

ASGE guideline: modifications in endoscopic practice for the elderly

This is one of a series of statements discussing the utilization of gastrointestinal endoscopy in common clinical situations. The Standards of Practice Committee of the American Society for Gastrointestinal Endoscopy prepared this text. In preparing this guideline, a MEDLINE literature search was performed, and additional references were obtained from the bibliographies of the identified articles and from recommendations of expert consultants. When little or no data exist from well-designed prospective trials, emphasis is given to results from large series and reports from recognized experts.

Guidelines for appropriate utilization of endoscopy are based on a critical review of the available data and expert consensus. Further controlled clinical studies are needed to clarify aspects of this statement, and revision may be necessary as new data appear. Clinical consideration may justify a course of action at variance to these recommendations.

INTRODUCTION

The use of gastrointestinal endoscopy in geriatric patients is rising as a result of population demographics and the growing application of technology to clinical problems. An increasing proportion of the population is reaching an advanced age. In the year 2000, 34.9 million people (12.6% of the total population) were aged ≥ 65 years, and 4.4 million were aged ≥ 85 years.¹ This article is intended to provide guidance regarding endoscopic practice issues in the elderly. Geriatric patients are often defined as those aged ≥ 65 years; advanced age patients are those aged ≥ 80 years. Because physiologic age is a continuum, this article is not intended to apply to rigidly defined age ranges. This review updates the 2000 ASGE guideline on this subject.²

INDICATIONS AND CONTRAINDICATIONS

For patients in any age group, endoscopy should be performed only when the results will influence clinical

management or outcome. The indications for gastrointestinal endoscopy among the elderly are largely the same as those for adults, with some variation in the relative frequency based upon the development of age-related diseases such as cancer, gastrointestinal ischemia, and biliary tract disease. The same relative and absolute contraindications also pertain, without respect to age. Increased attention should be paid, however, to the risk engendered by age-related diseases, such as cardiac and pulmonary dysfunction. Significant risk may outweigh the acknowledged benefits of a procedure.

Several studies of indications and outcomes of patients aged ≥ 80 years have found elective and emergency endoscopic procedures (including EGD, ERCP, and colonoscopy) to be safe and that advanced age is not a contraindication to endoscopy.³⁻⁵ For example, in a large multicenter trial on ERCP complications, age was not found to be a risk factor for complications after endoscopic sphincterotomy.⁶ In a retrospective analysis, endoscopic sphincterotomy for bile duct stones was found to be a safe and effective treatment in patients aged ≥ 70 years. In comparison to patients aged 70 to 89 years, those aged ≥ 90 years underwent more emergency procedures and more frequently required multiple procedures and stent placement.⁷ Several recent studies have shown colonoscopy to be safe in elderly patients.⁸⁻¹² In these studies, indications for colonoscopy were both for symptoms and surveillance/screening. Unadjusted cecal intubation rates varied from 69% to 94% and were generally comparable to younger patients,⁹⁻¹¹ though ileal intubation rates were lower.¹¹ Poor colonic preparations appear to be more frequent in the elderly and occur in 16% to 21% of patients.^{10,12}

Ethical issues are raised by the use of diagnostic or therapeutic modalities in patients with a limited life expectancy, a situation more common in the elderly. The acuity of the situation and the likelihood of benefit influence the decision to proceed with an endoscopic procedure. For example, studies have shown that the 30-day mortality in elderly patients receiving percutaneous endoscopic gastrostomy (PEG) is approximately 19% to 22%, largely due to underlying medical illnesses.^{13,14} There is particular controversy concerning the usefulness of PEG in elderly patients with dementia.¹⁵

Similarly, the use of elective screening procedures for colorectal neoplasia in the elderly should be restricted

to situations where it will likely extend life expectancy. Physiologic age and prognosis must be considered in the elderly. Most national guidelines for colorectal cancer screening do not provide upper-age constraints,¹⁶⁻²⁰ although the concept of when to stop screening or surveillance on the basis of age has been addressed in the literature.^{16,19,20} Factors to be taken into account include lead time between screening and potential benefit, comorbid medical illnesses, and life expectancy. Screening colonoscopy studies have generally excluded patients aged ≥ 80 years, so there are no data to address a mortality benefit in this age group. Some authorities recommend limiting screening for colorectal cancer to those patients aged < 80 years and discontinuing surveillance at age 85 years.²¹ In view of the safety of colonoscopy in the age group ≥ 80 years and the high yield for advanced neoplasia, it has been proposed that it may be appropriate to continue screening in this age group as long as there are no life-limiting comorbidities.²²

