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Physical Status Relationship *American Society of Anesthesia* (ASA) with Time to Achieve Bromage Score 2 in Spinal Anesthesia Patients in the IBS Recovery Room of Dr Iskak Tulungagung Hospital

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ABSTRACT

Background: The American Society of Anesthesiologists (ASA) Physical Status classification is used to assess a patient's overall health and predict potential complications related to spinal anesthesia. The Bromage score is commonly used to evaluate motor block recovery following spinal anesthesia, with the achievement of Bromage score 2 indicating partial motor function return.

Purpose: This study aimed to analyze the relationship between ASA physical status and the time required to achieve Bromage score 2 in patients undergoing spinal anesthesia in the recovery room of Dr. Iskak Tulungagung Hospital.

Methods: This research employed a cross-sectional design. The study population included all spinal anesthesia patients in the hospital's recovery room, totaling 250 individuals. A sample of 38 respondents was selected using simple random sampling. Data were collected using observation sheets and analyzed with the Spearman Rho test at a 95% confidence level ($\alpha = 0.05$).

Results: The results showed that the majority of respondents (57.9%) had an ASA status of 2, and most (60.5%) achieved Bromage score 2 within 120–149 minutes. Statistical analysis revealed a p-value of 0.017 (<0.05), indicating a significant relationship between ASA physical status and time to achieve Bromage score 2.

Conclusion: Higher ASA classifications are associated with more severe systemic conditions, which may slow the body's response to anesthetic drugs, resulting in a longer time to reach motor recovery.

Keywords: ASA physical status, bromage score, spinal anesthesia

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BACKGROUND

Anesthesia is a branch of medical science that studies the management of patients who will undergo surgical procedures to numb feelings, such as pain, fear and discomfort experienced by the patient, so that the patient can feel comfortable and maintain the safety or life of the patient due to drugs from anesthesia. There are 3 types of anesthesia, namely, general anesthesia, local anesthesia and spinal anesthesia (Mangku, 2018). Spinal anesthesia can provide satisfaction to the patient, both in terms of technique, speed of recovery and minimal side effects, has minimal influence on the respiratory system as long as the anesthetic block does not reach a high block, reduces the risk of aspiration and airway obstruction, poses little risk of hypoglycemia when the patient wakes up, the patient can eat immediately after surgery and can provide good muscle relaxation for lower abdominal and lower extremity operations (Triyono, 2017).

Before surgery, assessing the patient's physical status is critical to identify any existing conditions that may affect anesthesia management and surgical outcomes. The American Society of Anesthesiologists (ASA) Physical Status Classification is widely used for this purpose. It provides a standardized, globally recognized system to evaluate a patient's overall health and predict possible intraoperative and postoperative complications (Pramono, 2019; Triyono, 2017). The ASA status integrates various factors such as age, comorbidities, surgical complexity, anesthesia technique, and anticipated postoperative care (Doyle DJ, 2019), which makes it a comprehensive tool for risk stratification (Pramono, 2019). Physical status assessment American Society of Anesthesia (ASA) pre-anesthesia is an important assessment carried out by an anesthetist, including the anesthetist, to determine possible complications (Triyono, 2017). Pre-anesthetic and re-anesthetic evaluations are the initial steps performed by the anesthetist as part of the series of anesthesia procedures conducted on surgical patients. The pre-anesthetic evaluation of the ASA physical status is one of the measures used to identify the possibility of intraoperative and postoperative complications, enabling prevention and preparation for managing potential complications (Triyono, 2017).

The classification of a patient's physical status is determined by several factors and can be assessed during the pre-anesthesia assessment using this scale which can indicate pre-operative health and help determine whether the patient will undergo surgery or not. To predict the risk of surgery, several factors need to be considered, including age, comorbidities, extent and duration of the surgical procedure, planned anesthesia technique, skills of the surgical team, duration of anesthesia, available equipment, blood products needed, medications, post-operative care (Doyle DJ, 2019).

