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ANESTHETIC RISK ASSESSMENT IN VETERINARY MEDICINE: PRACTICAL CONSIDERATIONS AND LIMITATIONS OF THE ASA PHYSICAL STATUS CLASSIFICATION

Anesthetic risk assessment in Veterinary Medicine: practical considerations and limitations of the ASA Physical Status classification

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Abstract

Pre-anesthetic evaluation is essential for the safety of veterinary patients. The American Society of Anesthesiologists Physical Status (ASA PS) classification is the main tool for anesthetic risk stratification. It ranges from ASA PS I (healthy animal) to ASA PS V (moribund animal). This classification supports anesthetic planning by guiding clinical decision-making. Studies confirm its prognostic value: patients with ASA PS ≥ III have a significantly higher risk of complications and perioperative mortality. However, the system has limitations, including subjectivity and the lack of consideration of the type of surgical procedure. Therefore, an integrated approach to pre-anesthetic assessment is recommended. Despite these limitations, the ASA PS remains an essential tool for anesthetic planning and improving clinical outcomes. This study is a narrative review that aims to critically analyze the application, limitations, and updates of the ASA PS in anesthetic risk assessment.
Keywords: Risk stratification; perioperative mortality; anesthetic planning; anesthetic safety.

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Resumo

A avaliação pré-anestésica é essencial para a segurança do paciente na Medicina Veterinária. A classificação *American Society of Anesthesiologists Physical Status* (ASA PS) é a principal ferramenta de estratificação de risco anestésico. Ela varia de ASA PS I (animal hígido) a ASA PS V (animal moribundo) e auxilia no planejamento da anestesia. Estudos confirmam seu valor prognóstico: pacientes com ASA PS ≥ III apresentam risco bem maior de complicações e morte no perioperatório. No entanto, o sistema tem limitações: é subjetivo e não considera o tipo de procedimento cirúrgico. Por isso, defende-se uma avaliação pré-anestésica integrada. Mesmo com essas falhas, a ASA PS continua indispensável para o planejamento anestésico e para melhorar os desfechos clínicos. Este artigo é uma revisão narrativa da literatura. Seu objetivo é analisar criticamente a aplicação, as limitações e as atualizações da ASA PS na avaliação do risco anestésico.

Palavras-chave: Estratificação de risco; mortalidade perioperatória; planejamento anestésico; segurança anestésica.

Introduction

Anesthetic risk assessment is a critical step in anesthetic planning in Veterinary Medicine. The physical status classification of the animal, according to the American Society of Anesthesiologists Physical Status (ASA PS), is the most widely used system for this purpose. Originally developed for human patients, the ASA PS classification has been extensively adapted and applied in veterinary practice. It categorizes patients into five levels based on their physical condition: ASA PS I (healthy animal, without systemic disease), ASA PS II (mild systemic disease, without significant functional limitation), ASA PS III (moderate to severe systemic disease, with functional limitation), ASA PS IV (severe systemic disease that represents a constant threat to life), and ASA PS V (moribund patient, not expected to survive without the procedure) (ASA committee of oversight: economics, 2026). This classification is an effective tool for assessing prognosis, anesthetic risk, and perioperative mortality (Portier; Ida, 2018; Redondo *et al.*, 2024), particularly in small animals.

Systematic reviews and clinical studies report that patients classified as ASA PS ≥ III present significantly higher risks of complications and mortality during and after anesthetic procedures compared to those classified as ASA PS < III, in dogs, cats, and other domestic species (Portier; Ida, 2018; Redondo *et al.*, 2024). This increased risk is associated with reduced physiological reserve, rendering these patients more susceptible to events such as refractory hypotension, severe hypoxemia, malignant arrhythmias, hemodynamic instability, and perioperative organ failure (renal, hepatic, or respiratory). The presence of decompensated systemic diseases or pre-existing functional limitations impairs the response to anesthetic-surgical stress, increasing the likelihood of death within the first 72 hours (Brodbelt *et al.*, 2008; Portier; Ida, 2018; Redondo *et al.*, 2024; Rodrigues *et al.*, 2018).

Although the classification is relatively simple and, at times, subjective in category assignment, its practical utility lies in its ability to identify patients with a higher probability of adverse anesthetic events (Portier; Ida, 2018; Rodrigues *et al.*, 2018). Its clinical applicability is well established in routine veterinary anesthesia, constituting an important component of clinical decision-making and risk communication (Portier; Ida, 2018; Redondo *et al.*, 2024). However, despite its widespread use, the practical application of ASA PS in veterinary routine presents limitations such as subjectivity, the absence of procedure-related variables, and difficulties in standardization across species and age groups—gaps that may lead to misinterpretation of anesthetic risk. In this context, the present study aims to critically analyze the application, limitations, and updates of the ASA PS classification in anesthetic risk assessment in small animals.

