Recovery Pattern and Home-Readiness after Ambulatory Gastrointestinal Endoscopy

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Background: *Despite increased use of ambulatory gastrointestinal endoscopy, few data exist regarding patient recovery patterns and home-readiness.*
Objective: *The authors prospectively identified the pattern of home-readiness, the persistent symptoms after procedure and the factors that delay discharge after home-readiness criteria are satisfied.*
Material and Method: *Three hundred and sixty nine patients were scored by the investigator using the Modified Post-Anesthetic Discharge Scoring System (PADSS) every 30 min, commencing 30 min after procedure, until the PADSS score was ≥ 9. The same investigator telephoned each patient 24 hr after discharge to administer a standardized questionnaire so that postoperative symptoms could be identified.*
Results: *The number of patients who satisfied the PADSS home-readiness criteria was 81.6%, 97.9%, and 100% at 30, 60, and 90 min, respectively. All patients were promptly discharged before two hours. After home-readiness criteria were satisfied, 36% of patients had delayed discharge because of the unavailability of immediate escorts or other non-medical reasons. No patient had persistent symptoms and all patients could achieve a PADSS score ≥ 9 three hours after anesthesia. The patients undergoing shorter endoscopic procedures, such as EGD or dilated esophagus were discharged faster than patients undergoing colonoscopy or duodenal stent. The 24 hr postoperative symptoms were mainly sore throat, pain, weakness, and abdominal distension. There was no incidence of unanticipated admission.*
Conclusion: *Periodic objective evaluation of home-readiness revealed that the majority of patients would achieve a satisfactory score on or before 1 hr after procedure. The time to home-readiness by objective evaluation correlated with the type of procedure. Most delays after satisfactory home-readiness scores were reached, were due to non-medical reasons.*

Keywords: *Recovery pattern, Home-readiness, Ambulatory, Gastrointestinal endoscopy*

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Ambulatory surgery accounts for an estimated 65-70% of elective surgical procedures in North America[1]. Thailand has seen a dramatic increase in ambulatory surgery. The parallel advances in minimally invasive surgical techniques, anesthetic agents, and monitoring will continue to increase the popularity of ambulatory surgery together with the economic drive for healthcare efficiency worldwide and increasing public expectation.

Crucial to the future development of ambulatory surgery, however, is the timing of patient discharge, which is dependent on the patient's recovery from general anesthesia or intravenous sedation. There may be medicolegal implications involved in discharge after ambulatory surgery and anesthesia[2]. At the time of discharge from the ambulatory unit, patients should be home-ready: they should be clinically stable and able to rest at home under the care of a responsible adult. However, there is very little information and documentation about the recovery pattern and home-readiness of the ambulatory gastrointestinal endoscopy.

The present study tested the hypothesis that periodic, objective evaluation of home-readiness would reveal that the majority of patients at Siriraj Hospital would achieve a satisfactory discharge score on or

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before 2 hr after the conclusion of GI endoscopic procedure.

Material and Method

The present study was approved by the institutional human ethics committee. The present prospective study was undertaken in 369 consecutive patients undergoing endoscopic examination. The age, sex, weight, ASA class, total duration of the procedure, type of procedure, anesthetic agents and preanesthetic problems were recorded for each patient. All patients received topical pharyngeal anesthesia and/or total intravenous anesthesia.

After undergoing gastrointestinal endoscopy, the patients were transported to the recovery room. Using the Modified Postanesthetic Discharge Scoring System (PADSS; Appendix 1)[3], the investigator scored each patient every 30 min, commencing 30 min after the procedure, until the patient's PADSS score was $\geq$ 9. After the patient obtained the score, the discharge process was begun. It consisted of patients changing into street clothes and being given information about their postoperative care. The time taken to obtain a PADSS score $\geq$ 9 and the time that patients were actually discharged were both recorded. The threshold criterion for delay in discharge was defined as 30 min. The reasons for any delay in discharge more than 30 min after a PADSS score $\geq$ 9 was obtained were noted. Patients who had a PADSS score $\leq$ 9 and postoperative symptoms that prevented their discharge within 3 hr after anesthesia were classified as having persistent symptoms. The reasons for persistent symptoms delaying discharge from the endoscopic unit were documented.