PREPROCEDURE PREPARATION

Preparation for endoscopy in the geriatric or aged populations differs little from that for younger adults. For EGD, the recommendations for cessation of ingestion of solids and liquids are the same as for younger patients.²³ Preparation for colonoscopy with either standard dose PEG lavage or sodium phosphate osmotic laxative preparations can be used. Similar tolerability and efficacy of the 2 regimens has been demonstrated in the elderly.^{24,25} However, sodium phosphate preparations are associated with hyperphosphatemia, hypernatremia, and hypokalemia, although there were no clinically significant adverse effects in clinical trials in healthy elderly patients.²⁴⁻²⁶ Caution should be exercised in those patients with renal or cardiac dysfunction, in whom fluid and electrolyte shifts can occur with the osmotic preparations.

Elderly patients are more likely to have underlying heart disease and implanted cardiac devices. Electrocautery used during endoscopic procedures has the potential for causing electromagnetic interference with these devices, possibly leading to pacemaker inhibition or false detection of ventricular arrhythmias.²⁷ The concern arises when using standard monopolar snares, not biopsy forceps, sphincterotomy, and argon plasma coagulation. Recommendations for management of patients with pacemakers and implantable cardioverter defibrillators (ICDs) are not well defined.²⁷⁻³¹ Preprocedure evaluation of device function in collaboration with cardiology personnel should be considered, especially in patients with ICDs. A forthcoming ASGE document will provide more specific guidelines for these patients. Intracardiac defibrillators should be inactivated before the use of electrocautery. This must always be done with the use of continuous rhythm monitoring until the defibrillator is reactivated

after the procedure. Alternative means of tissue removal, destruction, or hemostasis, such as cold snare or biopsy, injection therapy, heater probe thermocoagulation, band ligation, and clipping should be considered whenever possible in patients with ICDs.

During capsule endoscopy there is a theoretical potential for interference from the digital radiofrequency communication between the capsule and the data recorder, so the presence of a cardiac pacemaker or ICD is considered a relative contraindication to capsule endoscopy.^{32,33} Recently, reports on small series of patients have been published showing capsule endoscopy to be safe in patients who were monitored and studied in a hospital setting. No significant interference with pacemaker or ICD function was seen, and there was no interference with the capsule endoscopy images.^{32,33} Because large studies are not available, it may be advisable that patients with implanted cardiac devices be evaluated by a cardiologist before capsule endoscopy and patients with ICDs be observed in a hospital setting with continuous cardiac monitoring.

SEDATION AND ANALGESIA

Most gastrointestinal endoscopy is performed using moderate sedation. Guidelines regarding conscious sedation and monitoring of adult patients have been previously published.^{34,35} Sedation in the elderly requires awareness of their increased response to sedatives. A variety of physiologic processes contribute to the increase in sensitivity and sedation risk in geriatric patients.³⁶ Arterial oxygenation progressively deteriorates with age, with and without oxygen supplementation. Cardiorespiratory stimulation in response to hypoxia or hypercarbia is blunted and delayed. Narcotic and non-narcotic central nervous system (CNS) depressants produce greater respiratory depression and a greater incidence of transient apnea and episodic respirations. The risk for aspiration also rises as a result of a significant increase in the sensory stimulus threshold required for reflexive glottic closure.³⁷

The age-related increase in lipid fraction of body mass yields an expansion of the distribution volume for pharmacologic agents, which are highly lipid soluble, including the benzodiazepines. In conjunction with reduced hepatic and renal clearance mechanisms, this can prolong recovery for elderly patients after sedation. Finally, a complex interplay among heightened CNS sensitivity and alterations in drug receptors, volumes of distribution, and intercompartmental transfer contributes to the reduced dosage requirements of all of the standard sedative agents. Nevertheless, age alone is not a major determinant of morbidity. Rather, age-related diseases and rapid or excessive dosing contribute more to the cardiopulmonary complications of sedation than does age itself.³⁶

Drugs used for sedation in geriatric patients should have a short half-life, with minimally active metabolites

and limited side effects. Doses based solely on mg/kg body weight may produce profound respiratory depression and hypotension. The primary modification in sedation practices required in the geriatric population is administration of fewer agents at a slower rate and with a lower cumulative dose. As in younger adults, midazolam and/or narcotics are generally used. Fentanyl may have an advantage over meperidine in the elderly due its quicker onset of action and shorter half-life. Propofol has a narrower margin of safety in elderly patients but has been shown to be safe when used in elderly patients.³⁸⁻⁴⁰ Lower initial doses of sedative-hypnotics, usually half the normal recommended adult dose, along with slow and gradual titration to effect is a useful guide when sedating the geriatric patient.^{41,42}

