improving bowel movement and quality of life in chronic constipation.^{64,65} However, these drugs still need further studies related to its use in the elderly in terms of its effectiveness and safety because there are only a few studies in the elderly population. Additionally, these agents are quite expensive compared to conventional laxatives.

Surgery

Surgery performed on patients with constipation is the last option when all therapies fail to improve symptoms. Subtotal colectomy with ileorectal anastomosis is the procedure most commonly applied in cases of refractory slow transit constipation while noting the absence of DD. Side effects that often reported are diarrhea, incontinence, and obstruction.^{27,66} However, it should be remembered that surgery would not improve severe complaints such as abdominal pain as well as considering the risk in older people with various comorbidities.⁶⁷

CONCLUSION

Constipation is a gastroenterology disorder that is still often seen widely even in the elderly, a population with various accompanying comorbidities.

Table 3. Class, mechanism of action, and side effects of new constipation drugs⁵

Drug Class	The mechanism to activate peristaltic and accelerate intestinal transit	Side effect
Type 2 chloride channel Activator	Chloride secretion in the intestinal lumen is followed by passive diffusion of water and salt, thereby increasing fecal content and distension of the intestinal wall.	Nausea and Headache
Guanylate cyclase receptor agonist	Increases intracellular and extracellular cGMP levels; increases the levels of chloride, bicarbonate, and water secretions into the lumen.	Diarrhea according to dose
Serotonin 5ht ₄ receptor agonist	Exciting neurons in the mesenteric plexus and acetylcholine release	Headache, nausea, and diarrhea
1,5-Benzothiazepines Enantiomer	Binding and inhibiting ileal bile acid transporters resulting in a build-up of bile acids in the colon.	Abdominal pain, Diarrhoea

Constipation has also been known to provoke large expenditures and decreased quality of life in the elderly population. A better understanding of constipation pathophysiology in this population is vital in the management of diagnosis and therapy. A thorough history taking and physical examination in diagnosis will be constructive in determining the appropriate therapeutic approach. Currently available pharmacological options are laxatives and modern medicines, which are better for managing constipation. However, more research is needed regarding the safety and effectiveness of these modern drugs with larger multicenter randomized studies.

CONFLICT OF INTEREST

The authors stated there is no conflict of interest

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