Using a questionnaire, the same investigator documented each patient's postoperative course in a follow-up phone call 24 hr after discharge to detect any delayed complications (Appendix 2)[4].

Statistical analysis

Results were reported as mean $\pm$ standard deviation (SD) or percentage (%) where appropriate. Statistical analyses were Chi's square and Student's T-test. Results were considered significant at $p < 0.05$.

Results

Three hundred and sixty-nine patients (157 men, 212 women), mean age 52.0 $\pm$ 15.3 years (range, 19-89 yr), who underwent ambulatory gastrointestinal endoscopy at Siriraj Hospital were included in the present study. The patients' characteristics are summarized in Table 1.

Appendix 1. Modified post-anesthesia discharge scoring system (PADSS)

Vital signs	
$\pm$ <20% of preoperative value	2
$\pm$ 20-40% of preoperative value	1
$\pm$ >40% of preoperative value	0
Ambulation	
Steady gait/no dizziness	2
With assistance	1
None/dizziness	0
Nausea and vomiting	
Minimal	2
Moderate	1
Severe	0
Pain	
Minimal	2
Moderate	1
Severe	0
Surgical bleeding	
Minimal	2
Moderate	1
Severe	0

The total score is 10, patients' scoring $\geq$ 9 are considered fit for discharge home

The diagnoses were CA colon (23.9%), esophageal stricture (13.3%), lower GI hemorrhage (9.8%), dyspepsia (7.6%), hemorrhoid (6.5%), colonic polyp (5.2%), gastritis (4.1%), corrosive esophagitis (2.7%), gall stone (2.7%), constipation (2.4%), colitis (2.2%), and others (19.6%), respectively.

There were 198 pre-anesthetic problems in 416 procedures. They involved mainly hypertension. Other problems were diabetes mellitus, heart disease; coronary artery disease, respiratory disease; chronic obstructive pulmonary disease, asthma, hematological disease; anemia, neurological disease; cerebro-vascular accident, Parkinson's disease, and others (Table 2).

Almost all of the procedures were carried out under total intravenous anesthesia (80.5%). The rest were topical pharyngeal anesthesia and intravenous sedations (19.5%). The anesthetic duration ranged from 4 to 110 minutes. The mean anesthetic time was 32.5 $\pm$ 14.9 minutes. The details of sedative agents, narcotics and local anesthetics are shown in Table 3.

Clinical monitoring observed by the anesthetic personnel consisted of non-invasive blood pressure, pulse, arterial oxygen saturation and the cardiogram. Gastrointestinal endoscopic procedures were colonoscopy (62.5%), esophago-gastro-duodenoscopy (EGD 20.7%), dilated esophagus (14.7%), and others (2.1%).

Appendix 2. Postoperative evaluation phone call

Date and time of postoperative call		
Problems since discharge :		
Any bleeding significant enough to return to the hospital or to the doctor	( ) yes	( ) no
Sore throat	( ) yes	( ) no
Hoaresness of voice	( ) yes	( ) no
Diarrhea	( ) yes	( ) no
Dyspepsia, abdominal distension	( ) yes	( ) no
Pain at the procedure area	( ) yes	( ) no
Pain at the injection site	( ) yes	( ) no
Pain in other areas	( ) yes	( ) no
Nausea and/or vomiting	( ) yes	( ) no
Headache	( ) yes	( ) no
Very sleepy or difficult to wake-up	( ) yes	( ) no
Feel faint, or lightheaded	( ) yes	( ) no
Any form of generalized discomfort, or weakness	( ) yes	( ) no
Any other complaints		
What medications did you take?		
On a scale of 1 to 0, 0 being no activity and 10 being back to normal activities, where would you rate yourself ?	(Score 0 -10)	
Go back to the emergency room or the hospital	( ) yes	( ) no
Call the doctor since discharge	( ) yes	( ) no

Reason: _____

Any additional comments

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_____

The number of patients who satisfied the PADSS home-readiness criteria at each 30 min interval after procedure was 81.6% of patients at 30 min, 97.9% at 60 min, and 100% at 90 min. The patients undergoing shorter endoscopic procedures, such as EGD or dilated esophagus, were discharged home faster than patients undergoing colonoscopy or duodenal stent. These findings support the hypothesis that periodic objective evaluation of home-readiness would reveal that the majority of patients in the GI Endoscopy Center, Siriraj Hospital would achieve a satisfactory discharge score before two hours after the conclusion of the procedure.

