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Common Clinical Dilemma Leading to American Society of Anaesthesiologists Physical Status Class Assignment Variation and the Impact of 2019 Amendment

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Dear Editor,

Variation in the American Society of Anesthesiologists physical status (ASA-PS) class allocation in the clinical practice has been well noted in adults undergoing elective noncardiac surgeries in quaternary-level health care setups (1). The classification has moderate inter-rater variability, which is inherent to the subjectivity characteristics. A systematic review in context to the reliability of the American Society of Anesthesiologists (ASA) physical status classification was also found to have a wide range of inter-rater agreements (2). The ASA is amending the ASA-PS classification from time to time (3). The recent amendment of the 2014 version was done on October 23, 2019 (4). The 2014 amendment incorporated a few examples by each classification and has been found to improve correct assignments of ASA-PS classifications to patients (5). Still, a recent hypothetical case-scenario-based survey based on the 2014 version found ASA-PS class assignment to have low inter-reliability and experience dependence (6). The 2014 amendment still had some obscurity, and the low reliability had been attributed to this (7).

Moreover, a few terms, e.g., smoking, are also ambiguous when used as definitions, which is also regarded as one of the reasons for variations in the assignment (8). Despite the well-known fact that there is a wide variation of ASA-PS class assignment, common dilemmatic clinical conditions leading to assignment variation are not much studied and reported. Moreover, whether the newly amended ASA-PS classification of October 23, 2019, will have a solution to this issue also remains a point to be pondered.

The American Society of Anesthesiologists physical status class assignment in this cohort was done by the residents posted in the preanesthetic assessment clinic (PAC). A printout of the 2014 ASA-PS classification was kept in the room for ready reference.

Data from the files of 270 patients, planned for noncardiac elective surgeries, whose preoperative anesthesia checkup was done prior to October 23, 2019, and were scheduled for surgery from October 10 to November 20, 2019, in a general operation theater complex were prospectively collected. Retrospective evaluation of these prospectively collected data was done, and due information to the authority was given. The operating complex mostly cares for the single investigator analyzed adult patients. The data were recorded in Microsoft Excel. The entire PAC file was scrutinized and assigned ASA-PS was noted. Furthermore, the ASA-PS class assigned by the residents was reviewed and compared against the 2014 and 2019 ASA-PS classification to find out the inter-rater variability (variability between the investigator and residents). Nonagreeing patients' data were analyzed to find out the clinical dilemmatic condition, and underassignment and overassignment rates were calculated. When a variation was noted, the rea-

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sons (i.e., clinical conditions) for which the assessors assigned the different ASA-PS for the same patient were evaluated and noted. If a patient was assigned higher ASA-PS (e.g., class III) in the PAC because of an uncontrolled systemic disease and the condition got optimized by the day of surgery to become ASA-PS class II, this assignment variation was not calculated as disagreement, and the ASA-PS class assignment done in the PAC was regarded as correct. The data for the variation are presented in absolute number and percentage scale.

Out of the 270 patients, one patient's ASA-PS was not noted in the first check-up; remaining cases ranged from ASA-PS I to IV with a mean+standard deviation age of 42.3±18.1 years. The majority of the patients were male; the demographic variables are presented in Table 1. There were 165 (61.3%) agreements (i.e., correct assignment) and 105 (38.7%) disagreements (i.e., variation) of ASA-PS. Among the disagreements, 44 (41.9%) were underassigned and 61 (58.1%) were overassigned (Table 2). The assignments were for both incorrect clinical judgment and overlooking some clinical conditions such as obesity, mild anemia, obstructive sleep apnea, as well as clinical dilemmatic situations such as smoking, tobacco use, cancer, etc. (Table 3). Although dilemmatic clinical conditions mostly lead to overassignments of ASA-PS, incorrect assignments were both over- and underassigned (Table 4).

Table 1. Demographic and surgical invassiveness grades of the cohort presented in #mean+standard deviation (95% confidence limit) and $number (percentage) scales

Particulars	Values
Age#	42.3±18.1 (40.1-44.4)
Adults (>18 years)$	240 (88.8)
10-18 years$	30 (11.1)
Weight (kg)#	57.9±14.7 (56.0-59.6)
Height (cm)#	159.8±9.9 (158.5-160.9)
BMI (kg m^{-2})#	22.7±5.2 (21.9-23.2)
Male$	177 (65.6)
Female$	93 (34.4)
National Institute for Health and Care Excellence surgical grade	2 (3-2)
1	40 (14.8)
2	117 (43.3)
3	92 (34.0)
4	21 (7.7)

BMI: body mass index.

One of the frequent contemplations among the health care providers is that most of the surgical conditions, which are planned to be operated, are local, and even cancer is not exempted. In contrast, cancer is regarded as a systemic disease, and even if the disease is localized, chemotherapy, weight loss, anemia, etc., may often impact the cardiopulmonary reserve and the patient's inbuilt ability to withstand and resist complications. If cancer is not considered as a systemic disease, there is a possibility of underassigning the class (9). However, as the ASA-PS class is not precise in this aspect, the variability in the assignment is prevalent. In this cohort, 11 out of 46 cancer patients were assigned higher class considering it as a systemic disease, whereas in the remaining 76.1% cases, cancer was considered while assigning the ASA-PS class. The recent amendment of 2019 also mentions the term "systemic disease" in the definition section, which still keeps the scope for variation in such cancer patients.

