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## RECOMMENDATIONS

# Risk management in ambulatory and short-stay gastrointestinal surgery<sup>☆</sup>



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## Introduction

The development of ambulatory surgery is a France national priority. The most recent statistics (2014) revealed that the overall rate of ambulatory surgery (all specialties grouped together) was 44.9% in France [1]. The framework and

indications for ambulatory surgery have been extensively debated in guidelines of Learned Societies [1,2], a report from the High Authority of Health (*Haute Autorité de santé* [HAS]) and National Agency for Support of Performance in Health Care and Medico-social Establishments (*Agence nationale d'appui à la performance des établissements de santé et médico-sociaux*) [3]. These recommendations provide details concerning the indications and organizational characteristics for ambulatory surgery but do not deal with related risk management.

The goal of the 2015 National Meeting of the French Federation of Visceral and Gastrointestinal Surgery (*Fédération de chirurgie viscérale et digestive* [FCVD]) was to analyze the risks related to ambulatory surgery and to establish specific management guidelines based on the National Multi-source Feedback Registry (used for accreditation purposes, also called REX) and the literature.

These recommendations are the combined results of presentations made during their one-day national meeting, discussion with participants, and Jury deliberations within the FCVD.

<sup>☆</sup> Guidelines of the French Federation of Visceral and Gastrointestinal surgery (*Fédération de chirurgie viscérale et digestive* – FCVD), and the Francophone working group for enhanced recovery after surgery (*Groupe francophone de réhabilitation améliorée après chirurgie* – GRACE).

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Of note, parallel to the development of ambulatory surgery, we have seen the emergence of a concept called "enhanced recovery after surgery" (also called in the past, fast-track surgery or rapid or early recovery) that addresses various procedures that are more complex than those performed in ambulatory surgery (so-called major gastrointestinal surgery). The latter involves a complete set of pre-, intra- and postoperative measures that aim to minimize the surgical after effects. One of the advantages of enhanced recovery is that hospital stay can be short, thanks to a specific clinical pathway and multimodality management [4]. The management plan recommended by GRACE (*Groupe francophone de réhabilitation améliorée après chirurgie*), or the Francophone working group for enhanced recovery after surgery, is therefore similar to that for ambulatory surgery. The FCVD decided to appraise the risk management related to these two types of care strategies and to take this beyond the theme addressed during the national meeting. On the other hand, the FCVD considers that ambulatory surgery (without hospital stay), surgery with < 24 h hospital stay, and surgery within enhanced recovery programs are all based on the same principles. Table 1 summarizes these definitions.

The advantages expected to be reaped from short hospital stay depend closely on establishment of rigorous clinical pathways, requiring team work from all participants as well as the active participation of the patient who is the main recipient of the healthcare process. This results in improved quality of healthcare and surgical outcome [3,5]. But these advantages are closely linked with risk management related to this approach and the necessity to set up systemic procedures for the management of these risks.

The risks related to short hospital stay (ambulatory and enhanced recovery programs) should not be superior to those of conventional hospital stay. Table 2 summarizes the respective risks linked to these two approaches.

## Analysis of the REX database for ambulatory surgery

Between March 2009 and March 2014, the REX database encompassed 285 severe adverse events (SAE) associated with healthcare procedures or "adverse patient occurrences" (APOs): 115 were preoperative (40%), 40 were intra-operative (15%), and 130 were postoperative (46%).

**Table 1** English and French definitions of various types of short hospital stay.

English terminology	French terms	Definition
Ambulatory surgery	<i>Chirurgie ambulatoire</i>	Hospital stay < 12 h, the same day
Extended recovery	<i>Séjour d'une nuit</i>	Hospital stay < 23 h, with one night in hospital
Enhanced recovery	<i>Réhabilitation améliorée</i>	Short hospitalization (2–8 days – less than traditional mean hospital stay, according to procedure)

## Preoperative APOs

Preoperative APOs were related to cancellation/re-scheduling (24%), skin prep (21%) or wrong (site) side errors (15%), anticoagulation problems or failure to fast. These APOs resulted in re-scheduling or complete hospitalization in 56% of cases.