Table 1. Patients' characteristic (n = 369)

Sex	Number	%
Male	157	42.5
Female	212	57.5
Age (yr)		
15-30	54	14.6
31-45	50	13.6
46-60	151	40.9
61-75	95	25.8
> 75	19	5.1
Mean age $\pm$ SD	52.0$\pm$15.3	
ASA physical status		
I	174	47.2
II	168	45.5
III	27	7.3
Weight (kg)		
30-50	124	33.6
51-70	212	57.4
71-90	31	8.4
> 90	2	0.6
Mean weight $\pm$ SD	56.4$\pm$10.9	

All patients were promptly discharged before two hours when their PADSS scores were $\geq$ 9. However, the discharge was delayed after PADSS criteria were satisfied in one hundred and thirty-three patients (36%) because their family were not immediately available. Two patients were discharged at 135 and 150 min after their endoscopic procedures. Postoperative phone interviews revealed no significant difference in the postoperative symptoms experienced by patients in the prompt delayed discharge groups. These findings support the hypothesis that most delays after satisfactory home-readiness scores were reached, were due to nonmedical reasons.

No patient had persistent symptoms and could not achieve a PADSS score $\geq$ 9 3hr after anesthesia. The 24 hr-postoperative symptoms were sore throat (5.7%), pain (2.2%), weakness (1.4%), abdominal distension

Table 2. Preanesthetic problems (n = 369)

	Number	%
Hypertension	82	22.2
Diabetes mellitus	28	7.6
Heart disease	23	6.2
Respiratory disease	19	5.1
Hematologic disease	14	3.8
Neurological disease	10	2.7
Liver disease	4	1.1
Thyroid disease	4	1.1
Renal disease	3	0.8
Others	16	4.3

Table 3. Anesthesia related data (n = 369)

	Number	%
Anesthetic technique		
Total intravenous anesthesia	297	80.5
Topical pharyngeal anesthesia and intravenous sedation	72	19.5
Sedative agents		
Propofol	369	100
Midazolam	350	94.8
Narcotics		
Fentanyl	245	66.4
Pethidine	117	31.7
Local anesthetics		
Lidocaine spray	141	38.2
Lidocaine viscous	99	26.8
Duration of anesthesia (min)		
< 30	128	34.7
30-59	212	57.5
60-89	26	7.0
> 89	3	0.8
Mean duration $\pm$ SD	32.5$\pm$14.9	

Table 4. The 24 hr postoperative symptoms (n = 369)

Symptoms	Number	%
Sore throat	21	5.7
Persistent pain	8	2.2
Weakness	5	1.4
Abdominal distension	3	0.8
Hoarseness of voice	2	0.5
Dizziness	2	0.5
Nausea/vomiting	1	0.3
Headache	1	0.3

(0.8%), hoarseness of voice (0.5%), dizziness (0.5%), nausea/vomiting (0.3%), and headache (0.3%) (Table 4).

Three hundred and fifty-eight (97.0%) patients were successfully interviewed 24 hr after the procedure. Eleven (3.0%) patients were lost to follow up because of inability to contact patients. Two patients (0.5%) had been an emergency visit because of severe abdominal pain. There was no incidence of unanticipated admission.

Discussion

Ambulatory surgery, as it is now commonly practiced, not only involves simple, short surgical procedures on healthy patients, but also lengthier procedures on geriatric and debilitated patients.

Providing adequate sedation and analgesia is an integral part of the practice of GI endoscopy. Selected patients may not require any sedation for certain endoscopic procedures. However, most endoscopic procedures are performed with the patient under intravenous sedation. This is usually accomplished by the use of a narcotic and/or a benzodiazepine[5]. The anesthesiologist must decide the level of sedation that will be required before the procedure.

The present prospective study identified the pattern of home-readiness, the persistent symptoms after ambulatory surgery, and the factors that delayed discharge after home-readiness criteria were satisfied. The authors found that some patients had further delay in discharge after home-readiness criteria were satisfied because escorts were not immediately available or because of other nonmedical reasons.

