

NARRATIVE REVIEW

AMBULATORY ANESTHESIA

Quality assessment tools for early postoperative recovery in day surgery patients

Janvier Nibaruta¹, Lv Xingjiao², Han Xiaoxia³, Hou Xiaoyu⁴, Cao Xuefen⁵,
Leng Yufang⁶

Author affiliation:

1. Janvier Nibaruta, The First School of Clinical Medicine, Lanzhou University, Lanzhou, 730000 China; E-mail: nibarutajanvier@gmail.com; ORCID: [0000-0002-9932-4990](https://orcid.org/0000-0002-9932-4990)
2. Lv Xingjiao, The First School of Clinical Medicine, Lanzhou University, Lanzhou, 730000 China; E-mail: 292904143@qq.com
3. Han Xiaoxia, The First School of Clinical Medicine, Lanzhou University, Lanzhou, 730000 China; E-mail: 2020987404@qq.com
4. Hou Xiaoyu, The First School of Clinical Medicine, Lanzhou University, Lanzhou, 730000 China; E-mail: [houxy20@lzu.edu.cn](mailto:houxu20@lzu.edu.cn)
5. Cao Xuefen, The First School of Clinical Medicine, Lanzhou University, Lanzhou, 730000 China; E-mail: caoxf20@lzu.edu.cn
6. Leng Yufang, The First School of Clinical Medicine, Lanzhou University and Department of Anesthesiology, the First Hospital of Lanzhou University, Lanzhou, 730000 China; E-mail: lengyf@lzu.edu.cn

Correspondance: Prof. Leng Yufang, Ph.D., Lanzhou, Gansu, China. Tel: +86-177-9317-5611, E-mail: lengyf@lzu.edu.cn

ABSTRACT

From the patient's perspective, medical personnel must assess the patients' recovery reliability in case of day surgery patients. Rather than focusing solely on clinical recovery indicators, it should consider the patient's pain, physiological, psychological, and social function, and quality of life, etc. Due to the return of day surgery patients to their homes following surgery, the doctors and the nurses require discrete observation and guidance. As a result, paying attention to the quality of recuperation following surgery of patients has critical clinical guiding significance. This guidance effectively pays attention to patient recovery, assists medical staff in taking some effective interventions for the quality of postoperative recovery of patients, and promotes high-quality nursing development. This review discusses the commonly used tools for postoperative evaluation in day surgery patients regarding pain assessment, quality of early postoperative recovery, and the quality of life. It examines some evaluation tools for their validity and application status in China and elsewhere. The clinical practice affects direct clinical personnel in evaluating the post-surgery quality of people undergoing daycare procedures.

Keywords: Day surgery; Assessment tools; Pain; Postoperative recovery; Quality of life

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1. INTRODUCTION

Enhanced recovery after surgery (ERAS) aims to reduce patient anxiety and postoperative complications and enhance surgical outcomes and early functional restoration after serious surgery. It depends upon minimally invasive technology, development of rapid anesthesia techniques, use of specific drugs and specialized equipment.¹ The ERAS protocols for various surgical procedures such as colorectal, breast, abdominal, and emergency orthopedic interventions include peri-operative guidance, feeding practices, and alternative

anesthesia and pain control approaches.² It has been demonstrated to reduce complications,³ shorten the duration of stay,⁴ and improve pain scores postoperatively.⁵ Day surgery can improve the efficiency of medical services, reduce service costs, and to a certain extent, solve the social problems of 'difficult to see a doctor', 'expensive to see a doctor', and 'late surgery'. Early recovery allows the patients to return home after the operation. As a result, the quality of post-surgical recovery is a health outcome that patients and healthcare providers are concerned about.⁶ It requires meticulous

peri-operative care, and efficient clinical nursing for day surgery patients. Accurate and reliable postoperative assessment tools are essential for day patients. Many studies exist on day surgery patients' postoperative recovery quality assessment tools.^{7, 8} At the same time, in China the postoperative recovery of day surgery patients needs more attention. Therefore, this review can be used to develop a postoperative recovery quality assessment scale for day surgery patients and provide a basis for clinical staff to measure the quality of postoperative recovery.

