

Assessment Of Post-Anaesthesia Recovery Using Modified Aldrete Score And Fast-Track Criteria: A Comparative Study

Vidhiya R.S¹, U.G. Thirumaaran², Sivatharshini P³, Manisha Kajla⁴

¹Post Graduate, Department of Anaesthesiology, Meenakshi Medical College Hospital & Research Institute, MAHER University, Kanchipuram

²Professor and Head, Department of Anaesthesiology, Meenakshi Medical College Hospital & Research Institute, MAHER University, Kanchipuram

³Associate Professor, Department of Anaesthesiology, Meenakshi Medical College Hospital & Research Institute, MAHER University, Kanchipuram

⁴Post Graduate, Department of Anaesthesiology, Meenakshi Medical College Hospital & Research Institute, MAHER University, Kanchipuram

Corresponding Author: Dr. Vidhiya R.S, Post Graduate, Department of Anaesthesiology, Meenakshi Medical College Hospital & Research Institute, MAHER University, Kanchipuram. Email: drvidyaa.g@gmail.com

Abstract

Background: Assessment of postoperative recovery is an important component of perioperative patient care following general anaesthesia. Standardized recovery scoring systems are used in the post anaesthesia care unit (PACU) to determine patient readiness for discharge. The Modified Aldrete Score is widely used for evaluating recovery, while fast-track criteria have been introduced to identify patients suitable for early discharge and improved perioperative efficiency.

Aim: To compare the Modified Aldrete Score and fast-track criteria in determining postoperative recovery following general anaesthesia.

Materials and Methods: This prospective comparative study was conducted in the Department of Anaesthesia at a tertiary care teaching hospital attached to Meenakshi Medical College, Kanchipuram. A total of 90 patients undergoing elective surgical procedures under general anaesthesia were included in the study. Postoperative recovery was assessed in the PACU using both the Modified Aldrete Score and fast-track criteria. The time required to achieve a Modified Aldrete Score of ≥ 9 and the time required to fulfill fast-track recovery criteria were recorded and compared. Statistical analysis was performed using appropriate tests, and a p value less than 0.05 was considered statistically significant.

Results: The mean recovery time according to fast-track criteria was 14.2 ± 3.8 minutes, whereas patients required 18.6 ± 4.5 minutes to achieve a Modified Aldrete Score of ≥ 9 . Patients achieved recovery significantly earlier when assessed using fast-track criteria, and the difference was statistically significant ($p < 0.001$). These findings indicate that fast-track criteria allow earlier identification of recovery in patients following general anaesthesia.

Conclusion: Both the Modified Aldrete Score and fast-track criteria are reliable methods for assessing postoperative recovery. However, fast-track criteria allow earlier detection of recovery and may help reduce PACU stay while maintaining patient safety.

Keywords: Modified Aldrete Score, fast-track criteria, postoperative recovery, general anaesthesia, post anaesthesia care unit.

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Introduction

Post anaesthesia recovery is a critical phase in perioperative patient care, as it involves the restoration of physiological functions following the administration of anaesthetic agents. Careful assessment of recovery is essential to ensure patient safety before transferring patients from the post anaesthesia care unit (PACU) to the ward or allowing discharge after ambulatory procedures. Inadequate evaluation during the recovery

period may result in complications such as airway obstruction, respiratory depression, hemodynamic instability, or delayed neurological recovery. Therefore, standardized recovery assessment tools are widely used in clinical practice to objectively determine when patients have adequately recovered from general anaesthesia [1].

Several scoring systems have been developed to assess post anaesthesia recovery, among which the Modified

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Aldrete Score is one of the most commonly used tools in clinical practice. The Modified Aldrete Score evaluates five key parameters including activity, respiration, circulation, consciousness, and oxygen saturation. Each parameter is scored individually, and the total score helps clinicians determine whether a patient has achieved adequate recovery for safe discharge from the PACU. This scoring system is widely accepted due to its simplicity, reliability, and ease of application in various surgical settings [2].

With the advancement of anaesthetic techniques and the increasing number of ambulatory surgical procedures, faster recovery and early discharge have become important goals in modern anaesthesia practice. As a result, alternative assessment tools such as fast track criteria have been introduced to identify patients who can safely bypass prolonged PACU observation and be transferred directly to step down recovery areas. Fast track criteria evaluate parameters such as level of consciousness, physical activity, hemodynamic stability, pain control, and absence of significant postoperative nausea and vomiting, allowing clinicians to identify patients suitable for early recovery and discharge [3].

The implementation of fast track recovery protocols has gained increasing attention due to their potential benefits, including reduced PACU stay, improved operating room efficiency, and enhanced patient satisfaction. These protocols aim to promote rapid recovery while maintaining patient safety. However, differences may exist between traditional recovery scoring systems such as the Modified Aldrete Score and newer fast track criteria in determining readiness for discharge following general anaesthesia [4–6].

