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Balancing safety and effectiveness in colonoscopy for older adults: a narrative review

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Colonoscopy is becoming more widely used in older adults for screening and diagnostic evaluation of colorectal cancer. While advanced age itself is not a contraindication, elderly patients often present unique challenges, including frailty, comorbidities and polypharmacy, which increase the risk of complications during the procedure. Rather than chronological age alone, frailty is important in risk assessment and clinical decision-making before performing a colonoscopy. This review summarizes recent evidence, particularly from large cohort studies and clinical guidelines, to provide a balanced evaluation of the advantages and disadvantages of performing colonoscopies on older adults. Ultimately, we emphasize the importance of judicious patient selection, customized bowel preparation and tailored sedation management to optimize the safety and effectiveness of colonoscopy in this vulnerable group. **(Intest Res 2025;23:443-454)**

Key Words: Aged; Colonoscopy; Frailty; Outcome expectations; Safety

INTRODUCTION

Colorectal cancer (CRC) is a major health concern for older adults. It is one of the leading causes of cancer-related mortality, and its incidence increases significantly with age–the largest proportion of new CRC diagnoses occurs in individuals aged 65 years and over.[1-3] Screening colonoscopy plays a pivotal role in reducing CRC morbidity and mortality by facilitating the early identification and removal of precancerous lesions.[4-6] Therefore, colonoscopy is widely recommended as a preferred method of CRC screening for individuals at average risk up to a certain age: most guidelines recommend routine screening and surveillance up to the age of 75 years, with a more individualized approach taken for those aged between 76 and 85 years based on the patient's health status and prior screening history.[7-10] Beyond screening and surveillance, colonoscopy is also frequently used to diagnose gastrointestinal symptoms in older adults. Recent real-world data from Korea have shown a significant increase in colonoscopy utilization among older age groups, particularly among individuals aged 65 to 85 years,[11] highlighting the growing clinical demand for addressing safety and effectiveness issues specifically in the elderly.

Although performing colonoscopies on elderly patients poses unique challenges, an increasing number of these procedures are being performed on this patient group. Older individuals are more likely to have comorbid medical conditions and to take medications such as antiplatelets and anticoagulants, which can increase the risk of complications related to the procedure. They are also more likely to have reduced physiological reserve, a condition commonly referred to as frailty.[12,13] This medical syndrome is characterized by diminished strength and endurance, and reduced physiological function, which increases an individual's vulnerability to stressors.[14] It represents decreased physiological reserve in older adults, making them more susceptible to stress related to the procedure. Various frailty assessment tools have been developed to quantify this vulnerability. For instance, the Fried frailty phe-

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notype considers criteria such as unintentional weight loss, exhaustion, and grip strength, whereas the Cumulative Deficits Frailty Index measures frailty based on the accumulation of health deficits. Gait speed and chair stand performance are also employed in clinical practice.[15,16] The frailty index based on laboratory values (FI-LAB) is a simple tool that uses only blood test results and vital signs to measure individualized frailty, making it easier to assess frailty in clinical practice.[17] While no single gold standard for measuring frailty exists, these validated instruments can stratify an older patient's risk prior to a procedure and predict life expectancy. Additionally, older adults have a shorter life expectancy within which to realize the benefits, especially the primary or secondary prevention of CRC through screening colonoscopy.[7,12,18] Given these factors, a careful assessment for balancing the potential risks and benefits of colonoscopy is required in individualized decision-making for each patient. This review examines the safety and effectiveness of colonoscopy in older adults, including special considerations for colonoscopic procedures such as bowel preparation and sedation, and current recommendations for physicians.

BENEFITS OF COLONOSCOPY

The prevalence of colonic neoplasia increases with age. The diagnostic yield of colonoscopy which is defined as the detection of clinically significant adenomas or cancers increases with age. Epidemiological data shows a steep rise in colorectal neoplasia rates in the elderly, with the incidence of CRC in the individuals over 65 years being about 2.2 times higher than in middle-aged adults.[3] A recent Korean population-based cohort study further demonstrated that colonoscopy significantly reduced CRC incidence and mortality in older populations.[19] Although the protective benefit was most pronounced in younger age groups, even patients aged 80 years or older still exhibited a meaningful reduction in CRC occurrence and related mortality compared to those who did not undergo colonoscopy. These region-specific findings reinforce the continued benefit of colonoscopy in elderly patients, albeit with diminishing returns at advanced ages. A prospective study of 2,000 patients undergoing colonoscopy reported that those aged over 65 years old had a diagnostic yield of clinically significant neoplastic lesions in 64% of examinations, compared with 45% in younger adults. CRC was detected in 7.1% of patients aged over 65 versus 1.3% of younger adults, respectively, underscoring the substantial benefit of colonoscopy in older patients.[20] The high diagnostic yield is a key benefit of endoscopic evaluations in older adults, especially for those undergoing the procedure for the first time.

