

IDENTIFYING PREOPERATIVE PHYSICAL STATUS AND UNDERLYING DISEASES USING 2019 AMENDED ASA-PS CLASSIFICATION

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ABSTRACT

Background: ASA classification has been applied all over the world in premedication. The 2019 Amended ASA-PS was modified by new definitions, approved examples, especially definition for emergent patients. In Vietnam, there has not any independent study on ASA- PS classification up to now. The addition of “E” denotes emergency surgery. **Objectives:** To determine the ratio of patients in each ASA class, their underlying diseases and complications that might happen intraoperative as well as postoperative. **Materials and methods:** This cross-sectional descriptive study was conducted at Anesthesiology Department of Can Tho University of Medicine and Pharmacy Hospital from January 2021 to December 2021, the sample size was ≥ 420 , and the sampling method was convenience sampling. The sample included 528 patients of both emergent and elective operations included. **Results:** The ratios of ASA were I (39.21%), II (33.52%), III (17.42%), IE (6.06%), IIE (3.03%) and IIIE (0.76%). None of the cases was classified as ASA IV/IVE, V/VE or VI. The most common patients’ health conditions were social alcohol drinkers and current smokers. The most popular underlying diseases were diabetes mellitus, obesity, hypertension, CAD, mild respiratory diseases (history of asthma or mycobacterium tuberculosis) and COPD. **Conclusions:** The result showed that patients who came for operations were classified from ASA I to ASA III, IE to IIIE. The ASA I group was the most common. Patients might have more than one health condition or underlying diseases. The intraoperative complications belonged to cardiovascular diseases and respiratory diseases, they were all cured and there was no need for intensive care.

Keywords: ASA-PS (American Society of Anesthesiologists), preoperative classification, underlying diseases, intraoperative complications, postoperative complications.

I. INTRODUCTION

ASA Physical Status (ASA-PS) Classification System was first introduced in 1941 by Saklad et al. In 1980, a new version was introduced and used worldwide. Over sixty years, ASA classification has been used by anesthesiologists not only in clinical practices but also in medical research [1]. The 1980 classification system was merely based on definition; therefore, it had poor interrater agreement. Until 2014, another version of ASA classification was introduced with examples for each class of ASA. The addition of “E” denotes emergency surgery. An emergency is defined as delaying surgery would lead to a significant increase in the threat to life or body part. On October 23, 2019, the classification was amended. This 2019-version has clarified the examples of the classification, which are applied to adult patients but not necessary to pediatric or obstetric patients. Assigning a Physical Status classification level is a clinical decision based on multiple factors. While the Physical Status classification may initially be determined at various times during the

preoperative assessment of the patient, the final assignment of Physical Status classification is made on the day of anesthesia care by the anesthesiologist after evaluating the patient [2], [3], [4].

In the Mekong Delta, there has not been any independent research of ASA Physical Status classification on surgery patients. This research aimed to find the ratio of each ASA class, the ratio of diseases of each class and complications that might happen intraoperatively.

II. MATERIALS AND METHODS

This cross-sectional descriptive study was conducted at Anesthesiology Department of Can Tho University of Medicine and Pharmacy Hospital from January 2021 to December 2021. The sample size was calculated considering a result of 43% ASA I [5] with an alpha error of 0.05 and power of study 95%. The calculated minimum sample size was ≥ 420 cases (380 plus 10%). The sampling method was convenience sampling and the actual sample size was 528 cases. Both elective and emergent operations were included, except C-sections. Patients who could not communicate or under the age of 18 were excluded.

Prior permission from the University Ethical Committee and consent from the patients were obtained. On arriving at the operation room, after informed consent was obtained, all needed information related to the research was collected by anesthetic nurses and anesthesiologists given anesthesia to the patients based on interviews, test results and clinical examinations. The 2019 amended ASA-PS Classification System was used to classify the patients.

III. RESULTS

528 cases of both emergent and elective operations were included in the research. There were 488 (92.25%) elective operations and 41 (7.75%) emergent operations. The average age of the patients was 49 ± 16.9 .

