

Underlying—Disease Risk for Antispasmodic Premedication in Older Patients Undergoing Investigations of the Gastrointestinal Tract

Noboru Saito^{1,2}, Akiyoshi Seshimo¹ and Shingo Kameoka¹

¹Departments of Surgery II and ²General Medicine, Tokyo Women's Medical University School of Medicine, Tokyo, Japan.

Abstract

Purpose: Improve risk management of patients undergoing investigations of the gastrointestinal (GI) tract, in regard to underlying diseases and choice of premedication. According to a nationwide survey in Japan, 74% of the deaths associated with premedication were patients aged 60 years or over.

Methods: Subjects were 418 patients undergoing investigations of the GI tract (367 endoscopy, 51 barium contrast radiography) between October 2001 and January 2004. Age distribution peaked in the 65–69 years group, and 40% of subjects were aged 65 years and over. Using a questionnaire, each subject was interviewed prior to the investigation to determine contraindications for anticholinergic agents or glucagon preparations. To confirm the risk associated with antispasmodic agents in elderly subjects, the group was subdivided into those aged under 65 years and those aged 65 and over, and compared.

Results: Anticholinergic agents were contraindicated in more than 50% of subjects aged 65 years and over, and glucagon was contraindicated in 11% of subjects aged 65 years and over. The proportion of elderly subjects in whom antispasmodic agents, including anticholinergics and glucagon, were contraindicated was significantly greater than for subjects aged under 65 years.

Conclusions: Using a written questionnaire at the time of obtaining informed consent facilitates the identification of underlying diseases and selection of appropriate premedication.

Keywords: anticholinergic drugs, gastrointestinal tract, glucagon preparations, risk analysis, risk management

Introduction

Generally, anticholinergic agents or glucagon preparations are administered prior to GI investigations in order to suppress peristalsis and secretions for easier observation of the target area. The parasympatholytic actions of anticholinergic agents contraindicate their use in patients with glaucoma, prostatic hypertrophy and cardiovascular conditions such as arrhythmia and heart disease. Glucagon, a peptide hormone secreted by the pancreas, is contraindicated in patients with pheochromocytoma, although serious adverse reactions are considered uncommon, other than in patients with marked hyperglycemia.

The importance of clinical risk management (i.e. detecting and reducing the risk associated with medical procedures) has increased in current medical practice. In endoscopy in particular, recent advances and wider application have led to increased use in high-risk cases and according to a nationwide survey in Japan, 74% of deaths associated with endoscopic premedication were in patients aged 60 years or over.¹ We present the risk management initiatives we have introduced to overcome this problem.

We surveyed patients undergoing investigations of the gastrointestinal (GI) tract from the viewpoint of the influence of the underlying disease on selection of antispasmodic agent. We also investigated associations with age, in order to identify the high-risk group and assist in risk management. For the purpose of this study, elderly subjects were defined as those aged 65 years or over, as per the Japanese Welfare Law for the Elderly.

Correspondence: Dr. Noboru Saito, Department of Surgery II, Tokyo Women's Medical University School of Medicine, 8-1 Kawada-cho, Shinjuku-ku, Tokyo 162-8666, Japan. Tel: +81-3-3353-8111, ext. 39251; Fax: +81-3-5269-7334; Email: nobosaito@surg2.twmu.ac.jp



Copyright in this article, its metadata, and any supplementary data is held by its author or authors. It is published under the Creative Commons Attribution By licence. For further information go to: <http://creativecommons.org/licenses/by/3.0/>.

Methods

Patients

The subjects were 418 patients who attended the Second Department of Surgery of the Tokyo Women's Medical University School of Medicine for investigations of the GI tract (367 upper GI endoscopy, 51 barium contrast radiography) between October 2001 and January 2004. The peak of the subjects' age distribution was 65–69 years, and 40% of subjects were aged 65 years and over (Fig. 1).

Pre-investigation questionnaire

Using a pre-investigation questionnaire (Fig. 2), a nurse or doctor interviewed each subject prior to the investigation. Subjects for whom anticholinergic agents were contraindicated were defined in accordance with the 'Guidelines for Endoscopy in Elderly Patients' issued by the Japan Gastroenterological Endoscopy Society, namely, those with 'hypertension, arrhythmia, ischaemic heart disease, glaucoma, or benign prostatic hypertrophy', and glucagon preparations were contraindicated in subjects with 'diabetes mellitus'.

Results

The numbers and proportions of subjects with underlying diseases that influenced the selection of antispasmodic agent are shown in Table 1. Circulatory diseases, benign prostatic hypertrophy and diabetes mellitus were relatively common.