It is important to distinguish between colonoscopies performed for screening or surveillance purposes in asymptomatic elderly individuals and those performed for diagnostic reasons in individuals presenting with gastrointestinal symptoms. In asymptomatic older adults who have been regularly screened previously, the incremental yield of new findings may be low. Some studies focusing on asymptomatic individuals aged 80 years or older found a relatively low rate of significant new neoplasia (cancer in 0%–0.7%) and advanced adenomas in only about 2%–4%, suggesting that routine screening colonoscopy in very old, asymptomatic patients with negative prior results has limited benefit in diagnostic yield.[21-23] In contrast, elderly individuals who have never undergone CRC screening may harbor advanced lesions, and screening colonoscopy is highly beneficial and strongly recommended for this colonoscopy-naive population when their health status permits.[8,9,24]

Colonoscopy has clear diagnostic value when patients present with alarm symptoms such as rectal bleeding, iron-deficiency anemia, or recent changes in bowel habits, regardless of age. Research has demonstrated that colonoscopy can be a valuable diagnostic tool even in very elderly individuals, with studies showing its efficacy in identifying sources of bleeding or malignancies that can be treated, thereby enhancing clinical outcomes.[25-27] In such cases, the potential benefits of acquiring diagnostic information or administering endoscopic treatment including polypectomy or hemostasis can outweigh the risks associated with colonoscopic procedures. Diagnostic and therapeutic colonoscopies are generally considered appropriate in the elderly when clear indications are present, as they can directly impact treatment and prognosis in practice.

However, the interpretation of positive fecal immunochemical test (FIT) results necessitates further consideration. Current guidelines advocate a personalized approach to decision-making for adults aged 75 years and over, taking into account the potential burdens associated with CRC screening.[8] Additionally, the false-positive rate of FIT rises with age, and the routine performance of colonoscopies following positive FIT results in very elderly patients may incur further risks.[28] Consequently, it may be prudent to refrain from routine FIT screening in older adults aged 75 years and over who are reluctant to undergo a colonoscopy. The decision regarding the performance of a diagnostic colonoscopy in older patients with posi-

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tive FIT should be made on an individual basis, with consideration given to the risk of the procedure rather than the patient's chronological age.

In conclusion, while the benefit of screening colonoscopy declines with advancing age and shorter life expectancy, the endoscopic procedure remains valuable for evaluating gastrointestinal symptoms or completing therapeutic interventions in older patients. Consequently, the decision to perform a colonoscopy should be made on an individual basis, considering the purpose of the procedure.

CONSIDERATIONS FOR BOWEL PREPARATION AND SUCCESSFUL CECAL INTUBATION

Adequate bowel preparation is of crucial importance for the safety and efficacy of a colonoscopy.[29] In older adult patients, achieving adequate good colon cleansing can present a greater challenge. Several age-related factors have been identified as contributing to higher rates of inadequate bowel preparation in this population. These include chronic constipation, decreased gastrointestinal motility, cognitive impairment, and difficulties in tolerating large volume bowel cleansing solutions. A number of studies have previously observed that older age is associated with an increased likelihood of suboptimal bowel preparation and incomplete examinations with increasing age.[29-31] Indeed, advancing age is now recognized as an independent predictor of an incomplete colonoscopy exam.[26,29,30,32] A meta-analysis reported a mean cecal-intubation rate of 84.7% ± 11.7% in individuals over 80 years old, whereas large contemporary series in younger adults consistently exceed 93% to 95%.[33] Inadequate preparation not only reduces the diagnostic yield, but also increases procedure time and the likelihood of a repeat examination. Consequently, it is recommended that tailored approaches to bowel preparation be employed for older adults undergoing colonoscopy.