Table 1: The number of ASA classification

ASA classification	I	II	III	IV	V	IE	IIE	IIIE	IIIE	IVE	VE	Total
N	207	177	92	0	0	32	16	4	0	0	0	528

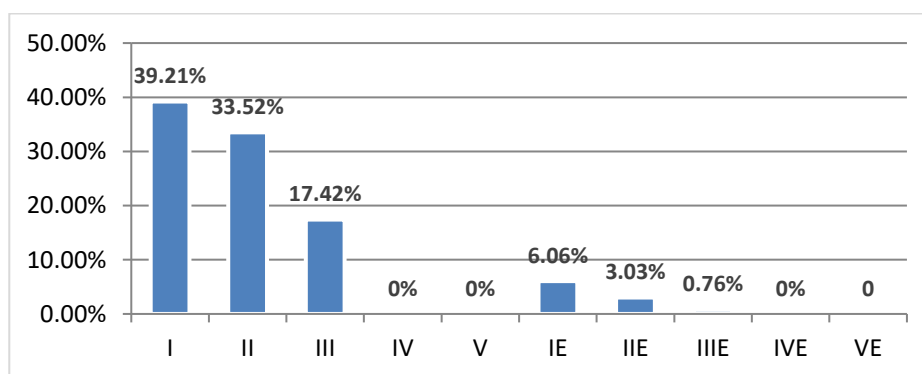


Figure 1: The percentages of ASA classification

Among 528 patients, the highest ratio was ASA I (39.21%), then ASA II (33.52%) and ASA III (17.42%). None of the cases was classified as ASA IV or V (Table 1). In emergency surgery, the number of patients was smaller but the rank was similar, the highest ratio was ASA IE (6.06%), then ASA IIE (3.03%) and ASA IIIE (0.76%).