Accurate evaluation of postoperative recovery is particularly important in patients undergoing short surgical procedures or ambulatory surgeries where early discharge is anticipated. The use of appropriate recovery assessment tools can help prevent premature discharge while also avoiding unnecessary delays in patient transfer from the PACU [7].

Despite the widespread use of both the Modified Aldrete Score and fast track criteria, there remains a need to evaluate their comparative effectiveness in determining recovery after general anaesthesia in different clinical settings. Understanding the advantages and limitations of these assessment tools may help improve recovery protocols and enhance patient safety [8,9]. Therefore, the present study was undertaken to perform a comparative assessment of the Modified Aldrete Score and fast track criteria in

determining postoperative recovery in patients undergoing surgery under general anaesthesia.

Materials and Methods

This prospective comparative study was conducted in the Department of Anaesthesia at a tertiary care teaching hospital attached to Meenakshi Medical College, Kanchipuram, Tamil Nadu. The study aimed to compare the effectiveness of the Modified Aldrete Score and fast track criteria in determining postoperative recovery in patients undergoing surgery under general anaesthesia.

A total of 90 patients undergoing elective surgical procedures under general anaesthesia were included in the study. Patients aged between 18 and 60 years and classified as American Society of Anesthesiologists (ASA) physical status I or II were eligible for inclusion. Patients with severe systemic illness (ASA III or above), patients undergoing emergency surgeries, those with neurological disorders affecting consciousness, and patients who refused to participate were excluded from the study.

All patients underwent a thorough preoperative evaluation including medical history, physical examination, and relevant laboratory investigations. Standard monitoring including electrocardiography, non invasive blood pressure, pulse oximetry, and respiratory rate was applied throughout the surgical procedure. General anaesthesia was administered using standard anaesthetic techniques according to institutional protocols.

Following completion of surgery and discontinuation of anaesthetic agents, patients were transferred to the post anaesthesia care unit for recovery monitoring. Recovery status was assessed using two different scoring systems: the Modified Aldrete Score and the fast track criteria. The Modified Aldrete Score evaluated parameters including activity, respiration, circulation, consciousness, and oxygen saturation. Fast track criteria assessed factors such as level of consciousness, physical activity, hemodynamic stability, pain control, and absence of postoperative nausea and vomiting.

Both scoring systems were applied at regular intervals in the post anaesthesia care unit to determine readiness for recovery and discharge. The time required to achieve the required recovery score according to each assessment method was recorded and compared.

All collected data were entered into Microsoft Excel and analyzed using SPSS software. Descriptive statistics including mean, standard deviation, frequency, and percentage were calculated. Comparative analysis between the Modified Aldrete

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Score and fast track criteria was performed using appropriate statistical tests. A p value of less than 0.05 was considered statistically significant.

Results

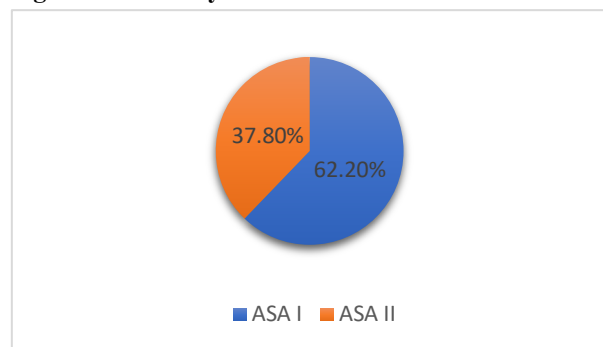
A total of 90 patients undergoing elective surgical procedures under general anaesthesia were included in the study. Postoperative recovery was assessed using both the Modified Aldrete Score and fast track criteria, and the recovery profiles were compared.

Table 1: Demographic Characteristics of Study Participants (n = 90)

Variable	Frequency (%)
Mean age (years)	35.6 ± 9.8
Age 18–30 years	32 (35.6%)
Age 31–40 years	28 (31.1%)
Age 41–50 years	20 (22.2%)
Age >50 years	10 (11.1%)
Male	48 (53.3%)
Female	42 (46.7%)

The majority of patients were between 18 and 40 years of age. Male patients constituted 53.3% of the study population, while females accounted for 46.7%.

Figure 1: ASA Physical Status Distribution



Most patients were classified as ASA physical status I (62.2%), while 37.8% were classified as ASA II.

Table 2: Type of Surgical Procedures

Type of Surgery	Frequency (%)
General surgery	34 (37.8%)
Orthopedic surgery	26 (28.9%)
Gynecological surgery	18 (20.0%)
ENT surgery	12 (13.3%)

General surgical procedures constituted the largest proportion (37.8%), followed by orthopedic and gynecological surgeries.