One means of minimizing risk in the elderly patient is to perform endoscopy with minimal or no sedation. Although moderate sedation significantly improves tolerance for EGD, several studies have demonstrated the role of newer ultrathin endoscopes in allowing nonsedated upper endoscopy, including in elderly patients.⁴³⁻⁴⁷ Two studies have shown successful nonsedated PEG placement with the use of ultrathin endoscopes.^{48,49} Other advantages of smaller caliber upper endoscopes are the reduced likelihood of oxygen desaturation and arrhythmias during the procedure.^{50,51}

MONITORING/PROCEDURAL CARE

As with all moderate sedation, standard monitoring procedures should be followed. Great care should be exercised in older patients with rheumatoid arthritis because neck extension during upper endoscopy or to improve ventilation may cause atlanto-axial subluxation with the potential to produce spinal cord injury.

There should be a low threshold for oxygen administration before and during moderate sedation because it reduces the incidence of oxygen desaturation.⁵² Oxygen supplementation should be used liberally in patients with known cardiovascular or pulmonary compromise, realizing that oxygen dosing has the potential risk of causing respiratory depression when patients with chronic hypercarbia lose the respiratory drive of hypoxemia.

Equipment

The monitoring devices, resuscitative equipment, and drugs used for geriatric patients are the same as those used for all patients. Oxygen should be readily available. Endoscopes and accessories are the same as those used in younger adults. Pediatric instruments, particularly colonoscopes with more flexible insertion tubes, may be useful in older patients who frequently have significant fixation or narrowing of the sigmoid colon as a result of prior surgery or diverticular disease.

Therapeutic Interventions

There are no age-specific differences in the technical aspects of endoscopic therapies for geriatric patients. As previously discussed, prudent judgment should be used regarding the relative risk and benefit for endoscopic therapies, which may have little bearing on prognosis or quality of life due to significant underlying comorbidities.

SUMMARY

- Most diagnostic and therapeutic endoscopic interventions can be safely performed in elderly patients. (B)
- Preparation for endoscopy in the elderly differs little from that in younger adults, but caution regarding fluid and electrolyte shifts should be exercised when using colonoscopy preparations. (B)
- Colonoscopic screening and surveillance for colorectal cancer in patients of advanced age should be individualized on the basis of general health and comorbid medical illnesses. (C)
- Moderate sedation in the elderly requires heightened attention to dosing and the effects of standard sedatives. (C)
- Initial doses of sedatives should be lower than standard adult dosing and titration should be more gradual to allow assessment of the full dose effect at each dose level. (C)
- Intensified monitoring is appropriate for many elderly patients. (C)

REFERENCES

1. Guralnik JM, Ferrucci L. Demography and epidemiology. In: Hazzard WR, Blass JP, Halter JB, et al, editors. Principles of Geriatric Medicine and Gerontology, 5th ed. New York: McGraw-Hill; 2003.
2. Eisen GM, Chutkan R, Goldstein JL, et al. Modifications in endoscopic practice for the elderly. *Gastrointest Endosc* 2000;52:849-51.
3. Clarke GA, Jacobson BC, Hammett RJ, et al. The indications, utilization and safety of gastrointestinal endoscopy in an extremely elderly patient cohort. *Endoscopy* 2001;33:580-4.
4. Seinela L, Ahvenainen J, Ronneikko J, et al. Reasons for and outcome of upper gastrointestinal endoscopy in patients aged 85 years or more: retrospective study. *BMJ* 1998;317:575-80.
5. Van Kouwen MC, Drenth JP, Verhoeven HM, et al. Upper gastrointestinal endoscopy in patients aged 85 years or more. Results of a feasibility study in a district general hospital. *Arch Gerontol Geriatr* 2003;37:45-50.
6. Freeman ML, Nelson DB, Sherman S, et al. Complications of endoscopic sphincterotomy. *N Engl J Med* 1996;335:909-18.
7. Sugiyama M, Atomi Y. Endoscopic sphincterotomy for bile duct stones in patients 90 years of age and older. *Gastrointest Endosc* 2000;52:187-91.
8. Sardinha TC, Noguera JJ, Ehrenpreis ED, et al. Colonoscopy in octogenarians: a review of 428 cases. *Int J Colorectal Dis* 1999;14:172-6.
9. Lagares-Garcia JA, Kurek S, Collier B, et al. Colonoscopy in octogenarians and older patients. *Surg Endosc* 2001;15:262-5.