We also collated the proportion of subjects in whom antispasmodic agents (anticholinergic agents/glucagon preparations) were contraindicated because

of underlying diseases (Fig. 3). Of the younger subjects, aged less than 40 years of age, 10–20% has a risk associated with anticholinergic agents. The prevalence of risk-associated underlying diseases increased with age, with anticholinergic agents contraindicated in 53% of subjects aged 65 years and over. Glucagon preparations were contraindicated in 4–15% of subjects aged 40 years and over. To confirm the risk associated with antispasmodic agents in elderly subjects, we divided all patients into two groups, aged under 65 years or 65 years and over, and compared the risk between groups (Table 2). Anticholinergic agents were contraindicated in 53% of subjects aged 65 years and over, significantly higher than the 21% of subjects aged under 65 years (χ^2 test, $P = 0.0014$). Glucagon was contraindicated in 11% of subjects aged 65 years and over, significantly higher than the 5% of subjects aged under 65 years (χ^2 test, $P = 0.033$).

Discussion

The number of investigations of the GI tract performed in Japan has risen markedly in recent years, with expansion of the system of regular health checks and with increasing consumer demand for early detection and treatment. At the same time the ageing of Japanese society has increased the proportion of patients considered as high risk, in particular elderly patients with unrelated underlying diseases. The Accident Prevention Committee of the Japan Gastroenterological Endoscopy Society has conducted, and published in detail, nationwide surveys of investigation-related accidents at 5-yearly intervals since 1983.^{2–4} The third survey comprised 1,200,000 investigations, yielding 2600

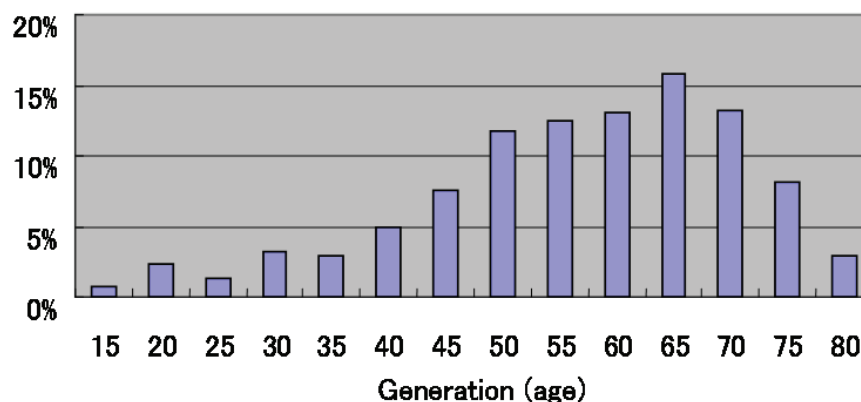


Figure 1 Distribution of the subjects' ages.

Day Month Year

Filled in by:

Name _____ Age _____ years Male/Female

Please answer the following questions so that your procedure will go smoothly and safely. Circle the correct answer.

1. How many times have you undergone investigations of the gastrointestinal tract (e.g. gastroscopy, colonoscopy, barium enema, barium meal, etc.)?
(First time) (This is the _____ time)
2. If you have undergone gastrointestinal investigations before, did you have any adverse reactions during or after the procedure?
(No) (Yes: nausea, dizziness, palpitations, difficulty urinating, other _____)
3. Are you taking any blood thinning medicines?
(No) (Yes: warfarin, aspirin, ticlopidine, clopidogrel, persantin, other _____)
4. Do you have any heart or circulatory problems?
(No) (Yes: high blood pressure, arrhythmia, angina, heart attack, other _____)
5. Do you have glaucoma, or raised intraocular pressure?
(Yes) (No)
6. For the gentlemen, do you have an enlarged prostate, or trouble urinating?
(Yes) (No)
7. Have you ever been diagnosed with phaeochromocytoma?
(Yes) (No)
8. Do you have diabetes? Are you taking medicine to lower blood sugar?
(Yes) (No)
9. Have you ever had a bad reaction to a medicine?
(Yes) (No)

If you answered yes, please write the name(s) of the medicine(s) if you know it/them.

10. Have you ever suffered from an infectious disease, e.g. affecting the liver?
(No) (Yes: hepatitis B, hepatitis C, other _____)
11. Do you suffer from asthma, or any other allergic condition?
(Yes) (No)
12. For the ladies, are you pregnant, or is there any chance you might be pregnant?
(Yes) (No)

* If you take any regular medications, please notify us in advance.