Metodology

This study consists of a narrative literature review on the application of the ASA PS classification in anesthetic risk assessment in small animals. Indexed scientific articles were analyzed, with emphasis on clinical applicability, limitations, and updates. Throughout the text, the authors adopt a critical approach, discussing the prognostic value of the tool as well as its weaknesses, such as subjectivity and the absence of surgical variables.

Classification and Categories of ASA PS

The ASA PS classification was originally developed for human use, with the objective of categorizing the patient's physical status prior to anesthetic procedures. It was subsequently incorporated into Veterinary Medicine, becoming a widely used tool for anesthetic risk stratification across different species, particularly small animals.

The classification ranges from ASA PS I—healthy animal—to ASA PS V—moribund patient, not expected to survive without the procedure (Table 1) (ASA Committee of Oversight: Economics, 2026; McMillan; Brearley, 2013). The suffix "E" (emergency) may be added to any ASA PS category (I to V) to indicate that the procedure is performed on an urgent basis (ASA committee of oversight: economics, 2026; McMillan; Brearley, 2013). In Veterinary Medicine, the ASA PS classification has been incorporated to support anesthetic planning.

Table 1 – ASA Physical Status Classification

ASA PS I	Clinically healthy patient, without identifiable systemic disease.
ASA PS II	Patient with mild systemic disease, without significant functional limitation.
ASA PS III	Patient with moderate to severe systemic disease, with functional limitation.
ASA PS IV	Patient with severe systemic disease that represents a constant threat to life.
ASA PS V	Moribund patient, not expected to survive without the procedure.
E - Emergency.	

T Source: adapted from the American Society of Anesthesiologists (ASA committee of oversight: economics, 2026).

Clinical Application of the ASA PS Classification in Veterinary Medicine

In veterinary clinical practice, the ASA PS classification is used during the pre-anesthetic evaluation in conjunction with complementary tests, allowing for an individualized assessment of the patient's physical condition, considering factors such as age, clinical status, type of procedure, and available resources (Table 2) (ASA committee of oversight: economics, 2026; Monteiro *et al.*, 2023; Rodrigues *et al.*, 2017; 2018). The classification supports the selection of anesthetic protocols, determination of monitoring levels, and communication of risk with the clinical team and pet owners.

However, the authors highlight that the same ASA PS category may encompass markedly different levels of risk, depending on the underlying disease. For example, a young dog with controlled otitis externa (ASA PS II) presents low anesthetic risk, compatible with conventional protocols and basic monitoring. In contrast, an asymptomatic dog with myxomatous mitral valve

disease (MMVD) at stage B2, also classified as ASA PS II, represents a substantially different clinical scenario. Although the classification category is the same, the anesthetic risk is not equivalent. As discussed by Levinzon *et al.* (2026), the subjectivity of the ASA PS classification limits its accuracy in risk stratification for dogs with MMVD. Dogs at stage B2 exhibit cardiac remodeling and an increased risk of adverse events within the first 24 hours following anesthesia, despite being classified within the same category as otherwise healthy animals. Furthermore, there is considerable heterogeneity within stage B2 itself, as dogs that barely meet the criteria for this stage present a different risk profile compared to those with more advanced cardiac overload (Levinzon *et al.*, 2026).

Thus, a single ASA PS score may fail to accurately reflect the true cardiovascular risk profile, reinforcing the authors' critical perspective that the classification should not be used in isolation but rather integrated with complementary examinations and comprehensive clinical assessment.

Even mild cardiac disease compromises the ability to adjust cardiac output in response to anesthetic-induced vasodilation, myocardial depression, and variations in preload and afterload. Moreover, anesthetic-surgical stress may precipitate arrhythmias or congestive heart failure. Studies indicate that patients with cardiac disease (ASA PS II or III) have up to a threefold higher incidence of perioperative adverse events compared to healthy individuals within the same category (Portier; Ida, 2018; Redondo *et al.*, 2024). In this context, anesthetic management of ASA PS II cardiac patients should include the selection of drugs with minimal cardiovascular depression (such as reduced-dose propofol, opioids, or etomidate), reduction or avoidance of potent inhalational agents, advanced monitoring (continuous ECG, invasive blood pressure when available, capnography), judicious fluid therapy to prevent volume overload, and the availability of antiarrhythmic and vasopressor agents.