10. Lukens FJ, Loeb DS, Machicao VI, et al. Colonoscopy in octogenarians: a prospective outpatient study. *Am J Gastroenterol* 2002;97:1722-5.
11. Arora A, Singh P. Colonoscopy in patients 80 years of age and older in safe, with high success rate and diagnostic yield. *Gastrointest Endosc* 2004;60:408-13.
12. Yoong KK, Heymann T. Colonoscopy in the very old: why bother? *Postgrad Med J* 2005;81:196-7.
13. Mitchell SL, Tetroe JM. Survival after percutaneous endoscopic gastrostomy placement in older persons. *J Gerontol: Med Sci* 2000;55A:M735-9.
14. Callahan CM, Haag KM, Weinberger M, et al. Outcomes of percutaneous endoscopic gastrostomy among older adults in a community setting. *J Am Geriatr Soc* 2000;48:1048-54.
15. Nair S, Herten H, Pitchumoni CS. Hypoalbuminemia is a poor predictor of survival after percutaneous endoscopic gastrostomy in elderly patients with dementia. *Am J Gastroenterol* 2000;95:133-6.
16. Winawer SJ, Fletcher RH, Miller L, et al. Colorectal cancer screening: clinical guidelines and rationale. *Gastroenterology* 1997;112:594-642.
17. Winawer S, Fletcher R, Rex D, et al. Colorectal cancer screening and surveillance: clinical guidelines and rationale-update based on new evidence. *Gastroenterology* 2003;124:544-60.
18. Rex DK, Johnson DA, Lieberman DA, et al. Colorectal cancer prevention 2000: screening recommendations of the American College of Gastroenterology. *Am J Gastroenterol* 2000;95:868-77.
19. Smith RA, von Eschenbach AC, Wender R, et al. American Cancer Society guidelines for the early detection of cancer: update of early detection guidelines for prostate, colorectal and endometrial cancers. *CA Cancer J Clin* 2001;51:38-75.
20. U.S. Preventive Services Task Force. Screening for colorectal cancer: recommendation and rationale. *Ann Intern Med* 2002;137:129-31.
21. Miller KM, Wayne JD. Approach to colon polyps in the elderly. *Am J Gastroenterol* 2000;95:1147-51.
22. Stevens T, Burke CA. Colonoscopy screening in the elderly: when to stop? *Am J Gastroenterol* 2003;98:1881-5.
23. Faigel DO, Eisen GM, Baron TH, et al. Preparation of patients for GI endoscopy. *Gastrointest Endosc* 2003;57:446-50.
24. Thomson A, Naidoo P, Crotty B. Bowel preparation for colonoscopy: a randomized prospective trial comparing sodium phosphate and polyethylene glycol in a predominantly elderly population. *J Gastroenterol Hepatol* 1996;11:103-7.
25. Seinela L, Pehkonen E, Laasanen T, et al. Bowel preparation for colonoscopy in very old patients: a randomized prospective trial comparing oral sodium phosphate and polyethylene glycol electrolyte lavage solution. *Scand J Gastroenterol* 2003;38:216-20.
26. Beloosesky Y, Grinblat J, Weiss A, et al. Electrolyte disorders following oral sodium phosphate administration for bowel cleaning in elderly patients. *Arch Intern Med* 2003;163:803-8.
27. Niehaus M, Tebbenjohanns J. Electromagnetic interference in patients with implanted pacemakers or cardioverter-defibrillators. *Heart* 2001;86:246-8.
28. Technology Status Evaluation Report. Electrocautery use in patients with implanted cardiac devices. *Gastrointest Endosc* 1994;40:494-5.
29. Gruber M, Seebald C, Byrd R, et al. Electrocautery and patients with implanted cardiac devices. *Gastroenterol Nurs* 1995;18:49-53.
30. Bourke ME. The patient with a pacemaker or related device. *Can J Anaesth* 1996;43:R24-32.
31. Veitch A, Fairclough P. Endoscopic diathermy in patients with cardiac pacemakers. *Endoscopy* 1998;30:544-7.
32. Leighton JA, Sharma VK, Srivathsan K, et al. Safety of capsule endoscopy in patients with pacemakers. *Gastrointest Endosc* 2004;59:567-9.