Instructions/Comments

Figure 2. Pre-investigation patient questionnaire.

accidents for an incidence of 0.22%. Patients aged 60 years or more accounted for 74% of deaths associated with premedication, and 82% of all investigation-related deaths, emphasising the need for risk management in elderly patients undergoing GI investigations.

Harada et al. examined the hemodynamic effects of anticholinergic agents and glucagon preparations

administered as premedication for upper GI tract endoscopy, finding that the heart rate and pressure product rose significantly more with anticholinergic agents than with glucagon.⁵⁻¹⁶ In other words, the cardiac load is greater following the administration of anticholinergic agents than of glucagon.

The risk of hypoglycaemia should be worried also in non-diabetic patients following glucagon

Table 1. Numbers and proportions of the underlying diseases.

	n (%)
Circulatory diseases	100 (26.92)
Hypertension	51 (12.26)
Arrhythmia	29 (6.97)
Angina pectoris	14 (3.37)
Myocardial infarction	6 (1.44)
Glaucoma	12 (2.88)
Benign prostatic hypertrophy	38 (9.13)
Phaeochromocytoma	4 (0.96)
Diabetes mellitus	32 (7.69)

administration, in particular after 90-120 min, we give glucose tablets to the patients after endoscopy.

Collation of the present survey results revealed that anticholinergic agents were contraindicated in 35% of all subjects and that proportion rose with age. In particular, anticholinergic agents should be avoided in more than 50% of subjects aged 65 years and over. On the other hand, glucagon preparations were contraindicated in 7% of all subjects, and 11% of subjects aged 65 years and over, suggesting that, when choosing an antispasmodic agent for an elderly patient, from the viewpoint of preventing adverse

events it is better to opt for glucagon rather than an anticholinergic agent.

In conjunction with the conducting of this study, we changed from our previous method of oral interview to using a patient questionnaire to assist with the choice of antispasmodic agent. As a result, in 2001 there was a change in the proportions of the different antispasmodic agents administered prior to endoscopy or barium contrast radiography of the GI tract, from 87% anticholinergics and 11% glucagon prior to introduction of the questionnaire to 79% and 21%, respectively, after its introduction. We considered the questionnaire useful in accurately identifying underlying diseases in the respondents, and assisting in the selection of the appropriate antispasmodic agent. In conducting this study, we were also reminded of the unavoidable fact that unpredictable adverse events will occur in a certain proportion of investigations, and that it is important from the risk management aspect to take a careful history and obtain informed consent in advance of the procedure.

Conclusions

The most prevalent underlying diseases requiring consideration in the selection of premedication for

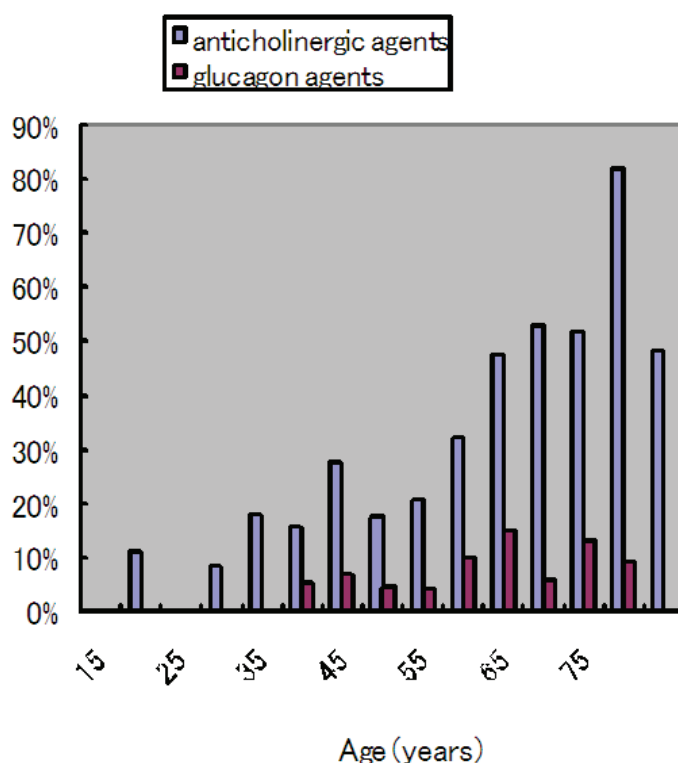
**Figure 3.** Contraindication ratio of antispasmodic agents according to underlying disease.

Table 2. Risk of antispasmodic agents.