2. BASIC CONCEPTS

2.1. Concept of day surgery

The advantages of the day surgery include; fast turnout of patients, saving of medical costs, and the reduced average length of hospitalization. The role of patients, the hospitals, the healthcare staff and the society has reached a consensus in many advanced countries. To advocate for medical institutions to carry out daily surgery, in 2013, the Health and Family Planning Commission established the China Ambulatory Cooperation Alliance (Chinese ambulatory surgery alliance CASA).⁹ According to the national conditions, a day surgery refers to the patient's planned surgery or operation within one day (24 h), excluding outpatient surgery.¹⁰ In special cases, the hospitalization needs to be postponed, but the maximum length of hospitalization is at most 48 h. According to the different operation modes of different medical systems and different understandings of day surgery, America, the United Kingdom, and other nations have proposed different concepts.¹¹ However, they all follow the core concepts of day surgery, such as efficiency, convenience, and benefit.

2.2. General principles

Preoperative, intra-operative, and postoperative enhanced recovery protocol (ERP) is the most common classification. The overarching philosophy underpins everything. In addition to the standard precautionary measures, ERP's goal is to use various medical and surgical techniques to minimize the addictive and dangerous effects of surgical intervention, permitting patients to recover early under optimal conditions.¹² More than an authored timeline is required to correctly adopt an ERP in daily practice. A structured organization and the involvement of multiple healthcare stakeholders are required for success.¹³

2.3. The concept of postoperative recovery quality

There is no unified standard for this concept in domestic and international literature;¹⁴ Korolija et al. believe that

the quality of postoperative recovery is, 'whether the patient achieves the preoperative state or a better one'.¹⁵ Borrell-Vega et al. believe that the quality of postoperative recovery varies according to the patient's health level, anesthesia, surgical methods, and potential postoperative complications.¹⁶ As the postoperative recovery of day surgery patients is not carried out under the guidance of medical staff, it remains a challenge to evaluate the postoperative recovery of patients continuously. We need a unified consensus on indicators to explain the postoperative recovery of patients.¹⁷ As a result, some studies suggest that medical staff should assess the postoperative recovery quality of day surgery patients from the patient's perspective, paying attention to the patient's pain, physiological, psychological, and social function, the quality of life (QoL), and so on; rather than focusing solely on the patient's physiological indicators.¹⁸ Due to the minimally invasive surgery and short-acting anesthesia techniques used in day surgery patients, some studies have confirmed that performing day surgery leads to reduced incidence of postoperative complications and postoperative readmission rates.¹⁹ Therefore, in the concept of postoperative recovery quality after day surgery, postoperative complications are less regarded as key evaluation indicators, and more emphasis is placed on patients' life satisfaction and early health status.

2.4. Perioperative nutrition in ERAS

No matter how minor it may be, every surgical procedure induces post-surgery insulin resistance (PIR), a metabolic stress response. Insulin resistance after surgery is a surgical stress indicator linked to higher death rates and prolonged hospital stay. Insulin resistance worsens when a patient is operated upon after long-lasting preoperative fasting or delayed post-surgical feeding. To modulate PIR, the ERAS guidelines include anesthetic, surgical, kinesiology, nutritional, and nursing interventions.²⁰ Peri-operative nutritional interventions in the ERAS protocols are centered on avoiding extended preoperative skipping food through oral carbohydrate loading up to 2 h before surgery, followed by early postoperative feeding via the nasogastric tube.²¹ These peri-operative adaptation strategies efficiently decrease complications and postoperative stay in patients with well-controlled type 2 diabetes. However, implementation and compliance should be improved. As a result, we must continue to work to improve our patients' peri-operative nutritional management to achieve the best possible postoperative recovery.²²