The lower completion rates observed in older adults are frequently attributed to various factors, including inadequate bowel preparation, the presence of diverticulosis, tortuous colons or obstructive lesions, and intolerance to colonoscopy due to abdominal discomfort. A significant contributing factor to incomplete procedures in the elderly is inadequate bowel preparation. While polyethylene glycol (PEG)-based preparation can present certain challenges for frail patients in completing the bowel preparation protocol, resulting in inadequate colon cleansing,[29,30,34] alternative low-volume bowel cleansing agents with improved tolerability may elevate the risk of electrolyte imbalance and dehydration in the elderly patients with renal insufficiency, congestive heart failure, or decompensated cirrhosis.

Recent studies have demonstrated that low-volume PEG preparations or oral sulfate tablets may be more suitable than 2 L PEG solutions for elderly individuals, offering improved compliance, fewer adverse events, and equivalent or superior preparation quality.[35-38] Furthermore, educational interventions utilizing structured instructions, nurse-led counselling, or multimedia education have been demonstrated to substantially enhance bowel preparation quality and adherence, particularly among elderly patients with chronic constipation or a history of abdominal surgery.[39,40]

Split-dose regimens, in which half of the preparation is taken the evening before and the remainder of the procedure is taken the following day, have been shown to improve preparation quality and are generally better tolerated.[30] Close caregiver support or detailed instructions may be needed for those with cognitive impairment to ensure that preparation instructions are followed correctly. Preparations of low volume, with or without the addition of adjunctive agents, such as stool softeners or enemas, may be considered for individuals unable to manage larger volumes.[41] A recent prospective, randomized, multicenter study reported that the oral sulfate tablets group showed significantly higher overall high-quality preparation rates and better tolerance compared to the 2 L PEG group in older adults aged 70 years and over.[38] However, it is imperative to emphasize the significance of adequate hydration during the preparation process as this is instrumental in preventing acute kidney injury or electrolyte imbalance in the elderly who are susceptible to dehydration.[42] Further investigation is necessary to determine the optimal, individualized bowel preparation that would ensure safety and effectiveness in elderly adults who are at high risk of dehydration.

While older patients exhibit lower rates of colonoscopy completion compared to younger patients, the implementation of optimized bowel preparation strategies, alongside the consideration of individual patient factors, has been demonstrated to significantly enhance the success rate of colonoscopy procedures in this demographic.

CONSIDERATIONS FOR SEDATIVE COLONOSCOPY

It is well-documented that the elderly are more prone to the adverse effects of sedative medications, including sedation-re-

lated adverse events such as respiratory depression, hypoxia, hypotension, or arrhythmia.[43-45] Furthermore, they frequently exhibit altered pharmacokinetics due to reduced hepatic and renal clearance, and are often on polypharmacy that interacts with sedatives.[46] However, despite these challenges, colonoscopy with sedation can be performed safely in the elderly with appropriate precautions and monitoring.

In recent years, propofol-based sedation has become a prevalent practice, particularly in older patients, for colonoscopies. This sedation is administered as monotherapy or in combination with opioids or benzodiazepines to achieve moderate sedation. Propofol has been demonstrated to have certain advantages over other sedative agents, including its rapid onset and quick recovery. These properties can be beneficial in minimizing prolonged sedation effects in older adults.[45,47,48] Several studies have specifically evaluated the safety of propofol sedation in elderly populations undergoing endoscopy. In patients over 80 years old who underwent endoscopic procedures with continuous propofol infusion administered by an anesthesiologist, the sedation was found to be safe and effective, with no significant increase in complications compared to younger patients.[49] Another prospective evaluation of conscious sedation with propofol in elderly patients showed that, with appropriate dosing adjusted to body weight and comorbidities, propofol did not result in excess adverse events and the majority of patients tolerated the sedation well without prolonged recovery times or hospitalizations.[50] A randomized controlled trial of high-risk patients aged ≥80 years who underwent interventional endoscopic procedures with nurse-administered propofol sedation reported that propofol sedation managed by trained nurses was safe and did not lead to a higher incidence of cardiopulmonary complications in elderly patients, compared to standard care.[51] Current guidelines posit that propofol-based sedative colonoscopy can be both safe and effective for elderly patients under the right conditions. These include when administered by trained non-anesthesiologists (endoscopists or nurses), provided there is appropriate training, patient selection and continuous monitoring standards are strictly followed.[52,53] However, it should be noted that many of the supporting studies were conducted in controlled settings with strict inclusion criteria and expert monitoring. Therefore, caution should be exercised when generalizing these results to clinical practice. The safety profile of propofol as observed in research trials may not fully translate to all real-world settings, especially in the context of continuous propofol infusion for older adults in resource-limited environments. A large multicenter cohort study of endoscopist-directed propofol sedation reported low cardiopulmonary complication rates, provided that appropriate protocols and training were in place.[54] Institutional protocols and staff training have been demonstrated to significantly influence sedation outcomes, as highlighted by systematic reviews demonstrating guideline variability and emphasizing the need for standardized training and monitoring frameworks.[55] It is recommended that low initial doses, slow titration, and vigilant monitoring of vital signs be employed in order to mitigate sedation risks in this vulnerable population. Respiratory monitoring with capnography has been demonstrated to facilitate the early detection of respiratory depression, thereby aiding in the mitigation of sedation risks in older adults who are deemed to be at high risk of sedative-related adverse events.[56,57]