Contraindication	Under 65 years	Over 65 years	generation total
Anticholinergic agents	21%	53%	35%
Glucagon preparations	5%	11%	7%

GI investigations are cardiovascular diseases, prostatic hypertrophy and diabetes mellitus. Anticholinergic agents were contraindicated in more than 50% of subjects aged 65 years and over, which was a significantly greater proportion than for subjects aged under 65 years. Using a written questionnaire facilitates the identification of underlying diseases and selection of the appropriate premedication. Overall, risk analysis has enabled better identification of factors that are useful in the fields of informed consent and risk management.

Key Points

- The prevalence of risk-associated underlying diseases increased with age, with anticholinergic agents contraindicated in approximately 50% of subjects aged 65 years and over.
- Anticholinergic agents were contraindicated in 53% of subjects aged 65 years and over, significantly higher than the 21% of subjects aged under 65 years.
- Glucagon was contraindicated in 11% of subjects aged 65 years and over, significantly higher than the 5% of subjects aged under 65 years.
- We changed from our previous method of oral interview to using a patient questionnaire to assist with the choice of antispasmodic agent.
- We considered the questionnaire useful in accurately identifying underlying diseases in the respondents, and assisting in the selection of the appropriate antispasmodic agent.

References

- [1] Sato, K. 2002. Endoscopy for patient of advanced age. In: *Postgraduate Education Committee of the Japan Gastroenterological Endoscopy Society (editors). The Guideline for Gastroenterological Endoscopy*, 2nd edn. Igaku-shoin: Bunkyo, Tokyo. 153–7.
- [2] Kasugai, T., Namiki, M., Honda, T. et al. 1989. The nationwide surveys of investigation-related accidents 1983–1987. *Gastroenterol. Endosc.*, 31:2214–29.
- [3] Kaneko, E., Harada, H., Kasugai, T. et al. 1995. The 2nd nationwide surveys of investigation-related accidents 1988–1992. *Gastroenterol. Endosc.*, 37:642–3.
- [4] Kaneko, E., Harada, H., Kasugai, T. et al. 2000. The 3rd nationwide surveys of investigation-related accidents 1993–1997. *Gastroenterol. Endosc.*, 42:308–13.
- [5] Harada, N., Inoue, M., Yokoyama, T. et al. 1997. Pulse and blood pressure changes during upper gastrointestinal endoscopy: comparison with anticholinergic agents to glucagon. *Diagn. Treatment*, 85:345–52.
- [6] Mort, J.R., Delafuente, J.C. and Odegard, P.S. 2006. Geriatric content in pharmacotherapy and therapeutics textbooks. *Am. J. Pharm. Educ.*, 70:130.
- [7] Faigel, D.O., Eisen, G.M., Baron, T.H. et al. 2003. Preparation of patients for GI endoscopy. *Gastrointest. Endosc.*, 57:446–50.
- [8] British Society of Gastroenterology. 2006. *BSG Guidelines in Gastroenterology: Complications of gastrointestinal endoscopy*. BSG; London. 1–30.
- [9] Quine, M.A., Bell, G.D., McClay, R.F. et al. 1995. Prospective audit of upper gastrointestinal endoscopy in two regions of England: safety, staffing and sedation, methods. *Gut*, 36:462–7.
- [10] Bowles, C.J.A., Leicester, R., Romaya, C. et al. 2004. A prospective study of colonoscopy practice in the United Kingdom today: are we adequately prepared for national colorectal cancer screening tomorrow? *Gut*, 53:277–83.
- [11] Bell, G.D. 2004. Premedication, preparation, and surveillance in “state of the art in gastroenterologic endoscopy: a review of last year’s most significant publications. *Endoscopy*, 36:23–31.
- [12] Teague, R. Clinical Practice Guidelines: Safety and sedation during endoscopic procedures. September 2003. http://www.bsg.org.uk/pdf/word_docs (accessed 10 May 2007).
- [13] Gupta, S.C., Gopalswamy, N., Surkar, A. et al. 1990. Cardiac arrhythmias and electrocardiographic changes during upper and lower gastrointestinal endoscopy. *Military Med.*, 155:9–11.
- [14] Waye, J.D., Lewis, B.S. and Yessayan, S. 1992. Colonoscopy: A prospective report of complications. *J. Clin. Gastroenterol.*, 15:347–51.
- [15] Wexner, S.D., Garbus, J.E. and Singh, J.J. 2001. The SAGES Colonoscopy Study Outcomes Group: A prospective analysis of 13,580 colonoscopies: Re-evaluation of credentialing guidelines. *Surg. Endoscopy*, 15:251–61.
- [16] Froehlich, F., Gonvers, J.J. and Fried, M. 1995. Conscious sedation for gastroscopy: Patient tolerance and cardiorespiratory parameters. *Gastroenterology*, 108:697–704.