## Intra-operative APOs

Intra-operative APOs were essentially wrong operative site (30%), technical (27%) or anaesthetic (20%) incidents. Acknowledged wrong site (side) errors ( $n = 8$ ) were observed essentially in abdominal wall or superficial surgery and resulted either in traditional hospitalization or unplanned re-operation.

## Postoperative APOs

Postoperative APOs consisted of bleeding (19%), pain, light-headedness, falls, urinary retention, or sometimes peritonitis. These postoperative APOs led to re-hospitalization for nearly half of the patients (48%) and traditional hospitalization for 37%.

In all, 45 patients (16%) required an unintended re-operation, essentially for bleeding (40%) or sepsis (including peritonitis) (47%).

## Risk management related to ambulatory and short-stay surgery

It is recommended that surgical units engaged in this surgical approach should develop safety policies and systems of practice analysis (morbidity and mortality conferences, accreditation programs, 360° or multisource feedback committees...), as well as warning systems.

Risk management in this context should follow the same plan: preoperative, intra-operative, postoperative, in-hospital, and post-discharge phases. Organizational measures include respecting surgical indications according to the current recommendations, use of a shared electronic medical record and adherence to a clinical pathway specific for each disease, active patient participation, organization of discharge modalities according to formally established and strictly followed criteria as well as a rigorous post-discharge surveillance program.

**Table 2** Risks specific to short-stay hospitalization.

Risks	Ambulatory or less than 24 h	Enhanced recovery
Cancellation	✓	✓
Failure requiring conventional hospitalization	✓	
Unplanned medical consultation	✓	✓
Unplanned re-hospitalization	✓	✓
Delayed recognition of postoperative complication (failure to rescue)	✓	✓

**Table 3** Organizational prerequisites before the procedure.

Preoperative organizational prerequisites	Stakeholder
Respect of eligibility criteria	A + S
Specific clinical pathway for each procedure	A + S + P
Mutual and shared medical record	A + S + P
Active participation of patient	Patient
Anticipated discharge organization	A + S + P
Surveillance program after discharge	A + S + P

S: surgeon; A: anesthesiologist; P: paramedical personnel.

The technical measures include mini-invasive surgery, management of postoperative pain, nausea and vomiting, prevention of postoperative ileus, prevention of nosocomial infections and thrombo-embolic complications, and nutritional support.

## Prerequisites for the preoperative phase

### Organizational prerequisites (Table 3)

- Respecting the eligibility criteria and validated indications for each type of short-stay surgery. According to the recommendations of Learned Societies [2], many surgical procedures can be performed in the context of short hospital stay (Appendix A); in the near future, others could potentially be added to the list according to outcomes published in the literature but this aspect is outside the scope of this paper.
- The indications for enhanced recovery programs are different; these are well defined in the GRACE recommendations [6] and those of other international societies and pertain to colorectal, esophageal, gastric, liver and pancreatic surgery.
- Creation of and adherence to a formal clinical pathway must be specifically adapted to each disease. All medical and paramedical personnel involved should be involved in formulation of this clinical pathway. The clinical pathways for ambulatory surgery concerning inguinal hernia developed by the FCVD [7], and the enhanced recovery protocols developed by GRACE [6] are two such examples. These clinical pathways should be established, validated and shared by the entire care-provider team (anesthesiologist, surgeon, paramedical personnel and nutritionist). Each stakeholder has a clearly defined role. An information card detailing the clinical pathway and observance of all these medical elements (risks related to the disease or patient), should be created.<sup>3</sup>
- The medical record should be accessible to and shared by each and every stakeholder. This record should contain all the medical elements necessary for admission, scheduling and postoperative surveillance. Use of a standardized and mutually shared electronic medical record is useful for ambulatory surgery as well as enhanced recovery programs. Such a medical record is based on key elements developed conjointly by the FCVD-CFAR-SFAR<sup>\*</sup> and given a seal of approval by the HAS concerning the teamwork

between anesthesiologists, intensive care physicians and surgeons (personal communication).