The safe and expeditious conduct of ambulatory surgical care can be achieved by prudent and timely discharge of patients, which can be achieved when an appropriate tool is used to evaluate each patient's readiness. The discharge scoring system, which the authors use, is simple, practical, and easy to remember. It provides a uniform assessment for all patients, it may have added medicolegal value, and it establishes a routine of repeated re-evaluation of home-readiness.

Symptoms may develop or recur after meeting the criteria but before discharge. It is essential that the use of the scoring system be combined with medical judgment and common sense. Delayed discharge could be due to several factors: unavailable escort, recurrence of symptoms, and persistent adverse symptoms. When home-readiness criteria were satisfied, 36% of patients had delayed discharge because their family was not immediately available. In units with limited space, this can create backlog in the postanesthetic care unit

(PACU) and operating rooms. In addition, if the patient is waiting for his/her escort, nurses have to stay overtime even if the unit is scheduled to close. Ensuring the immediate availability of a companion to accompany patient home and better pain management will ensure a more cost-effective ambulatory surgical unit and avoid any delay in discharge.

Despite the number and variety of tests in use, none had been specifically validated by follow-up studies providing adequate criteria to guide discharge in the ambulatory setting. Many are complex and time-consuming, and they may require special equipment that is not readily available. Many of these tests also suffer from a major drawback: they assess recovery of one part of brain function only, rather than complete recovery of the patient. Patients may be able to complete paper and pencil tests, yet still be in pain or nauseated. Not surprisingly, these tests have not found their way into routine clinical practice. Most centers still rely on clinical criteria for practical discharge decisions[6]. The more complex psychomotor tests, however, are still useful research tools, because they are sensitive to the degree of impaired psychomotor function[7].

Although the duration of stay in the ambulatory surgical unit after surgery may vary with the specific surgical case mix in each unit, the short duration of postoperative stay may reflect the recent advances in anesthesia and surgical care of these patients. In this present study, 97% and 100% of patients were discharged 60 and 90 min after their endoscopic procedures, respectively.

Anesthesiologists experienced in outpatient anesthesia can use their knowledge and experience to decide when a patient has recovered sufficiently for discharge. However, if physicians are to delegate the process, then a well-designed clinical scoring system will provide a reliable guide[8]. Using the Postanesthesia Discharge Scoring System (PADSS)[3], most patients can be discharged within two hours after surgery[4].

Unexpected hospital admission after ambulatory surgery has been used as an index of ambulatory patient morbidity and complications. The reported incidence of unanticipated hospital admission rates varies between 0.1% and 5%[9,10]. The incidence of this admission in the present study was zero (0%). In a case-control study[11] of 9,616 patients undergoing ambulatory surgery, factors associated with an increased likelihood of admission were general anesthesia, abdominal procedures, lengthy procedures, postoperative vomiting, and age. More extensive surgery than anticipated, rather than surgical misadventure, accounted for 63.2% of unanticipated admissions in one study[10]. Pre-existing medical diseases and perioperative complications accounted for 19.9%, anesthesia-related reasons, such as persistent nausea and vomiting and prolonged somnolence, 12.7%, and social reasons, 4.7%.

In the present study, the authors had a success rate of 97% in the postoperative telephone interview 24 hr after discharge. In addition, the phone interview was done only in the daytime. Some patients might be lost to follow-up phone call because they had returned to work. The 24 hr postoperative symptoms recorded were mainly sore throat and pain. The study of Philip BK[12] found 86% of patients reported at least one minor sequel persisting after discharge. Laparoscopy patients experienced significantly more ache, drowsiness, dizziness, sore throat, nausea, and vomiting.

The success and safety of an ambulatory surgery program depends on the patients' understanding and compliance. Patients often forgot verbal instructions or ignore them[13]; for many years, written instructions have been provided. Given the availability of sophisticated information systems, it was perhaps inevitable that these technologies would find their way into patient education. Instructional video presentations have been shown to patients preoperatively. Although those who saw the video claimed that they found it helpful, their knowledge about the perioperative period was not demonstrably better than those who had not seen it[14]. While these developments may have some promise for the future, for the present, written instructions must still be recommended.

The ultimate arbiter of the quality of service in the ambulatory surgery setting is the patient. In general, outpatients have been satisfied with their experience of ambulatory anesthesia and surgery[15]. The most common reasons for dissatisfaction involved inadequate communication between the patient and the medical/nursing staff. Dissatisfaction with anesthesia was also related to the number of postoperative symptoms suffered.