Midazolam, a short-acting benzodiazepine, is frequently employed for moderate sedation during colonoscopies. Aging-related physiological changes alter the pharmacokinetics of midazolam in elderly individuals, resulting in an increased volume of distribution and a reduced hepatic clearance, thereby prolonging its sedative effect.[43,58,59] At the same time, aging enhances the brain's sensitivity to GABAergic sedatives, such that even conventional midazolam doses can induce deeper or more protracted sedation than intended. As a result, elderly patients demonstrate heightened vulnerability to the occurrence of over-sedation and respiratory depression when administered with midazolam. Sedation-related adverse events are observed with greater frequently in the elderly. Oxygen desaturation episodes were significantly more common in adults aged ≥80 years (27%) than in younger adults (19%) during colonoscopy sedation.[58] Therefore, current guidelines underscore the importance of reducing dosage and implementing vigilant monitoring when administering midazolam to older patients. The initial midazolam dosage administered to older adults should be initiated at a range of 0.5–1 mg intravenously (approximately 0.01 mg/kg), with subsequent titration in 0.5 mg increments at 2-minute intervals to achieve the desired effect. It is generally recommended that administration be ceased once a total of approximately 2 mg has been administered, which is approximately half the amount utilized in younger adults.[46,58-60]

Although propofol-based sedation has become a widely utilized method for colonoscopy in older patients due to its rapid onset and swift recovery, midazolam remains a well-established option in older adults. This is primarily due to its slower onset, predictable titration, availability of flumazenil for rever-

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sal, and its generally lower incidence of hypotension compared to propofol. A meta-analysis was conducted to compare the safety and satisfaction of propofol and midazolam in elderly patients undergoing colonoscopy. The analysis concluded that both regimens were equally safe and satisfactory.[61] Additionally, a combined midazolam and low-dose propofol regimen was found to demonstrate favorable hemodynamic stability in frail or comorbid older populations.[62] Therefore, sedation should be individualized. A midazolam-based regimen may be preferable for frail patients or short procedures, while a propofol-based or combination regimen may be recommended with close monitoring when deeper or faster recovery is required.

Despite overall positive safety data, elderly patients have reduced physiological reserve with which to cope with the stress associated with sedation. A higher prevalence of transient hypotension and decreased oxygen saturation has been observed in older adults undergoing sedative colonoscopy when compared to younger adults.[45,59] Consequently, numerous endoscopists and anesthesiologists have adopted a bespoke sedation protocol for elderly patients. The protocol necessitates a meticulous pre-procedure evaluation of the patient's cardiopulmonary condition, alongside a thorough consideration of anesthesia support. This may entail the presence of an anesthesiologist or a nurse anesthetist to administer sedation in cases deemed to be high-risk. Furthermore, the protocol encompasses the implementation of recovery protocols, such as the extension of observation times following the procedure.[56] The selection of sedation should be tailored to the individual patient. For a 70-year-old patient who is otherwise fit, standard moderate sedation may be appropriate, whereas a 90-year-old patient who is extremely frail and has severe pulmonary dysfunction may undergo the procedure with minimal sedation or with full anesthesiology support to carefully control the sedation.[45,56,59]

In summary, sedation for colonoscopy can be administered safely to elderly patients. A substantial body of research has demonstrated that the administration of propofol and midazolam, when dosed appropriately and accompanied by effective monitoring, results in an acceptable risk profile of adverse events, even in patients over the age of 80 years. It is imperative to acknowledge the heightened sensitivity exhibited by these patients and to manage sedation in a manner that is informed by a team with expertise in geriatric care. Nevertheless, the present review is chiefly concerned with safety recommendations founded upon evidence from screening or diagnostic colonoscopies. It is imperative to exercise particular caution in the context of therapeutic colonoscopies that necessitate the administration of deep sedation by anesthesiologists.