33. Leighton JA, Srivathsan K, Carey EJ, et al. Safety of wireless capsule endoscopy in patients with implantable cardiac defibrillators. *Am J Gastroenterol* 2005;100:1728-31.
34. Waring JP, Baron TH, Hirota WK, et al. Guidelines for conscious sedation and monitoring during gastrointestinal endoscopy. *Gastrointest Endosc* 2003;58:317-22.
35. Karan SB, Bailey PL. Update and review of moderate and deep sedation. *Gastrointest Endosc Clin N Am* 2004;14:289-312.
36. Muravchick S. Anesthesia for the geriatric patient. In: Barash PG, Cullen BF, Stoelting RK, editors. *Clinical Anesthesia*, 4th ed. Philadelphia: Lippincott Williams and Wilkins; 2001. p. 1205-16.
37. Shaker R, Ren J, Bardan E, et al. Pharyngoglottal closure reflex: characterization in healthy young, elderly and dysphagic patients with pre-deglutitive aspiration. *Gerontology* 2003;49:12-20.
38. Cohen LB, Hightower CD, Wood DA, et al. Moderate level sedation during endoscopy: a prospective study using low-dose propofol, meperidine/fentanyl, and midazolam. *Gastrointest Endosc* 2004;59:795-803.
39. Heuss LT, Schnieper P, Drewe J, et al. Conscious sedation with propofol in elderly patients: a prospective evaluation. *Aliment Pharmacol Ther* 2003;17:1493-501.
40. Riphaus A, Stergiou N, Wehrmann T. Sedation with propofol for routine ERCP in high-risk octogenarians: a randomized, controlled study. *Am J Gastroenterol* 2005;100:1957-63.
41. Peacock JE, Lewis RP, Reilly CS, et al. Effect of different rates of infusion of propofol for induction of anaesthesia in elderly patients. *Br J Anaesth* 1990;65:346-532.
42. Darling E. Practical considerations in sedating the elderly. *Crit Care Nurs Clin N Am* 1997;9:371-80.
43. Sorbi D, Gostout CJ, Henry J, et al. Unsedated small-caliber esophagogastroduodenoscopy (EGD) versus conventional EGD: a comparative study. *Gastroenterology* 1999;117:1301-7.
44. Carey EJ, Sorbi D. Unsedated endoscopy. *Gastrointest Endosc Clin N Am* 2004;14:369-83.
45. Garcia RT, Cello JP, Nguyen MH, et al. Unsedated ultrathin EGD is well accepted when compared with conventional sedated EGD: a multicenter randomized trial. *Gastroenterology* 2003;125:1606-12.
46. Dumortier J, Napoleon B, Hedelius F, et al. Unsedated transnasal EGD in daily practice: results with 1100 consecutive patients. *Gastrointest Endosc* 2003;57:198-204.
47. Thota PN, Zuccaro G Jr, Vargo JJ 2nd, et al. A randomized prospective trial comparing unsedated esophagoscopy via transnasal and transoral routes using a 4-mm video endoscope with conventional endoscopy with sedation. *Endoscopy* 2005;37:559-65.
48. Vitale MA, Villotti G, D'Alba L, et al. Unsedated transnasal percutaneous endoscopic gastrostomy placement in selected patients. *Endoscopy* 2005;37:48-51.
49. Dumortier J, Lapalus MG, Pereira A, et al. Unsedated transnasal PEG placement. *Gastrointest Endosc* 2004;59:54-7.
50. Lieberman DA, Wuerker CK, Katon RM. Cardiopulmonary risk of esophagogastroduodenoscopy. Role of endoscope diameter and systemic sedation. *Gastroenterology* 1985;88:468-72.
51. Cooper MW, Davison CM, Uastin CA. Arterial oxygen saturation during upper gastrointestinal endoscopy in elderly patients: the role of endoscope diameter. *Age Ageing* 1995;24:254-6.
52. Reed MW, O'Leary DP, Duncan JL, et al. Effects of sedation and supplemental oxygen during upper alimentary tract endoscopy. *Scand J Gastroenterol* 1993;8:319-22.

Prepared by:
 STANDARDS OF PRACTICE COMMITTEE
 Waqar A. Qureshi, MD
 Marc J. Zuckerman, MD
 Douglas G. Adler, MD
 Raquel E. Davila, MD
 James V. Egan, MD
 S. Ian Gan, MD
 David R. Lichtenstein, MD
 Elizabeth Rajan, MD
 Bo Shen, MD
 Robert D. Fanelli, MD, SAGES Representative
 Trina Van Guilder, RN, SGNA Representative
 Todd H. Baron, MD, Chair