The alcohol-related terminology also plays a minor role in variation. Moderate drinking is up to one standard drink per day for women and up to two standard drinks per day for men, where a standard drink is equal to 12 g of absolute alcohol (10). However, the term "minimal alcohol use" used in the ASA-PS is not very clear and probably can be taken as lower than moderate drinking. "Social drinking," in contrast, refers to drinking patterns that are accepted by the society in which they happen (10). It is often more than moderate drinking but without getting intoxicated. Although these terms still have scopes of subjectivity, it is expected that this will improve the assignment. In this cohort, social alcohol

Table 2. ASA-PS distribution and assignment variations presented in #median (interquartile range) and $number (percentage) scales

ASA-PS class	Noted ASA	Actual ASA	Under assigned	Over assigned
All classes	II (II-I)	II (II-I)	44 (16.2)	61 (22.5)
I	85 (31.4)	120 (44.4)	18 (6.6)	0
II	143 (52.9)	100 (37.0)	24 (8.8)	42 (15.5)
III	39 (14.4)	45 (16.6)	2 (0.7)	15 (5.5)
IV	2 (0.7)	5 (1.8)	0	2 (0.7)
NM	1 (0.3)	0	0	0
Could not ascertain the reason	0	0	0	2 (0.7)

ASA-PS: American Society of Anesthesiologists physical status

Table 3. Clinical conditions and their contribution toward assignment variation of the American Society of Anesthesiologists physical status presented in number (percentage) scales

Clinical conditions (N-total number of respective conditions)	Number (%)
Dilemmatic conditions	
Past smoking (N=31)	02 (6.4)
Tobacco use (N=90)	21 (23.3)
Multiple comorbidity of mild intensity (N=36)	13 (36.1)
Previous surgery (N=56)	12 (21.4)
Disease for which there was a plan to undergo surgery (N=270)	5 (1.8)
Cancer (N=46)	11 (23.9)
Incorrect assignment	
Social alcoholism (N=14)	7 (50.0)
Hypertension (N=42)	3 (7.14)
Obesity (N=21)	7 (33.3)
Mild anemia (N=23)	5 (21.7)
Severity of comorbid condition (N=23)	12 (52.1)
Others (METs<4, malnutrition, obstructive uropathy, OSA, goiter, treated tuberculosis, hemodialysis, hydronephrosis, BPH, TIA, asymptomatic hepatitis B) (N=55)	21 (38.1)

METs: metabolic equivalent of tasks; OSA: obstructive sleep apnea; BPH: benign prostatic hyperplasia; TIA: transient ischemic attack

intake was overlooked and taken as no or minimal intake and underassigned ASA-PS as class I instead of class II in 5 out of 14 cases (35.7%).

However, the 2019 amendment is still silent on past smokers and active tobacco users. Tobacco use is one of the most frequent reasons for assigning a higher ASA-PS class among the present cohort. The present 2019 amendment, however, emphasizes on a modification for institute-specific examples to supplement ASA-approved examples by the anesthesiology department of the institute (4). This is likely to reduce the variation in the assignment caused by the dilemmatic conditions but cannot solve the variation owing to incorrect assignment as well as obscurity that existed in the 2014 classification (7). Similarly, this adaptation is likely to reduce intrainstitutional variation only, but unlikely to solve the problem at an interinstitutional level and international level. Therefore, knowing the typical clinical situation, which causes a dilemmatic situation leading to the variation in the class assignment in different parts of the world, can help us incorporating those examples in the next amendment. This, in turn, will help us to reduce the interinstitutional variation and increase the inter-rater agreement. This cohort indicates that tobacco use, a history of smoking, cancer, and previous surgeries need to be incorporated in the ASA-approved examples.

Table 4. Distribution of clinical conditions and their contribution toward under- and overassignment of the American Society of Anesthesiologists physical status presented in number (percentage) scales

Clinical situations (total number)	Underassigned number (%)	Overassigned number (%)
Smoking both active and past (N=56)	2 (3.5)	0
Tobacco (N=90)	0	21 (23.3)
Alcohol (N=53)	7 (13.2)	0
Hypertension (N=42)	3 (7.1)	0
Anemia of any severity (N=24)	5 (20.8)	0
Cancer (N=46)	0	11 (23.9)
Previous surgeries (N=56)	0	12 (21.4)
Obesity (N=21)	7 (33.3)	0
Multiple comorbidities of all intensities (N=37)	13 (35.1)	0
Severity of comorbid (N=23)	12 (52.1)	0
Disease for which surgery planed (N=270)	0	5 (1.8)
Others (METs < 4, malnutrition, obstructive uropathy, OSA, goiter, treated tuberculosis, hemodialysis, hydronephrosis, BPH, TIA, asymptomatic hepatitis B) (N=55)	11 (20.0)	10 (18.1)

METs: metabolic equivalent of tasks; OSA: obstructive sleep apnea; BPH: benign prostatic hyperplasia; TIA: transient ischemic attack

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