- The patient must be an active participant in the process and understand the finality and the conditions of this approach, whether for ambulatory surgery or enhanced recovery programs. In addition to the essential elements of direct oral communication with the patient and obtaining of informed consent, a detailed information card should be given to patients. Patient information should help prepare the patients for the various preoperative and postoperative procedures; this will help to avoid cancellations, delays or re-hospitalizations. In this respect, contacting the patient by telephone, messaging [8], or other electronic means, should limit these risks. It is formally recommended that the patient participate actively in the marking of the operative site.
- Discharge organization should be planned according to validated "fit for home" criteria, such as Chung's post-anesthetics discharge scoring system score (PADSS) in ambulatory surgery [9] or the GRACE discharge criteria after enhanced recovery [6] (Table 2). Social criteria of eligibility for ambulatory surgery should also be respected (Table 1).
- A schedule for post-discharge patient surveillance should be established with the patient before the procedure and should include a detailed outline of surveillance procedures (postoperative prerequisites).

### Technical prerequisites

- There are no technical prerequisites specific to ambulatory surgery.
- Perioperative nutritional support should be provided according to current recommendations within the enhanced recovery program. When indicated, such support significantly reduces postoperative morbidity and re-hospitalizations.

## Prerequisites for the intra-operative and in-hospital phases

### Organizational prerequisites (Table 4)

- The operating room safety checklist should be routinely observed because the first and second steps are important in preventing wrong site (side) errors and the third step helps prevent postoperative dysfunction with regard to prescriptions and follow-up. The checklist should be integrated into the shared patient record.
- Discharge from the ambulatory care area should abide by the modified Aldrete criteria [10]. Postoperative prescriptions included in the checklist or prescribed by the medical-surgical team should be provided in the ambulatory surgery unit or in-hospital in the case of enhanced recovery programs.
- For the enhanced recovery program, a postoperative surveillance protocol, based on clinical and biological data (i.e. C-reactive protein) should be applied. The goal of this protocol is to enable detection of an eventual complication early in the postoperative course. Patient discharge is authorized only after these elements have been verified (Table 2).
- Concerning the active participation of the patient as the principal actor of care in enhanced recovery programs, it is recommended that patients be given a "log book" in which they record information about their ambulation,

<sup>3</sup> FCVD: French Federation of Visceral and Gastrointestinal Surgery; CFAR: Collège français des anesthésistes réanimateurs; SFAR: Société française d'anesthésie réanimation.

**Table 4** Organizational prerequisite during hospital stay.

Organizational prerequisites during hospitalization	Stakeholders
Safety checklist in the operation room	A + S + P
Discharge from post-interventional room according the Aldrete score	A + P
Validated mutual postoperative surveillance protocol (CRP)	A + S + P
Active participation of patient (log book)	Patient
Discharge criteria (PADSS or PADSS modified for ambulatory surgery and clinical and laboratory criteria for enhanced recovery)	A + S + P
Post-discharge surveillance	A + S + P

PADSS: post-anesthetic discharge scoring system; S: surgeon; A: anaesthesiologist; P: paramedical personnel.

symptoms (pain, nausea/vomiting, bowel movements), and feeding. Patients greatly appreciate this logbook, which also allows the care-provider team to reduce their workload while obtaining pertinent information about the patient.

- For ambulatory surgery, patient discharge is authorized by one of the members of the medical/surgical teams after verification of the validated discharge criteria.
- According to the combined recommendations of the HAS, ANAP and SFAR, medical and surgical prescriptions should be signed only at the time of discharge.
- Discharge requirements correspond to the rules established conjointly by the HAS, ANAP, and SFAR.

**Technical prerequisites (Table 5)**

- Minimally invasive surgery is recommended whenever possible, in accordance with the current best practice rules specific to the disease being treated.
- A pre-established and shared protocol for pain control is recommended. This protocol should be multi-modal, associating general analgesia with loco-regional and/or local anesthesia in order to minimize the use of opiates.
- The medical and surgical team should establish similar protocols for antibiotic prophylaxis, thrombo-embolic prophylaxis and prevention of nausea, vomiting and postoperative ileus, in agreement with the current recommendations of the Learned Societies and evidence-based data [11].

**Table 5** Technical prerequisites during hospital stay.

Technical prerequisites during hospital stay	Stakeholders
Minimal invasive surgery	S
Pain control protocol	A + P
Antibiotic prophylaxis, thrombo-embolic prophylaxis, prevention of nausea and postoperative ileus protocols	A + P

S: surgeon; A: anaesthesiologist; P: paramedical personnel.