In monitoring recovery from spinal anesthesia, the Bromage score is a specific and validated scale used to assess motor block regression in the lower extremities. It is uniquely suitable for spinal anesthesia because it directly measures the degree of motor function affected by the spinal block, which other general recovery scales may not capture accurately (Fitria et al, 2018). Bromage score related to the length of the operation, namely requiring longer treatment in the recovery room. Thus, it is hoped that patients will be monitored well so that complications do not occur after spinal anesthesia (Fitria et al, 2018). Post-regional anesthesia monitoring is essential to assess the patient's condition and detect any potential anesthesia-related complications. The Bromage score is used to evaluate the patient's readiness to be transferred to a regular ward, which is typically achieved within two to three hours after spinal anesthesia (Nuriyadi, 2012 in Brilianti, 2020).

To enhance the achievement of Bromage score 2 in patients undergoing surgery with spinal anesthesia, the application of warm compresses to the femoral area and specialized

massage techniques on body tissues are used to shorten recovery time from muscle tension and improve blood circulation without increasing cardiac workload. This approach helps prevent postoperative complications, accelerates the recovery process, and assists in restoring physiological functions disrupted by anesthesia (Sukmawati, 2018). If the patient's bromage score reaches 2, the patient is declared to have recovered from anesthesia (Fitria, 2018). In increasing achievement *bromage score* 2 in surgical patients using spinal anesthesia by applying a warm compress to the femoral area, *massage* on body tissue with special techniques to shorten the recovery time from muscle tension, increase blood circulation without increasing the workload of the heart, so that it will prevent post-surgical complications and speed up the recovery process and be able to help restore physiological functions that are disturbed due to anesthesia (Sukmawati, 2018).

The combined use of ASA physical status and Bromage score provides a comprehensive evaluation framework: ASA offers a preoperative assessment of systemic health and anesthesia risk, while Bromage provides a postoperative measure of motor recovery specific to spinal anesthesia. This dual approach enables better anticipation and monitoring of anesthesia-related complications, optimizing patient safety and recovery.

METHODS

The research location or place for collecting research data is dr. Iskak Hospital Tulungagung. The land owned covers an area of 42,750 m^2, and the burial ground of Mr/Mrs X with an area of 140 m^2, building area 17,028.46 m^2, and surrounded by a 1,565 m trouser security *fence*^{2}. Dr. Iskak Tulungagung Hospital has become a type B educational hospital based on the Decree of the Minister of Health of the Republic of Indonesia No: HK.02.03/I/1147/2016 and the Decree of the Governor of East Java No: 188/359/KPTS/013/2015 concerning Regional Implementation of the Referral System for East Java Province.

This study employed a cross-sectional design, in which each subject was observed and measured only once at a single point in time. The type of research used was observational analytics, aimed at assessing relationships between variables without manipulating them.The population consisted of all patients who underwent spinal anesthesia in the IBS recovery room at Dr. Iskak Tulungagung Hospital. A total of 38 respondents were selected using simple random sampling. The research instrument used was an observation sheet designed to record the American Society of Anesthesiologists (ASA) physical status and the time taken to achieve Bromage score 2. The observation technique followed the definition by Arikunto (2019), where observation involves focused visual attention to systematically collect data. Data collection was carried out after respondents signed a consent form agreeing to participate in the study. This study was approved by the Health Research Ethics Committee of Dr. Iskak Tulungagung Hospital with ethical clearance number: 001748/EC/KEPK/I/10/2024. Anesthetist nurses recorded pre-anesthesia evaluations in the medical records, and the researcher upon receiving approval from the anesthesiologist in charge (DPJP) documented the ASA physical status and the time to achieve Bromage score 2. Two trained staff members in the recovery room assisted the researcher in observing and recording the time to motor block regression. Data analysis was performed using the Spearman Rho statistical test with SPSS software. A significance level of $\alpha = 0.05$ was used. A p-value < 0.05 indicated a significant relationship between ASA physical status and time to achieve Bromage score 2.