COMPLICATION RISKS AND SAFETY OUTCOMES

As people grow older, they are more likely to experience adverse events during colonoscopies. Patients of more advanced age have been shown to experience a higher incidence of complications during and following colonoscopy in comparison to patients of a younger demographic.[26,33,63] These complications encompass a range of events, including cardiopulmonary incidents associated with sedation, gastrointestinal bleeding (particularly post-polypectomy bleeding), perforation, and mortality. A Korean nationwide cohort study reported an increased incidence of both gastrointestinal and non-gastrointestinal complications following colonoscopy in older adults, emphasizing the need for careful patient selection and management in the elderly.[64] The elevated risk of adverse events associated with colonoscopy in older adults is attributable to multiple factors. It is frequently observed that these patients often have common severe comorbid illnesses that predispose them to problems related to sedation, and that their organs may be vulnerable to injury and recovery.[45,59,63] A comprehensive meta-analysis has been conducted that quantified the incidence of colonoscopy complications stratified by age.[33] In the cohort of patients aged 65 years and over, the pooled adverse event rates per 1,000 colonoscopies were as follows: 26 for any gastrointestinal complication, 6.3 for bleeding, 1.0 for perforation, 19.1 for cardiopulmonary complications, and 1.0 for mortality. In patients aged 80 years or older, the complication rates were higher, with approximately 34.9 per 1,000 for any gastrointestinal complication, 2.4 per 1,000 for bleeding, 1.5 per 1,000 for perforation, 28.9 per 1,000 for cardiopulmonary complications, and 0.5 per 1,000 for mortality. Patients over 80 years of age exhibited a 1.7-fold elevated risk of overall complications and a 1.6-fold elevated risk of perforation, in comparison to patients under 80 years old. Although the absolute incidence of serious complications such as gastrointestinal perforation or mortality remained low, the relative increase with advancing age is worthy of note: perforation occurred in 0.1% of patients under 80 years of age, compared with 0.15% of those aged over 80 years. A population-based cohort study in Canada examined 30-day post-colonoscopy outcomes in over 38,000 outpatients aged 50 and above.[63] The study found that the cumulative incidence of any complication was 6.8%

in patients aged ≥75, compared to 2.6% in those aged 50–74 years. The age of 75 years or more was identified as a significant independent predictor of complications, with an odds ratio (OR) of 2.3. As would be anticipated, the presence of comorbidities resulted in a marked amplification of risk: congestive heart failure exhibited an OR of 3.4, while chronic kidney disease demonstrated an OR of 1.8 for complications, respectively. The combination of advanced age and comorbidities has been demonstrated to contribute to an elevated risk of adverse events during colonoscopy.

Gastrointestinal bleeding is another significant complication, particularly if polyps are removed. Patients of more advanced age are more likely to be prescribed anticoagulants and/or antiplatelet agents, which have been shown to be significantly associated with the risk of post-polypectomy bleeding. The elderly are more susceptible to major bleeding, which can necessitate hospitalization or transfusion. While this occurrence is rare, affecting only 0.1% to 0.6% of the general population, it is observed in 3% of patients over 75 years of age.[65,66] Colonic perforation is among the most critical complications associated with this condition. The risk of perforation has been shown to increase with age, in part due to age-related tissue fragility, and possibly because older patients may have stiffer or more diseased colons, such as diverticulosis. In preceding studies, the incidence of perforation related to colonoscopy was approximately 0.1% in elderly patients.[33,67-69] The majority of complicated perforations occur during therapeutic interventions including polypectomy or balloon dilation for strictures, rather than during diagnostic colonoscopy. In patients aged 80 years or older, the mortality rate associated with colonoscopies has been estimated to be less than 0.1%.[33,67,70] However, it is challenging to ascertain whether the cardiopulmonary mortality that occurs following colonoscopies is a direct result of the procedure itself or an exacerbation of underlying comorbidities. It is noteworthy that colonoscopies rarely result in fatal outcomes, even in very elderly patients.