2.5. Pain management

Pain management is a critical issue in ERAS guidelines. While opioid medication is still a major part of post-surgical pain management, it has several adverse side

effects, including delayed gastrointestinal tract function, respiratory depression, and postoperative nausea and vomiting.²³ Non-opioid systemic analgesics, and regional and neuraxial techniques, have been reported to improve pain control, while reducing opioid use. When part of an ERAS protocol, multimodal and preventive pain control promotes early mobility and digestive function while decreasing postoperative death rates.²⁴

2.6. Factors influencing the adoption of the enhanced recovery program.

Variables related to patient or near relatives, human natural resistance to change, fear of innovation, the belief that skipping dinner the evening before intervention is essential, the anxiety of feeding before the return of bowel activity, fear of early ambulation, fear of discharge from hospital too quickly, and worry of financial constraints on medical services, are all factors to consider.²⁵

2.7. Factors influencing the duration of stay

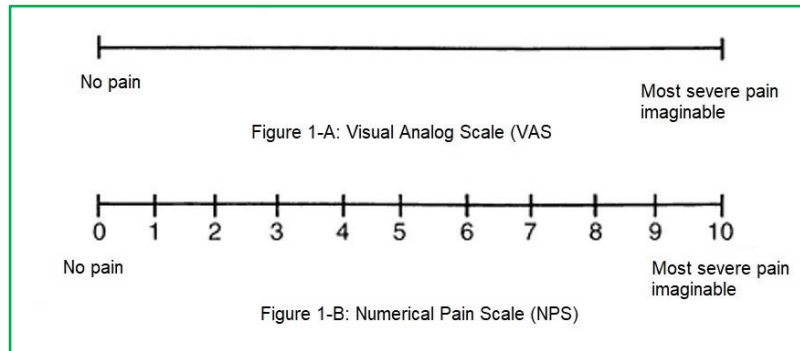
The following patient characteristics affected the hospital stay: age more than 60 y, an ASA class of II or higher, the development of adverse reactions, and the failure to discharge patients after functional recovery. All of these were widely correlated with a longer length of stay in a study by Maessen et al.¹³ Pain, organ failure, nausea and vomiting, ileus, hypoxemia, fatigue, and immobilization are frequently reported postoperative serious side effects influencing recovery.²⁶ Female gender, prolonged operative duration, a higher volume of infusions, intubation, spinal anesthesia, peri-operative opioid use, non-depolarizing muscle relaxants, and a longer preoperative waiting time, were all significant predictors.²⁷

3. Pain assessment, quality of postoperative recovery and the QoL

3.1. Day Surgery Pain Assessment Tool

3.1.1. Visual Analog Scale (VAS)

The visual analog scale (VAS) is simple and effective in clinical use and is more common for postoperative pain assessment of day surgery patients. The scale is the most commonly used pain assessment tool in patients on the first day after surgery.²⁸ Clarke & Spear built the first VAS in 1964.²⁹ The VAS is composed of 10 cm straight



line. The patient is asked to point where his or her pain falls at that moment (Figure 1-A). The pain score is: 0 = no pain; 1–3 points = there is mild pain, but it is tolerable; 4–6 points = pain interferes with sleep, but is tolerable; 7–10 points = the pain is intense and intolerable, and it harms appetite and sleep. A higher value indicates that the pain is more intense. VAS's intra-group correlation coefficient (ICC) ranged between 0.97 and 0.99, indicating high reliability and repeatability. The availability of a suitable and reliable pain measure, such as the VAS, that can address its sensory component provides accurate information about the pain experience and thus improves its overall management in day surgery.³⁰ Therefore, due to its high reliability, this scale is commonly used for pain assessment in these patients.³¹