**Table 6** Organizational prerequisite after patient discharge.

Organizational prerequisites after discharge	Stakeholders
Next-day call (formalized in checklist)	P
Surveillance by messaging with routine warning if anomaly on D1 for ambulatory surgery and D1 + D3 = D5 for enhanced recovery	A + S
Follow-up surgical consultation in case of enhanced recovery	S
Establishment of care network with family physician	A + S + P

S: surgeon; A: anaesthesiologist; P: paramedical personnel.

**Prerequisite for the post-hospitalization phase**

**Organizational prerequisites (Table 6)**

It is essential, within the framework of risk management, to establish protocols for continuous and vigilant surveillance, specifically adapted to each type of surgery. As the major participant in this modality of healthcare, the patient is an essential part of this surveillance. However, post-discharge surveillance is under the combined responsibility of the surgeon and anaesthesiologist (each within their domain of competency) and everything possible must be done to facilitate contact between the patient and healthcare team (information card, telephone numbers for 24/7 contact). In all cases, it is recommended that a written post-hospitalization surveillance protocol, approved by all care-providers, be made available.

- Next-day availability is essential for risk management in ambulatory surgery as well as within the framework of enhanced recovery programs.
- Telephone availability should be routine and formalized in a checklist established by the health care facility. This can be done by the paramedical team and transmitted to the primary care physician.
- A messaging system (such as SMS) can replace the telephone call, according to rules set up by the medical team with targeted questions and an information card provided to the patient during the preoperative visit that clearly explains the procedure. An added value of an integrated shared electronic health record is the ability to filter the responses so that anything abnormal would automatically trigger an appropriate electronic message to the medical team.
- In case the ambulatory structure cannot ensure the continuity of care, they must be responsible to make arrangements with another healthcare facility (public or private) having the necessary specialized units (intensive care) and the ability to receive these patients 24/7.
- In ambulatory surgery, a postoperative follow-up visit is not always routinely practiced. For enhanced recovery, program the interval between surgery and postoperative consultation should be adapted to the type of surgical procedure.

- For enhanced recovery program, governing bodies should approve the protocols and organize the professional networks necessary for continuity of care.

### Technical prerequisites

- Within the framework of enhanced recovery program, continuous surveillance after discharge by use of messaging modalities (such as SMS) is recommended, for example, on D1, D3 and D5 [8].
- Other systems for follow-up, such as Internet, and tele-monitoring are currently under investigation and evaluation.
- At the least alert, the responsible surgeon should see the patient, in order to eliminate (or confirm) any potential postoperative complication and manage it promptly and appropriately.

### Disclosure of interest

The authors declare that they have no competing interest.

### Appendix A. Eligibility for ambulatory gastrointestinal surgery

Eligibility criteria according the 2012 HAS recommendations [3] updating the 2009 *Société française d'anesthésie et de réanimation* (SFAR) recommendations.

- ASA grades I–III
- Patient willing to accept this type of care
- Patient with capacity of being accompanied home by a responsible adult and if necessary during one night after surgery
- Accompanying person having understood the postoperative care plan and accepting this responsibility
- Possibility of contacting the care facility (telephone)
- Duration of transportation and distance between home and care facility are not exclusion criteria
- Establishment of convention between different care facilities for postoperative management if necessary
- Respecting surgical indications as validated by Learned Societies

Indications for ambulatory surgery according the recommendation of Learned Societies in 2011 [2].

Procedure	Grace recommendations
Laparoscopic fundoplication	C
Laparoscopic cholecystectomy	A
Abdominal wall hernia	B–C
Bariatric surgery	B–C
Proctology	C
Laparoscopic appendectomy	C
Creation or closure of stoma	C
Thyroidectomy	C
Parathyroidectomy	C
Laparoscopic adrenalectomy	C

### Appendix B.

PADSS « fit for home » score in ambulatory surgery [9]; patient discharge is authorized for a score  $\geq 9$ .