In summary, advanced age increases the likelihood of adverse events following colonoscopy, although the absolute incidence rates of serious adverse events remain low. As illustrated in Table 1,[26,33,63,71] several studies have been conducted on the safety and effectiveness of colonoscopies in older adults. The challenge lies in evaluating the potential risks against the potential benefits for each patient (discussed in next section). It is imperative that patients are selected with the utmost care following a comprehensive review of their medical history and that they are closely monitored for any potential complica-

Table 1. A Review of Colonoscopy Outcomes in Older Adults

Study (year)	Study design	Population	Complication rates	Common complications	Inadequate preparation	Polyp/cancer detection
Day et al. (2011)[33]	Systematic review & meta-analysis	20 studies; <80 yr vs. ≥80 yr	≥80: 3.5%, <80: 2.6%	Cardiopulmonary (≥80: 2.9%, <80: 1.9%) Perforation (≥80: 0.15%, <80: 0.1%)	-	-
Cha et al. (2016)[26]	Retrospective cohort	≥90 (n=76) vs. 75–79 (n=140)	Higher in ≥90 (P<0.01)	Cardiopulmonary events higher in ≥90	≥90: 30%, 75–79: 15%	Advanced neoplasia ≥90: 28%, 75–79: 6%
Causada-Calo et al. (2020)[63]	Population-based cohort	≥75 yr vs. 50–74 yr (n=38,000)	≥75: 6.8%, 50–74: 2.6%	Cardiovascular events associated with heart failure (OR 3.4), chronic kidney disease (OR 1.8)	-	CRC detection higher in ≥75: (≥75: 1.6%, 50–74: 0.5%)
Abu Baker et al. (2025)[71]	Retrospective cohort	50–64 yr vs. 65–79 yr vs. ≥80 yr (n=35,000)	Increased inpatient procedures ≥80 (49%)	-	≥80: 18.5%, 50–64: 9.1%	Increased cancer/polyp detection with age

OR, odds ratio; CRC, colorectal cancer.

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Table 2. Comparison of International Guidelines on CRC Screening

Guideline	Start age	Stop age/upper limit	Special considerations in older adults
USPSTF (2021)–U.S. Preventive Services Task Force[8]	45 (previously 50)	75 (routine). Individualize 76–85. No screening >85	Consider overall health and prior screening; shared decision-making for 76–85 yr
MSTF (2022)–U.S. Multi-Society Task Force (ACG/AGA/ASGE)[7]	45 (recently lowered from 50)	Up to 75 for routine; selectively to 85 if unscreened and healthy	Emphasize 10-yr life expectancy for continued screening beyond 75 yr
ACG (2021)–American College of Gastroenterology[10]	50 (strong); 45 (conditional)	>75: weigh benefits vs. risks; often not recommended	Focus on life expectancy ≥7–10 yr for meaningful benefit
ESGE (2020)–European Society of Gastrointestinal Endoscopy[72]	50 in most programs	Until 70–75 in organized screening; rarely beyond 75	Some countries may extend to 80 yr but caution diminishing returns and rising risk
Asia-Pacific Consensus (2022)–APAGE/Asia-Pacific groups[73]	50 (45 in some high-risk regions)	75 as general limit; beyond 75 if robust, but caution recommended	Strong emphasis on individual risk, comorbidities, and shared decision

This table summarizes the major international CRC screening guidelines on age to start and stop screening, and special considerations for older adults.
CRC, colorectal cancer; AGA, American Gastroenterological Association; ASGE, American Society for Gastrointestinal Endoscopy; APAGE, Asian Pacific Association of Gastroenterology.

tions. This is of the utmost importance when performing colonoscopies on elderly individuals to ensure the safety of the procedure.

Even though the safety of colonoscopy worsens with advanced age, it remains acceptable in absolute terms for carefully selected patients. The presence of a clear indication should not be overridden by the patient's chronological age when determining whether to undergo a colonoscopy. To make a well-informed decision regarding the performance of colonoscopies in high-risk populations, physicians should consider the overall risk factors for adverse events related to colonoscopies in addition to the potential benefits.

WHEN TO STOP COLONOSCOPY?

Considering the balance between benefits and risks in elderly individuals, a frequently posed question pertains to the optimal timing for the continuation of colonoscopies, particularly in a screening or surveillance context. This issue has been addressed by several guidelines and expert statements (Table 2).[7,8,10,72,73]

It is important to note that the overall benefit of routine screening colonoscopies declines as the age of the patient increases. Most guidelines advocate for the implementation of CRC screening in average-risk adults up to the age of 75 years.[7,8,10,72,73] However, for adults between the ages of 76 and 85, a more individualized approach is recommended. This approach considers health status, prior screening history, and personal preferences, acknowledging that the net benefit is diminished in this decade of life. For individuals above the age of 85, the guidelines advise against the routine implementation of CRC screening, as the potential adverse effects are considered to exceed the benefits in most cases. This recommendation is based on modeling studies and epidemiological data that indicate a period of approximately 10 years or more is required to clearly observe the mortality reduction as a key benefit of screening colonoscopy. Therefore, in cases where a patient's life expectancy is found to be significantly less than 10 years, the implementation of routine screening procedures is unlikely to yield any tangible benefits while concurrently introducing an unwarranted level of risk.