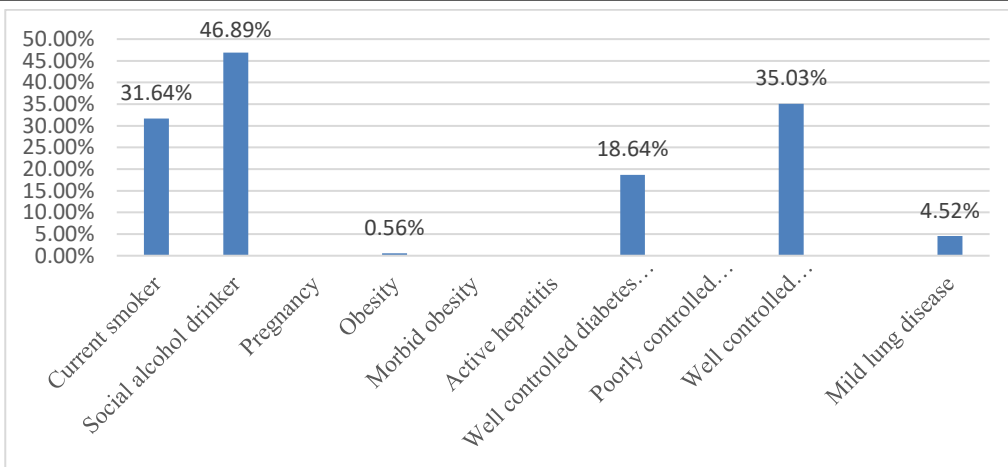


Figure 2: Rate of ASA II

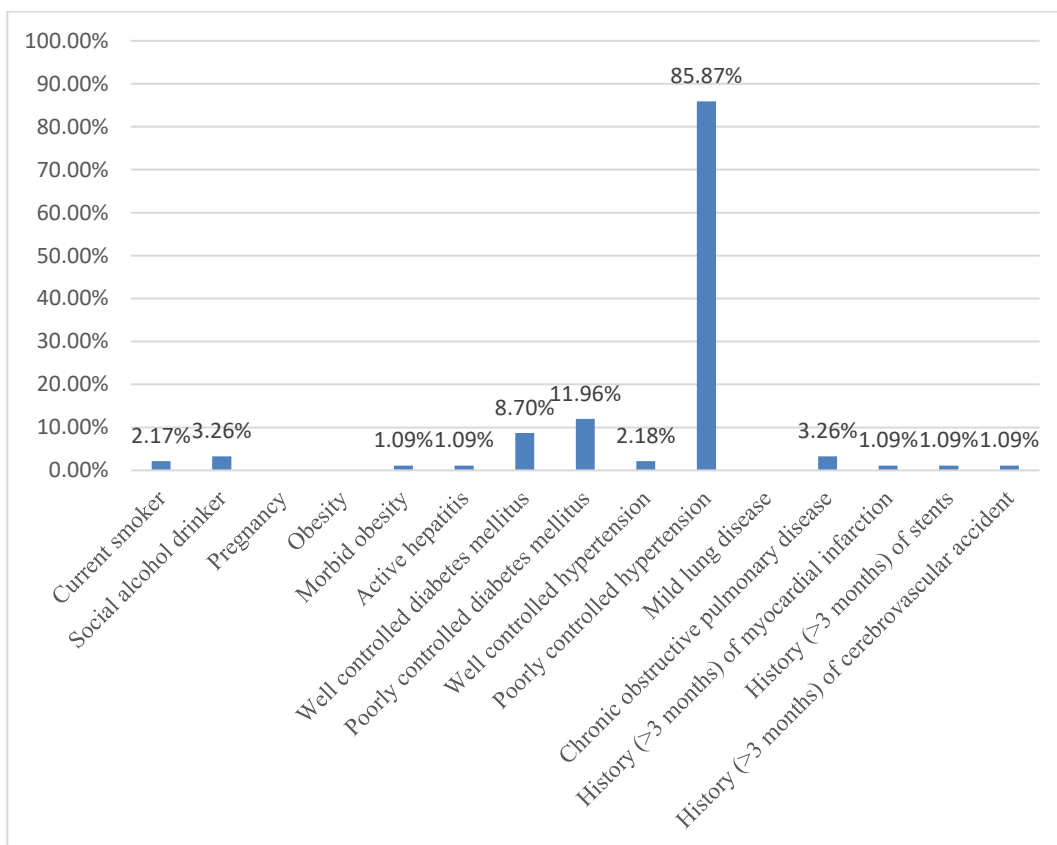


Figure 3: Rate of ASA III

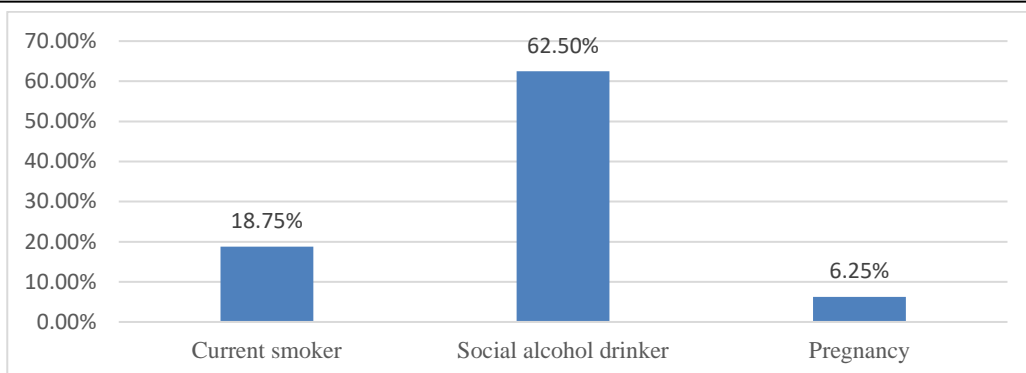


Figure 4: Rate of ASA IIE

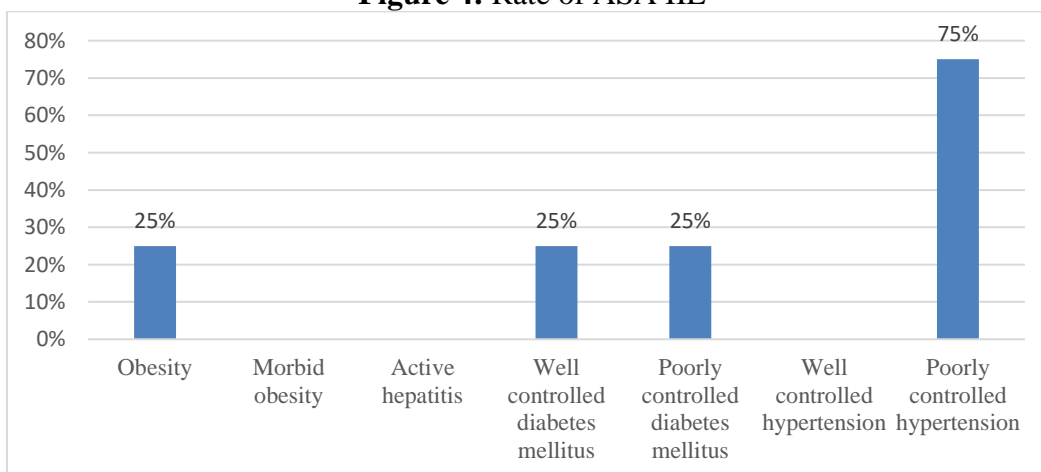


Figure 5: Rate of ASA IIIE

Table 2: ASA classifications and the related diseases

Disease	II	III	III E	IIIE
Current smoker	56	2	3	
Social alcohol drinker	83	3	10	
Pregnancy			1	
Obesity	1			1
Morbid obesity		1		
Active hepatitis		1		
Well controlled diabetes mellitus	33	8	2	1
Poorly controlled diabetes mellitus		11		1
Well controlled hypertension	62	2	4	

Disease	II	III	IIE	IIIE
Poorly controlled hypertension		79		3
Mild lung disease	8		1	
Chronic obstructive pulmonary disease		3		
History (>3 months) of myocardial infarction		1		
History (>3 months) of stents		1		
History (>3 months) of cerebrovascular accident		1		

In general, the most common conditions were social alcohol drinker (18.18%), hypertension (15.53% poorly controlled hypertension and 12.88% well-controlled hypertension) and current smoker (11.55%) (Table 2).

Table 3: Intraoperative complications

Complications	ASA						Total
	I	II	III	IE	IIE	IIIE	
Hypertension	0	0	2	0	0	0	2
Hypotension	2	3	2	0	1	1	9
Bradycardia	3	1	4	0	0	0	8
Bronchospasm	0	0	0	1	0	0	1
Total	5	4	8	1	1	1	20

There were 20 cases with intraoperative complications in the research, including hypertension (2/20), hypotension (9/20), bradycardia (8/20) and bronchospasm (1/20). ASA III group had the highest rate of complications (8/20). There were 5 cases to happen complications in ASA I group, which was defined as healthy patients. The ASA IE, IIE, IIIE groups, which were defined as emergencies, got less complications than other groups (Table 3). None of the cases got postoperative complications during the post anesthesia period (in 2 – 4 hours).

IV. DISCUSSION