3.1.2. Numerical Rating Scale (NRS)

A numerical rating scale is an assessment tool developed in 1978 by Downie.³² NRS is among the most widely and frequently used postoperative assessment tools, and it should be used extensively in patients undergoing day surgery to achieve satisfactory results.³³ This scale is a subjective assessment tool for patients that divides a straight line into 10 segments; 1–3 for minor pain, 4–6 for moderate pain, and 7–10 for extreme pain (Figure 1-B). This evaluation tool is more common in day surgery patients in many countries,^{34,35} and this scale has been applied to the clinical evaluation of day surgery patients in China.³⁶ The meta-analysis found that the three scales, NRS, VAS, and VRS, are acceptable, credible, and suitable for healthcare settings, with the VAS being the most difficult. The NRS has good sensitivity in general and generates data that can be analyzed for audit purposes.³⁷

3.1.3. The Verbal Rating Scale (VRS)

The verbal rating scale is a collection of adjectives that indicate the severity of pain. No pain, mild, moderate, and severe or intense pain is the most frequently used words. These adjectives have numbers appointed to them for the convenience of documentation. These rank numbers may give the incorrect impression that the intervals between each parameter are equal, but that is

different,³⁸ and may become a source of error. In Chinese day surgery, however, the VRS was used to assess postoperative pain, which was associated with increased postoperative nausea and vomiting, resulting in a longer length of stay.³⁹

3.1.4. Wong-Baker facial expression scale (WBFPS)

Donna Wong and Connie Morain Baker created the facial expression scale.⁴⁰ This scale uses 6 facial expressions to describe the pain and requires patients to choose an expression that can appropriately express their pain level during the assessment, ranging from 1, a smiling face denoting no pain, to 6, a crying face denoting severe pain.⁴¹ This scale primarily assesses pain in the presence of cognitive impairment, difficulty with expression, and pain after delivery. In patients undergoing day surgery, it is mainly used in stomatology to evaluate the pain within the 12th h after surgery,^{42, 43} and more clinical practice for further research has been conducted in various domains.^{44, 45}

3.1.5. Children's pain behavior scale (FLACC)

The FLACC (Face, Leg, Activity, Cry, and Consolability) scale includes facial expression, body movements, activity state, crying degree, and comfort degree. It contains five behavioral indices (face, legs, activity, cry, and controllability). Each measurement was assigned a rating between 0 and 2 for an overall score between 0 and 10. Initially designed for children aged 0 to 7 y,⁴⁶ with many bed research displays, for 0–16 y old children also have good reliability and validity.⁴⁷ The scale was localized into the Chinese version in 2012 and has good reliability,⁴⁸ and Cronbach's α of the Chinese FLACC scale was measured to be 0.85. The scale was used to evaluate the pain 48 h after day surgery and showed that the day surgery patients aged 2 months to 7 y had good stability and reliability but still needed much clinical practice to verify the credibility, validity, and repeatability of the scale in the use of day surgery patients.⁴⁹ An observational study of Shobha's findings supports the FLACC as a pain scale in children with memory decline.⁵⁰

3.1.6. Faces Pain Scale-Revised (FPS-R)

The faces pain scale was developed for pediatric needs, but it has since been proven valid and reliable in adults and older adults too.⁵¹ Jensen found that adults favored the FPS or the NRS.⁵² Non-demented older adults completely understood the purpose of the FPS. This is significant because self-reporting and general language issues make assessing mentally impaired individuals difficult.⁵³ Anecdotal evidence suggests that the FPS is appropriate for cognitively impaired and end-of-life nonverbal individuals because it does not require

extensive-expression through reading, writing, or energy. Both cognitively impaired and cognitively intact older adults and clinical staff preferred the FPS for its ease of use. The findings of Li and colleagues show that, while Chinese adults can report pain intensity using all four scales, the FPS-R is the best. It is recommended that tool options be made available to address individual needs or preferences.⁵⁴