In the preceding expert discourse, it was posited that the implementation of screening colonoscopies in individuals beyond the age of 80 years should be approached with a degree of circumspection, on account of the diminishing yield and concomitant increase in risk.[28,74] The argument advanced was that in the case of elderly patients who have previously undergone negative screenings, the diagnosis of advanced colorectal neoplasms through the medium of an additional colonoscopy is a rarity. Contemporary guidelines also emphasize the consideration of individual's health: an 82-year-old individual in excellent health who has never undergone screening may still derive significant benefit from a screening colonoscopy; however, an 82-year-old with significant comorbidities and previous negative colonoscopies over a period of 5 to 10 years prior should probably not continue with screening. The appropriateness of performing surveillance colonoscopy is performed in older patients should also be determined in a similar manner. The overarching concept of the guidelines is that of individualization. Experts in the field advocate considering a life expectancy of approximately 8 to 10 years as a threshold. If the patient is expected to live for a minimum of 8 to 10 years

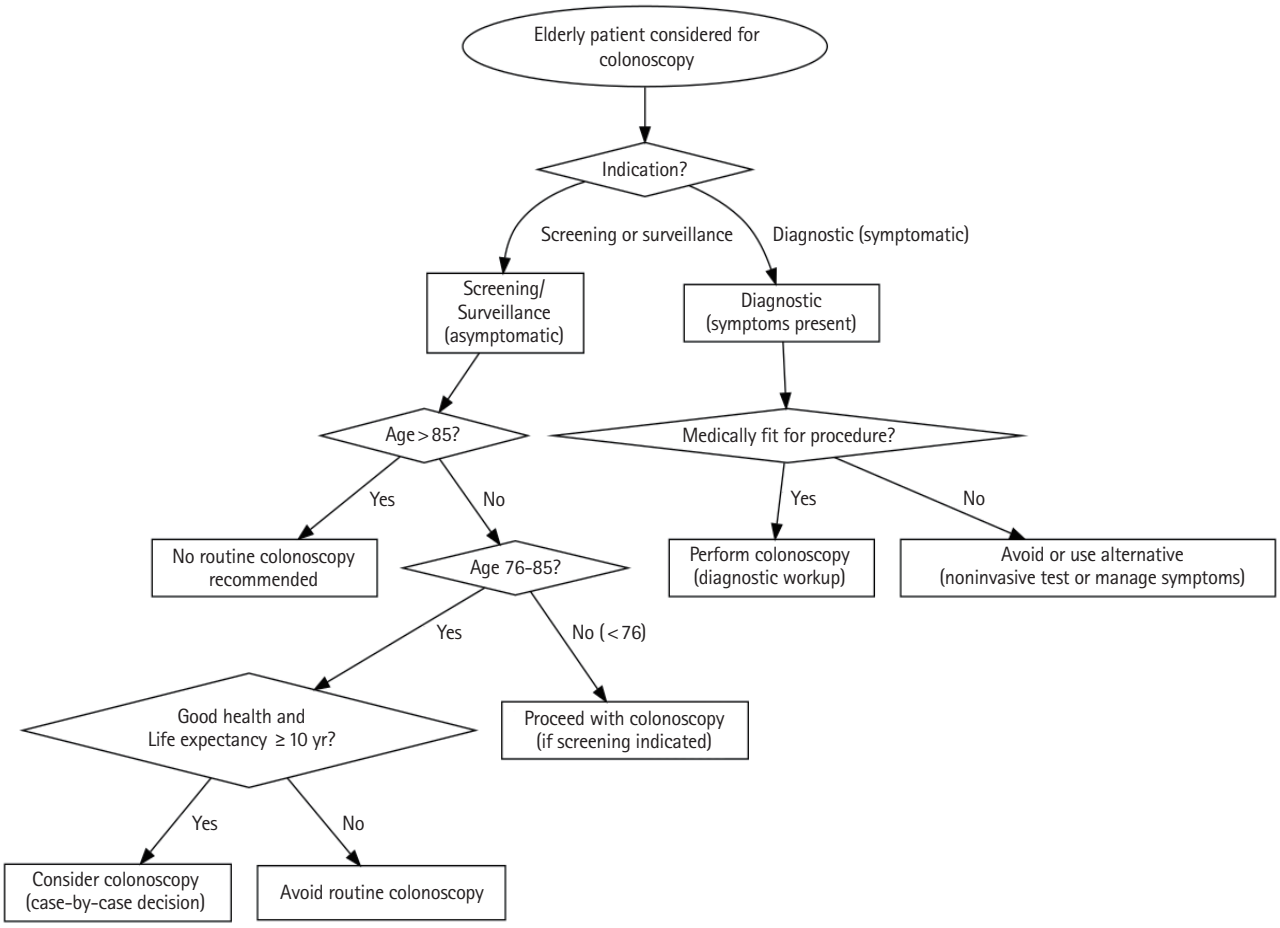

Fig. 1. Proposed decision-making algorithm for performing colonoscopy in older adults.

and possesses an acceptable level of health, the provision of screening or surveillance colonoscopies may be considered. Conversely, if the patient is not expected to live for at least 8 to 10 years, it is considered reasonable to discontinue routine examinations. The challenge lies in the practical estimation of life expectancy on an individual basis. Whilst chronological age should not be considered the solitary factor in this matter, it is nevertheless a useful proxy indicator for remaining life expectancy. The Charlson Comorbidity Index or geriatric assessment scales may help estimate life expectancy and risk, but there is not any tool available for decision-making whether performing colonoscopy or not in practice.[8] Clinicians may utilize validated tools to estimate life expectancy, such as the Schonberg Index which is a U.S. NIH-derived 11-item tool predicting 5-year mortality risk for adults aged ≥65 years.[75] However, there is a need for regionally validated tools for estimated life expectancy, given that the performance of prognostic tools may vary across populations. A recently published report detailed the development of a novel risk prediction score for adverse events following colonoscopy in individuals aged 60 years or older.[17] Adverse events defined as emergency room visits or unplanned hospitalizations within 30 days of post-colonoscopy, were found to be independently associated with the use of aspirin, P2Y12 inhibitors, and anticoagulants, as well as with moderate and high FI-LABs, irrespective of chronological age. The risk stratification system, based on these factors, has the potential to predict adverse events related to colonoscopies, thereby supporting personalized decision-making when performing colonoscopies in older adults.