Evaluation of ASA was performed by anesthesiologists in the premedication stage and the most accurate ASA-PS results were given by the anesthesiologist as the patient arrived in the operating room. Therefore, our ASA classification was performed in the premedication stage, right in the operating room. Our study was not conducted on patients under the age of 18, pregnant women who needed cesarean section, patients who could not communicate or patients who did not agree to participate in the study.

For elective operations, according to the hospital's guideline, most patients were examined and corrected for underlying disorders and diseases. As they came to the operating room, their underlying diseases had reduced. The study results had no patients in the ASA IV or ASA V group. Currently, the Can Tho University of Medicine and Pharmacy Hospital does not perform organ transplantation or organ donation, so we do not have ASA VI patients in the operating room.

In the group of emergent patients, patients needed surgery according to emergent conditions, we also classified them based on the definition of ASA. Accordingly, patients who need emergent operation did not receive surgery might increase the risk of life threatening or losing part(s) of their body [3].

As for the comorbidities in patients requiring surgery, many patients associated with smoking and drinking were seen more frequently in ASA II than in ASA III. Smoking was a problem that related to complications during and after anesthesia. Smoking increases the risk of airway constriction, increased secretions during and after endotracheal anesthesia... Therefore, it was necessary to carefully study the patient's smoking history and require patients to stop smoking before and after surgery. Alcoholic patients are at risk of liver failure, cirrhosis, chronic pancreatitis, etc. The ability to metabolize and eliminate drugs is poor and lasts longer after anesthesia. The dose of anesthetic and medical drugs is more different. Alcohol consumption and alcohol abuse alter the MAC of inhaled anesthetics, so that need careful preoperative evaluation [6].