3.2. Day surgery postoperative recovery assessment tool

3.2.1. Quality of Recovery-40 items (QoR-40)

The recovery quality score is a 40-item survey of the recovery with five dimensions: comfort, emotion, patient support, physical autonomy, and pain.⁵⁵ QoR-40 is the most commonly used postoperative recovery quality assessment scale in China and abroad. Chinese researchers found that the QoR-40C demonstrated good reliability, validity, and responsiveness. Thus, it is suitable as a quality-of-life measurement questionnaire for patients following surgery in China.⁵⁶ The internal consistency coefficient of QoR-40 was 0.93, the half-fold reliability was 0.83, and the responsiveness was 0.65.⁵⁷ This scale has been translated into multiple versions and is widely used to assess the quality of post-surgery recovery in patients experiencing elective, day, or outpatient surgery. QoR-40 is frequently used to evaluate patients within 24 h of day surgery, but it is also used in 72 h, one month, and so on.⁵⁸ However, no unified standard for evaluating the time-of-day surgery and more reliable evaluation results have been obtained. Due to the large number of entries on the scale, the clinical application takes a long time, and the clinical feasibility needs improvement.

3.2.2. Quality of Recovery-15 items (QoR-15)

The quality of recovery after anesthesia is a powerful determinant of patients' post-operative well-being.⁵⁹ QoR-15 screened out the most representative 15 entries and developed a simple version of QoR-15 based on retaining the five dimensions of the QoR-40 scale.⁶⁰ Stark developed the 15-item quality of recovery scale as a simplified version of the QoR-40.⁶¹ Lin Yuxuan⁶² of China first Sinicized and interpreted the QoR-15 in Chinese in 2014, tested the Chinese version, and confirmed that the index has high reliability, validity, and clinical practicalities in a Chinese population. Ning et al.⁶³ and Chazapis et al.⁶⁴ used this scale in day surgery patients and measured the quality of early postoperative recovery in such patients. QR-15 is more widely used in clinical practice and application than QR-40 in evaluating day surgery patients because it is simpler and more efficient. This scale's effectiveness and practicality have been validated in the evaluation of day surgery

patients both in China and abroad. It might be an extra accurate, efficient, and simple-to-use scale than PQRS.⁶⁵

3.3. Assessment tools for postoperative QoL for day surgery

The World Health Organization estimates QoL as a subjective experience from one's position in life in the context of one's culture, objectives, expectations, and concerns.⁶⁶ This concept's complexity and subjectivity make it difficult to evaluate and even more difficult to measure it appropriately. Knowing QoL is critical to enhancing patient remission, care, and resettlement. Dilemmas revealed by patients' self-reported QoL may lead to changes and advancements in treatment and care or show that some treatment methods are ineffective. QoL also identifies a variety of issues that patients may face. This data can be shared with future patients to help them understand and anticipate the implications of their treatment.⁶⁷

3.3.1. European five-dimensional health quality scale (EQ-5D)

The European Quality of Life Group (Euro-QoL Group) was established in 1987 as a multinational, and multi-professional network of researchers from seven centers in Norway, the Netherlands, Sweden, the United Kingdom, and Finland.⁶⁸ The European five-dimensional health scale is the most widely applicable scale to evaluate the postoperative QoL of day surgery patients, which can evaluate the QoL of patients after surgery and provide the most objective health test results. The Euro-QoL Group created EQ-5D, and its health evaluation process includes action, self-care, daily life, pain/discomfort, and anxiety/depression.⁶⁹ The Likert 5-level scoring method is used for each dimension, *without difficulty, minor difficulty, reasonable difficulty, severe difficulty, and extreme difficulty/inability*.⁶⁹ In 2016, China developed an EQ-5D scale based on Chinese group preference concerning EQ-5D content and achieved a good utility value, and the measured health utility value was -0.391.⁷⁰ Because the EQ-5D scale directly measures patients' subjective feelings, it is concise, easy to operate, and highly reliable. It has high reliability and operability in evaluating day surgery patients' postoperative QoL. Therefore, evaluating day surgery patients' postoperative QoL has clinical nursing application value. The EQ-5D was thus advanced to describe every aspect on a five-level scale, roughly matching to no, minor, moderate, severe, and the most severe deficiencies. The EQ-5D-5L is the name of the new version.⁷⁰ EQ-5D-5L value sets by several countries have been published⁷¹⁻⁷³, and others are coming. The Chinese version of the EQ-5D-5L interpretation system has shown some benefits.⁷⁴