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RESULTS

This research was conducted in the Recovery Awareness Room of the Central Operating Room at Dr. Iskak Hospital. The hospital has 12 operating rooms within the Central Surgical Installation, each designated based on specific classifications such as clean, clean-contaminated, and unclean rooms as well as specialized rooms for procedures like eye surgery and endoscopy. Before entering the operating room, patients must complete a registration and preparation process in the premedication room.

Table 1. Cross tabulation between ASA physical status and achievement time bromage score 2 in the recovery room central surgical installation at dr. Iskak Hospital Tulungagung 01 December to 30 December 2024

ASA Physical Status	Achievement time *Bromage Score* 2							
	91-119 minutes		120-149 minutes		150-180 minutes		Total	
	N	%	N	%	N	%	N	%
ACTIVITY 1	3	7.9	6	15.8	1	2.6	10	26.3
ACTIVITY 2	1	2.6	14	36.8	7	18.4	22	57.9
ACTIVITY 3	0	0	3	7.9	3	7.9	6	15.8
Total	4	10.5	23	60.5	11	28.9	38	100

Source: Primary Data, 2024

Table 2. shows that 14 respondents (36.8%) had ASA 2 physical status and achievement time bromage score 2 120-149 minutes.

Correlations

			ASA physical status	Bromage 2 achievement time
Spearman's rho	ASA physical status	Correlation Coefficient	1,000	,386*
		Sig. (2-tailed)	.	,017
		N	38	38
	Bromage 2 achievement time	Correlation Coefficient	,386*	1,000
		Sig. (2-tailed)	,017	.
		N	38	38

*. Correlation is significant at the 0.05 level (2-tailed).

From table 1.2 shows that the statistical test *Spearman Rho* obtained *p value* = 0.017 < α = 0.05. This shows that there is a relationship between physical status *american society of anesthesia* (ASA) with achievement time *bromage score* 2 in spinal anesthesia patients in the recovery room of the Central Surgery Installation at dr. Iskak Hospital Hospital.

DISCUSSION

Physical Status *American Society Of Anesthesia* (ASA) In Spinal Anesthesia Patients in the IBS Recovery Room at Dr. Iskak Hospital, Tulungagung

The results of the study involving 38 respondents showed that the majority 22 respondents (57.9%) had an ASA Physical Status of 2 in the Recovery Room of the Central Surgical Installation at Dr. Iskak Hospital, Tulungagung. The physical status classification used in this study follows the American Society of Anesthesiologists (ASA) Physical Status Classification System (ASAPS). A patient's pre-anesthesia physical condition is one of the factors influencing the recovery of vital functions following surgery or anesthesia.

Pre-anesthesia evaluations are conducted to prevent errors related to patient identity, surgery schedule, surgical plan, surgeon and anesthesiologist assignments, patient's family, place of residence, treatment room, and to ensure that preoperative vital signs are properly documented (Triyono, 2017).

In this study, 22 respondents (57.9%) were classified as ASA 2, indicating the presence of mild systemic diseases such as respiratory, cardiovascular, urinary, or endocrine disorders. Despite these conditions, ASA 2 patients are generally still able to carry out daily activities and are considered fit for surgery.

Among the respondents, 11 individuals (28.9%) with ASA 2 status were between 31 and 40 years old, classified as adults. At this age, patients are typically still in good health. Generally, younger individuals tend to have a lower (better) ASA status, while older individuals may have a higher (worse) ASA status due to age-related decline and systemic organ disorders. Preserving independence is a vital goal for older adults undergoing surgery. However, age-related physiologic changes, comorbidities, cognitive decline, frailty, and the surgical stress response all contribute to postoperative complications, prolonged hospital stays, and resulting decline in functional abilities and cognitive recovery. Unfortunately, loss of independence is common in older adults after surgery, with the incidence increasing with age (Zhang 2020). With more older patients presenting for surgery, anesthesiologists will routinely be required to care for patients with preoperative neurocognitive disorders. A preoperative neurocognitive disorder increases the risk of delayed neurocognitive recovery after surgery. Previously diagnosed neurocognitive disorders were present in 18% of older patients scheduled for elective noncardiac surgery. Additionally, 37% of patients without known neurocognitive deficits were found to have significant cognitive impairment on preoperative testing (Becher 2020).