Table 3: Recovery Time According to Modified Aldrete Score

Recovery Parameter	Mean Time (minutes)
Time to achieve Aldrete score ≥ 9	18.6 ± 4.5

The mean time required for patients to achieve a Modified Aldrete Score of 9 or above was 18.6 ± 4.5 minutes, indicating readiness for discharge from the post anaesthesia care unit.

Table 4: Recovery Time According to Fast-Track Criteria

Recovery Parameter	Mean Time (minutes)
Time to achieve fast-track criteria	14.2 ± 3.8

Patients achieved fast-track recovery criteria earlier with a mean recovery time of 14.2 ± 3.8 minutes.

Table 5: Comparison of Recovery Assessment Methods

Recovery Assessment Method	Mean Recovery Time (minutes)	p value
Modified Aldrete Score	18.6 ± 4.5	0.001
Fast-Track Criteria	14.2 ± 3.8	

Patients achieved recovery earlier when assessed using fast-track criteria compared with the Modified Aldrete Score. The difference in recovery time between the two assessment methods was statistically significant ($p = 0.001$). This suggests that fast-track criteria may allow earlier identification of patients suitable for recovery and discharge after general anaesthesia.

Discussion

The present study compared the effectiveness of the Modified Aldrete Score and fast-track criteria in determining postoperative recovery following general anaesthesia. Accurate assessment of recovery in the post anaesthesia care unit (PACU) is essential to ensure patient safety and determine readiness for discharge. Standardized recovery scoring systems are widely used to evaluate physiological stability, consciousness, and overall recovery after anaesthesia. The importance of structured recovery assessment has been emphasized by Butterworth JF et al [10] and Miller RD et al [11], who stated that validated recovery scoring systems play an important role in identifying patients suitable for safe discharge from the PACU.

In the present study, patients achieved recovery significantly earlier when assessed using fast-track

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criteria compared with the Modified Aldrete Score. The mean recovery time using fast-track criteria was 14.2 ± 3.8 minutes, whereas patients required 18.6 ± 4.5 minutes to achieve a Modified Aldrete Score of ≥ 9 . This difference in recovery time between the two assessment methods was statistically significant ($p < 0.001$). These findings suggest that fast-track criteria may allow earlier identification of patients who have adequately recovered from general anaesthesia. Similar observations were reported by White PF et al [17], who demonstrated that fast-track recovery systems enable earlier discharge from the PACU without compromising patient safety.

The Modified Aldrete Score has traditionally been used to evaluate recovery after anaesthesia and assesses parameters such as activity, respiration, circulation, consciousness, and oxygen saturation. Apfelbaum JL et al [13] emphasized that standardized recovery scoring systems are essential for maintaining safety in the postoperative period. However, the use of modern anaesthetic agents with rapid elimination profiles has improved recovery characteristics, allowing the adoption of fast-track recovery protocols.

In the present study, fast-track criteria enabled earlier identification of recovery compared with the Modified Aldrete Score. Similar results were reported by Ghimire R et al [15], who observed that patients undergoing laparoscopic surgery achieved fast-track recovery significantly earlier than the Modified Aldrete Score threshold ($p = 0.002$).

Fast-track recovery protocols have become increasingly important in ambulatory anaesthesia. Chung F et al [14] reported that implementation of fast-track recovery systems significantly reduced PACU stay while maintaining patient safety ($p < 0.05$). Likewise, Gupta A et al [19] demonstrated that improved anaesthetic techniques contribute to faster postoperative recovery and early discharge ($p < 0.01$). Furthermore, Dexter F et al [20] reported that efficient recovery assessment methods can significantly reduce PACU length of stay and improve perioperative workflow ($p < 0.05$).

An integrative review by Hawker RJ et al [16] also highlighted that although the Modified Aldrete Score remains widely used, fast-track criteria may offer advantages in modern ambulatory surgical practice. Overall, the findings of the present study indicate that both the Modified Aldrete Score and fast-track criteria are effective tools for assessing recovery following general anaesthesia. However, fast-track criteria may allow earlier identification of recovery, thereby

improving PACU efficiency and facilitating timely patient discharge.

Conclusion

The present study demonstrated that both the Modified Aldrete Score and fast-track criteria are effective tools for assessing postoperative recovery following general anaesthesia. However, patients recovered significantly earlier when evaluated using fast-track criteria than when evaluated using the Modified Aldrete Score. The mean recovery time using fast-track criteria was shorter, indicating its potential usefulness in identifying patients suitable for early transfer from the post anaesthesia care unit. The difference in recovery time between the two assessment methods was statistically significant ($p < 0.001$). These findings suggest that fast-track criteria may improve recovery assessment efficiency and reduce PACU stay while maintaining patient safety. Therefore, the use of fast-track criteria can be considered a reliable and efficient approach for determining postoperative recovery following general anaesthesia.

Conflict of Interest: Nil

Source of Funding: Nil

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