Conclusion

Periodic objective evaluation of home-readiness revealed that the majority of patients are ready to go home one hour after the conclusion of anesthesia and GI endoscopic procedure. The time to home-readiness by objective evaluation was found to correlate with the type of procedure. Further delay in discharge after home-readiness criteria were met, was mostly due

to the unavailability of immediate escorts or other non-medical reasons.

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รูปแบบการฟื้นตัวและความพร้อมก่อนกลับบ้านในผู้ป่วยนอกหลังการส่องกล้องระบบทางเดินอาหาร

สมชาย อมรโยธิน, วิยะดา ชลายนนาวิน, ศิริพร คงพลาย

ภูมิหลัง: *ในปัจจุบันการส่องกล้องระบบทางเดินอาหารแบบผู้ป่วยนอกมีความนิยมและเพิ่มจำนวนมากขึ้น แต่ว่าการศึกษารูปแบบการฟื้นตัวและความพร้อมของผู้ป่วยก่อนกลับบ้านยังมีจำนวนน้อย*

วัตถุประสงค์: *เพื่อการศึกษารูปแบบความพร้อมก่อนกลับบ้าน, อาการและความผิดปกติที่ยังหลงเหลืออยู่หลังจากทำหัตถการและปัจจัยต่าง ๆ ที่ทำให้ผู้ป่วยต้องกลับบ้านล่าช้าทั้งที่มีความพร้อมทุกอย่างแล้ว*

วัสดุและวิธีการ: *ผู้ป่วยทั้งหมด 369 คนได้รับการตรวจสอบและให้คะแนนโดยการใช้ PADSS ทุก ๆ 30 นาที หลังเสร็จจากการทำหัตถการจนกระทั่งได้ค่าคะแนน PADSS $\geq$ 9 หลังจากนั้นประมาณ 24 ชั่วโมง ผู้ประเมินโทรศัพท์สอบถามผู้ป่วยเกี่ยวกับอาการและความผิดปกติหลังจากการทำหัตถการโดยใช้แบบสอบถามที่กำหนดไว้*

ผลการศึกษา: *จำนวนผู้ป่วยที่มีค่า PADSS $\geq$ 9 เป็น 81.6 %, 97.9 % และ 100% ที่เวลา 30, 60 และ 90 นาทีหลังเสร็จจากหัตถการตามลำดับ ผู้ป่วยทุกคนมีความพร้อมสามารถกลับบ้านได้ภายในเวลา 2 ชั่วโมง มีผู้ป่วยร้อยละ 36 ที่มีค่า PADSS $\geq$ 9 แล้วยังไม่สามารถกลับบ้านได้เนื่องจากติดปัญหาเกี่ยวกับผู้มารับและปัญหาอื่น ๆ ที่ไม่ใช่ปัญหาทางด้านการแพทย์ ผู้ป่วยที่มารับการทำหัตถการระยะเวลาสั้น เช่น การส่องกล้องทางเดินอาหารส่วนต้น, การขยายหลอดอาหาร สามารถกลับบ้านได้เร็วกว่าผู้ป่วยที่มาส่องกล้องทางเดินอาหารส่วนปลายหรือการใส่ท่อลำไส้เล็กส่วนต้น อาการที่ยังคงหลงเหลืออยู่ 24 ชั่วโมงหลังทำหัตถการส่วนมากจะเป็นการเจ็บคอ, ปวดบริเวณทำหัตถการ, อ่อนเพลีย และท้องอืด แต่ไม่มีผู้ป่วยที่ต้องกลับมานอนรักษาในโรงพยาบาล*

สรุป: *ผู้ป่วยส่วนมากมีความพร้อมหลังส่องกล้องระบบทางเดินอาหารสามารถกลับบ้านได้ภายใน 1 ชั่วโมง ระยะเวลาจนถึงมีความพร้อมก่อนกลับบ้านมีความสัมพันธ์กับชนิดของการทำหัตถการ สาเหตุที่ทำให้ผู้ป่วยกลับบ้านล่าช้าส่วนมากเกิดจากปัญหาทางด้านอื่น ๆ ที่ไม่ใช่ทางด้านการแพทย์*