ASA Physical Status 1 indicates that the patient is completely healthy apart from the condition requiring surgery. In contrast, ASA 2 signifies that the patient has undergone a physical examination that reveals mild systemic disease. This assessment helps the surgical and anesthesia team identify potential postoperative risks and take steps to support the return of normal body function after anesthesia and surgery.

Achievement Time *Bromage Score* 2 In Spinal Anesthesia Patients in the IBS Recovery Room at Dr Iskak Hospital Hospital, Tulungagung

The results of research conducted on 38 respondents, the majority of respondents, namely 23 respondents (60.5%) had an achievement time bromage score 2 120- 149 minutes in the recovery room of the Central Surgery Installation at dr. Iskak Hospital Tulungagung. According to Kusumawati, in 2019 stated that Bromage score used to assess the level of development of leg movements after spinal anesthesia. Assessment is carried out by asking the patient to raise the leg, assessing the sensation of pain after needle puncture (pin prick test), provide a cooling sensation with aerosol spray or with alcohol. Limited ability to move normally (freely) and spontaneously can affect all physical and psychological areas (Nuryadi, 2019). The impact of the patient's long recovery period can result in several losses, namely psychological disturbance to the patient due to incapacity move extremities below (Triyono, 2017).

In this study, 23 respondents (60.5%) reached a Bromage score of 2 within 120-149 minutes. This indicates that the respondents were able to move their legs but were not yet able to flex their knees, suggesting that the effects of anesthesia were beginning to wear off. Regarding the characteristics of the respondents, 10 individuals (26.3%) who achieved a Bromage score of 2 within 120-149 minutes were aged between 31 and 40 years. At this age, individuals are considered young adults, generally possessing optimal organ function and

efficient metabolic activity, which contributes to a faster recovery from the effects of anesthesia.

Based on educational background, 17 respondents (44.7%) who achieved a Bromage score of 2 within 120–149 minutes had a high school education. With a secondary level of education, these respondents generally have a basic understanding of post-operative recovery, which may contribute to a calmer emotional state during the recovery process.

In terms of occupation, 14 respondents (36.8%) who reached a Bromage score of 2 within the same time frame were self-employed. These individuals are often exposed to information from others who have undergone surgery, including recovery experiences. As a result, they may be more motivated to recover quickly by actively attempting to move their lower limbs, believing that the ability to move indicates a return to normal function.

Regarding gender, 14 respondents (36.8%) who achieved a Bromage score of 2 within 120–149 minutes were male. Male respondents may exhibit a stronger determination and willingness to recover quickly by making efforts to move their lower limbs, aiming to regain mobility and walk sooner.

A patient is considered to have reached a Bromage score of 2 when they are able to move the soles of their feet specifically, when they can move both ankles and toes independently measured in minutes from the time spinal anesthesia is administered. This movement must occur without assistance and while the patient is still in the recovery room. A Bromage score of 1 or 0 indicates that the patient has regained full strength in the leg muscles and can move them completely.

Physical Status Relationship *American Society Of Anesthesia* (ASA) By Achievement Time *Bromage Score* 2 In Spinal Anesthesia Patients in the IBS Recovery Room at Dr. Iskak Hospital, Tulungagung

Based on the results of the study involving 38 respondents, statistical analysis using the Spearman Rho test showed a p-value of 0.017 ($p < \alpha = 0.05$). This indicates a statistically significant relationship between the physical status classified by the American Society of Anesthesiologists (ASA) and the time to achieve a Bromage score of 2 in spinal anesthesia patients in the recovery room of the Central Surgery Installation at Dr. Iskak Hospital, Tulungagung.