3.3.2. Brief Health Questionnaire (short-form health survey, SF-36)

The SF-36 scale has indicators and 36 items. The higher the SF-36, the better the QoL. The SF-36 is a multi-item scale that measures eight different aspects of health: 4) pain in the body; 5) psychological distress and well-being; 6) limitations in usual role activities due to emotional problems; 7) vitality; and 8) general health perceptions.⁷⁵ SF-36 is a widely used universal scale, applied to the quality-of-life assessment of patients with a variety of diseases, all of which show good reliability and validity, Such as in hypertension, diabetes, chronic renal failure, heart valve patients' postoperative quality-of-life assessment, etc. SF-36 also has important application value in day surgery patients, and some researchers have applied this scale to the evaluation of day surgery patients, which has confirmed its high applicability and effectiveness, but because the SF-36 scale is still less in clinical research in day surgery patients, a large number of studies are needed to verify the practicality and reliability of this scale in these patients.⁷⁶

3.3.3. Post-operative Quality of Recovery Scale (PQRS)

Post-operative quality of recovery scale (PQRS) received preliminary validation and feasibility in 2010.⁷⁷ The PQRS cognitive tests are simple to administer and take about 3 min on an average, and they do not require the assistance of a specially trained neuropsychologist. Except for orientation, the tests show a consistent pattern of recovery up to the day 3 evaluations.⁷⁸ It monitors multiple recovery domains in sick people of different ages, languages, and traditions, from the immediate to the long term. It is broken down into six categories: *physiologic, nociceptive, emotional, daily living activities, cognitive, and overall patient outlook*.⁷⁹

4. PROBLEMS AND ENLIGHTENMENT

We only searched PubMed and GeenMedical, and there may have been gaps in our searches. There need to be more uniform standards for the concept of postoperative recovery quality, which should be clearly explained in future research. Because day surgery is still in its infancy in China, few studies have been conducted on the post-surgery recovery quality of day surgery patients. Only a few scales were discovered to assess the quality of postoperative recovery in patients undergoing surgical procedures. More research is being done on the quality of post-surgery recovery in patients who have day surgery in other countries. Some evaluation tools, however, still require extensive clinical practice to

validate their reliability and reproducibility in evaluating day surgery patients. In China, more tools need to be evaluated to assess the quality of postoperative recovery of day surgery patients. An assessment tool for this group of people can be designed to understand better the quality of postoperative recovery in China.

5. CONCLUSION

Only a few studies are available regarding how to enhance the efficiency of postoperative recovery of day surgery patients in China. To use pain-rating scales effectively, clinicians must be aware of the tool's potential for error and their ability to provide the necessary information. Data interpretation from a pain-rating scale is easier than it appears. There is no unified standard for defining postoperative recovery quality, and foreign researchers assess the postoperative recovery quality of patients undergoing day surgery from various perspectives. However, except for QoR-15 and QoR-40, the mature clinically researched tools, the rest of the scales still require extensive clinical practice. Given the scarcity of rehabilitation assessment tools in China, future research should focus on developing measurement tools suitable for day surgery patients in China based on foreign assessment tools and then analyzing the impact of such tools in medical practice.

6. Conflict of interest

No conflict of interest declared by the authors.

7. Authors' contribution

JN: Conception, drafting and writing of the manuscript, literature research

LXJ, HXX: Literature research, manuscript editing

HXY: Drafting of the work, literature research

CXF: Manuscript reviewing and revising

LYF: Critical revision and approval

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