The overarching objective is to ensure the provision of high-quality care for older adults, with the aim of identifying those who stand to benefit from a colonoscopy and ensuring that those for whom it would be likely to cause more harm are spared unnecessary interventions. These principles are outlined in Fig. 1, which presents a pragmatic algorithm for clinicians confronted with the decision regarding colonoscopy in elderly patients.

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CONCLUSIONS

The performance of a colonoscopy on elderly patients has been shown to carry with it a higher potential for positive outcomes, but also an elevated risk to the patient. It is an established fact that older adults bear the greatest burden of colorectal pathology, and that colonoscopy can provide significant benefits in terms of cancer prevention, diagnosis of symptoms, and therapeutic interventions. Concurrently, advanced age is associated with a number of challenges, including the presence of comorbid illnesses, physiological changes, and a reduced margin for error. This has the potential to increase the risk of adverse events. Generally, colonoscopy can be performed safely in the elderly, provided that due attention is paid to the selection of patients and to the management of the procedure itself. Optimizing bowel preparation, adjusting sedation practices, and close monitoring for complications are critical components of care. The selection of older patients for colonoscopy should be made on an individual basis, with a comprehensive evaluation of the indication for the procedure, the probability of benefit, and the patient's life expectancy and risk factors. The notion of chronological age should not be considered an automatic exclusion; rather, it is imperative to acknowledge the significance of physiological age and health status as more substantial determinants. To ensure the optimal utilization of colonoscopies in the geriatric population, physicians must adhere to best practices. These include a thorough pre-procedure assessment, the appropriate administration of sedation, and adherence to guideline recommendations on when to perform or stop screening. It is evident that ongoing research and quality improvement efforts, including the development of enhanced risk stratification models and the implementation of gentler preparation methods, will contribute to the continued enhancement of the safety profile of colonoscopies in the elderly. The overarching objective is to furnish elderly patients with the diagnostic and preventive benefits of colonoscopy while concomitantly minimizing any potential harm, thereby upholding a high standard of care for this expanding demographic within the community.

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