According to Sommeng (2017), ASA physical status can assist in determining a patient's surgical readiness and predicting perioperative risks. Several factors influence surgical and anesthesia risks, including age, body weight, gender, type of surgery, and unhealthy lifestyle habits. The ASA classification system is a widely used preoperative evaluation tool that reflects the patient's physical condition prior to surgery. Risk factors such as advanced age, smoking, obesity, and pregnancy may complicate the anesthesia process and increase the risk of difficult intubation (Smith, 2018).

Kasanah (2019) states that the evaluation of Bromage score 2 is typically performed after the anesthetic drug's effect begins to wear off, generally within 120 minutes. A recovery time of ≤90 minutes is categorized as fast, while >90 minutes is considered slow. Factors affecting the time to reach Bromage score 2 include the injection site, the type of spinal anesthetic used, patient age, and body weight. Prolonged recovery may result in several complications, such as psychological distress due to immobility of the lower limbs. In rare cases, neurological complications such as paresthesia, motor weakness, and even loss of sphincter control may occur after spinal anesthesia (Triyono, 2017).

ASA physical status is significantly influenced by age; older patients tend to have higher ASA scores due to age-related decline in organ function. Excessive body weight can alter drug distribution and slow the onset and clearance of anesthetic agents. Similarly,

lifestyle factors such as chronic smoking or alcohol consumption can interfere with the metabolism of anesthetic drugs, reducing their efficacy or delaying recovery. In patients with hepatic or renal impairment, the metabolism and excretion of anesthetic agents are slower, thus prolonging the time needed to achieve Bromage score 2. Additionally, with increasing age, the volume of the spinal and epidural spaces tends to decrease, which may further delay recovery.

In this study, patients classified as ASA 2 were those with mild systemic diseases such as asthma, acute respiratory infections (ARI), hypertension, or diabetes mellitus. Although these conditions affect various organ systems, they are considered to be at a mild level, and patients are generally still able to perform daily activities. The majority of these patients achieved a Bromage score of 2 between 120–149 minutes, indicating that the effects of spinal anesthesia had begun to diminish, allowing partial movement of the lower limbs.

The findings suggest that the higher the ASA classification, the more severe the systemic conditions, which may impair the body's response to anesthetic agents and delay the return of motor function. Conversely, patients with lower ASA status, indicating minimal or no systemic disease, tend to metabolize and eliminate anesthetic agents more efficiently, resulting in a faster recovery as measured by the time to reach Bromage score 2. This is consistent with the findings of Rozak (2020), who reported that patients with mild systemic disease (ASA 2) under the age of 50 generally recovered within four hours, whereas those with moderate systemic disease (ASA 3) and aged over 50 required more than four hours for recovery.

Supporting this, a study conducted by Muhammad Aliyafih on caesarean section patients under spinal anesthesia also demonstrated that a higher ASA physical status was associated with longer recovery times, as measured by the achievement of Bromage score 2 in the recovery room.

CONCLUSION

1. ASA's physical status in the recovery room of the Central Surgical Installation at R dr. Iskak Hospital Tulungagung, most of the respondents, namely 22 respondents (57.9%) had a physical status of ASA 2.
2. Achievement time *bromage score* 2 in the recovery room of the Central Surgical Installation at dr. Iskak Hospital Tulungagung, most of the respondents, namely 23 respondents (60.5%) had an achievement time *bromage score* 2 120- 149 minutes.
3. Physical status relationship *american society of anesthesia* (ASA) with achievement time *bromage score* 2 in spinal Anesthesia patients with results uji statistic *Spearman Rho* probability value is obtained *p value* 0,017 < □ =0,05.

SUGGESTION

1. For future researchers

There is a need for further research on physical status *american society of anesthesia* (ASA) and time to achievement *bromage score* 2 in spinal anesthesia patients with different research techniques.

2. For Hospital Institutions

Provide health workers with knowledge and understanding of physical status *american society of anesthesia* (ASA) and time to achievement *bromage score* 2 in spinal anesthesia patients so that patients undergoing surgery recover quickly and can recover quickly.

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