Signs	Score	Definitions
Vital signs (blood pressure, pulse, respiration)	2	< 20% difference from preoperative values
	1	20–40% difference from preoperative values
	0	> 40% difference from preoperative values
Ambulation	2	Steady AND without light-headedness
	1	Steady OR without light-headedness (with assistance)
	0	Not steady and with light-headedness
Pain, nausea and/or vomiting	2	Minimal
	1	Moderate
	0	Severe
Surgical bleeding	2	Minimal
	1	Moderate
	0	Severe
Feeding	2	Oral fluids and passing flatus
	1	Oral fluids or passing flatus
	0	No oral intake

Criteria for discharge for enhanced recovery programs [6].

- Pain controlled by oral analgesics
- Intra-venous line removed
- Feeding: solid food
- Intestinal activity at least for passing flatus
- No signs of infection: temperature < 38 °C, leukocyte count < 10,000 WBC/mL, CRP < 12 mg/dL, pulse < 120/min (for bariatric surgery)
- Patient accepting discharge
- Re-hospitalization possible (from organizational standpoint) in case of complication

Modified Aldrete Score [10] for discharge from post-anesthesia recovery room.

Signs	Score	Definitions
Motor activity	2	Able to move all four extremities
	1	Able to move two extremities
	0	No movement
Respiration	2	Deep respiratory movements + coughing
	1	Limited breathing or dyspnea
	0	Absence of spontaneous breathing

## Appendix B (Continued)

Signs	Score	Definitions
Circulation	2	Systolic blood pressure < 20% different from preoperative values
	1	Systolic blood pressure 20%–50% different from preoperative value
	0	Systolic blood pressure > 50% different from preoperative value
Conscience	2	Completely awake
	1	Answers if called by name
	0	Does not answer if called by name
Coloration	2	Normal or pink
	1	“Abnormal” coloration without frank cyanosis
	0	Frank cyanosis
SpO <sub>2</sub>	2	SpO <sub>2</sub> > 92% breathing room air
	1	SpO <sub>2</sub> > 90% with supplementary O <sub>2</sub>
	0	SpO <sub>2</sub> < 90% despite supplementary O <sub>2</sub>

## References

- [1] [www.chirurgie-ambulatoire.org](http://www.chirurgie-ambulatoire.org).
- [2] Kraft K, Mariette C, Sauvanet A, et al. Indications for ambulatory gastrointestinal and endocrine surgery in adults. *J Visc Surg* 2011;148:69–74.
- [3] [www.has-sante.fr/portail/upload/docs/application/pdf/2012-04/rapport\\_-\\_socle\\_de\\_connaissances.pdf](http://www.has-sante.fr/portail/upload/docs/application/pdf/2012-04/rapport_-_socle_de_connaissances.pdf).
- [4] Kehlet H, Wilmore DW. Evidence-based surgical care and the evolution of fast-track surgery. *Ann Surg* 2008;248:189–98.
- [5] Keenan JE, Speicher PJ, Nussbaum DP, et al. Improving outcomes in colorectal surgery by sequential implementation of multiple standardized care programs. *J Am Coll Surg* 2015;221:404–14.
- [6] [www.grace-asso.fr](http://www.grace-asso.fr).
- [7] [www.chirurgie-viscerale.org/societe/fc vd/documents/Officiels/index.phtml](http://www.chirurgie-viscerale.org/societe/fc vd/documents/Officiels/index.phtml).
- [8] Gordon CR, Rezzadeh KS, Li A, et al. Digital mobile technology facilitates HIPAA-sensitive perioperative messaging, improves physician-patient communication, and streamlines patient care. *Patient Saf Surg* 2015;9:21.
- [9] Chung F, Chan VW, Ong D. A post-anesthetic discharge scoring system for home readiness after ambulatory surgery. *J Clin Anesth* 1995;7:500–6.
- [10] Aldrete JA. The post-anesthesia recovery score revisited. *J Clin Anesth* 1995;7:89–91.
- [11] [www.sfar.org/article/207/prise-en-charge-anesthesique-des-patients-en-hospitalisation-ambulatoire-rfe-2009](http://www.sfar.org/article/207/prise-en-charge-anesthesique-des-patients-en-hospitalisation-ambulatoire-rfe-2009).