The most common underlying diseases were diabetes and hypertension. There was a difference in the classification of ASA II or ASA III for this group of diseases. Patients with untreated, poorly controlled blood sugar or blood pressure were evaluated for ASA II, while patients with well controlled glycemic index or blood pressure were evaluated ASA III. The glycemic index and HbA1c in the study were the available blood glucose readings closest to surgery. We also extracted information related to medical history and treatment history from medical records and information provided by patients. From there, the correct assessment of ASA classification is II or III in patients with diabetes and hypertension. Criteria to evaluate diabetes is ADA 2021 (fasting blood sugar > 7mmol/L or any blood sugar > 11.1mmol/L, or HbA1c > 6.5mmol/L) [7] and JNC8 hypertension (Hypertension: systolic blood pressure 140 mmHg or diastolic blood pressure 90 mmHg).

Only 02 obese patients (30<BMI<40) were recorded. But there was one patient in the ASA III-E group. This is a group of patients with severe systemic disease requiring emergency surgery. In addition to obesity, perioperative metabolic disorders would be more complicated than in other groups, and the risk of difficult intubation in this group of patients was also higher [6].

With the respiratory pathology group, patients with a history of bronchial asthma or history of tuberculosis who were cured were classified as ASA II (8 patients) and ASA II-E (1 patient), while COPD patients were classified as ASA III (3 patients). COPD patients were classified ASA III who were well-treated. There were no patients with COPD exacerbations requiring surgery in the study. For patients with a history of bronchial asthma or COPD, care should be taken in general anesthesia when anesthesiologists approached the patient's airway and in the use of drugs in resuscitation anesthesia to avoid the onset of episodes of dyspnea or bronchial constriction.

There was no patient with renal disease, or renal failure at the time of ASA-PS assessment in the study for several reasons. First, patients might have received previous medical treatment before surgery. Second, there was no artificial kidney unit for patients with kidney disease or kidney failure; therefore, these patients could not have surgery in our hospital.

The study results also showed that in one patient, there were more than one medical problem and underlying diseases. This made patients' preoperative condition more complicated and required careful control relating to the operation. During operations, four complications were noted as hypertension, hypotension, bradycardia, and bronchospasm. In general, the complications belonged to cardiovascular complications, appearing in all ASA stages from I to III. The most common respiratory disease was noted as history of tuberculosis and the second was COPD. However, the patient who got bronchospasm during operation belonged to ASA IE group, while 9 cases of ASA II and IIE (mild lung diseases) and 3 cases of ASA III (COPD) did not get bronchospasm. This case showed that although the patient got no underlying disease, the emergent situation could easily lead to respiratory complications. This recovery time was based on Aldrete criteria since patients could be sent to ward post-operative when they met Aldrete score 10/10. The released-ward time was different from RcoA where ASA III patients had to stay 24 hours in PACU. However, the patients with ASA III and IIIIE got no complication and met Aldrete score 10 were released to wards under permission of anesthesiologists [4].

In this study, there are some limitations as follows: firstly, the sample size of the study was not too large. Secondly, the study was carried out at the Can Tho University of Medicine and Pharmacy Hospital so the number of diseases was limited in the Mekong Delta region. Besides, there was no artificial kidney unit for patients with kidney disease or kidney failure; therefore, these patients could not have surgery in our hospital. In the end, we only did this study for 1 year. Therefore, the results of the study still are depended heavily on the lifestyle of the population and the objectivity is not high, it can only be referred at the regional level.

V. CONCLUSIONS

The research was conducted on 528 patients at a general hospital. The result showed that patients who came for operations were classified from ASA I to ASA III, IE to IIIIE. The ASA I group was the most common. The most common underlying diseases and conditions were social alcohol drinker (46.89%), well controlled hypertension (35.03%), and current smokers (31.64%). The intraoperative complications mostly belonged to cardiovascular diseases and respiratory diseases; they were all cured and there was no need for intensive care.

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