The authors argue that a simple ASA PS II classification, without proper consideration of the underlying condition (such as cardiac disease), may lead to misinterpretation of risk and inappropriate anesthetic protocols. Therefore, ASA PS should not be used in isolation; it must be integrated into a comprehensive clinical assessment and, when available, a detailed cardiological evaluation (echocardiography, biomarkers), in addition to an individualized anesthetic plan. Beyond risk stratification using ASA PS, current anesthetic protocols recommend continuous and careful patient monitoring throughout all phases of anesthesia, in accordance with the guidelines of the American College of Veterinary Anesthesia and Analgesia (ACVAA) for small animals (Bailey *et al.*, 2025).

Table 2 – Suggested Pre-Anesthetic Complementary Examinations According to Patient Physical Status

ASA PS	Up to 6 months	6 months to 6 years	Over 6 years
ASA PS I–II	Hematocrit, total protein, blood glucose.	Hematocrit, total protein, renal function assessment.	Hematocrit, total protein, renal function, ECG, and urinalysis.
ASA PS III	Hematocrit, total protein, blood glucose, renal function, blood gas analysis, and urinalysis.	Complete blood count, ECG, blood glucose, renal and hepatic function, blood gas analysis, and urinalysis.	Complete blood count, ECG, blood glucose, renal and hepatic function, electrolytes, blood gas analysis, and urinalysis.
ASA PS IV–V	Complete blood count, ECG, blood glucose, renal and hepatic function, electrolytes, blood gas analysis, and urinalysis.	Complete blood count, ECG, blood glucose, renal and hepatic function, electrolytes, blood gas analysis, and urinalysis.	Complete blood count, ECG, blood glucose, renal and hepatic function, electrolytes, blood gas analysis, and urinalysis.
Emergency (E)	PCV, total protein, and urinalysis*.	PCV, total protein, and urinalysis*	PCV, total protein, and urinalysis*.

ECG = electrocardiogram; PCV = packed cell volume.

* In emergency procedures, additional tests may be requested depending on surgery duration, patient age, and resource availability.

T Source: prepared by the authors, based on ASA committee of oversight: economics (2026); Monteiro *et al.* (2023); Rodrigues *et al.* (2017; 2018).

T Note: this is a guiding proposal and should be adapted to clinical reality and professional judgment.

Scientific Evidence Associated with the ASA PS Classification

Retrospective and prospective studies indicate that increasing ASA PS classification is directly associated with a higher incidence of anesthetic complications, including hypotension, hypoxemia, arrhythmias, and hemodynamic instability, as well as increased anesthetic mortality (Brodbelt *et al.*, 2008; Portier; Ida, 2018). In general, patients classified as ASA PS ≥ III present a significantly higher risk of perioperative complications and mortality compared to those with ASA PS < III (Portier; Ida, 2018; Rodrigues *et al.*, 2018). This elevated risk stems from the presence of moderate to severe systemic diseases (e.g., decompensated chronic kidney disease, clinically evident cardiac disease, hepatopathy, unstable *diabetes mellitus*), which reduce physiological reserve and the capacity to respond to anesthetic-surgical stress. Specifically, reduced cardiovascular, respiratory, renal, and hepatic reserve renders these patients more susceptible to refractory hypotension, hypoxemia, arrhythmias, organ failure, and impaired metabolism and excretion of anesthetic drugs, thereby increasing the likelihood of death within the first 72 hours (Brodbelt *et al.*, 2008; Portier; Ida, 2018; Rodrigues *et al.*, 2018). A similar association between higher ASA PS categories and increased mortality or perioperative complications has been reported in both canine and feline studies, reinforcing the applicability of the system across species (Rezende *et al.*, 2021; Rodrigues *et al.*, 2018).

These findings confirm the prognostic value of ASA PS, particularly as it indirectly reflects the patient's physiological reserve. However, the authors emphasize that this prognostic value should not be equated with absolute accuracy. Subjectivity and the absence of surgical variables, as previously discussed in this article, may lead to misinterpretations. This consideration is essential to ensure that ASA PS remains a useful, albeit not exclusive, parameter in risk stratification.

The ASA PS classification presents important limitations, particularly related to evaluator interpretation, as it depends on the anesthesiologist's clinical judgment, which may result in interobserver variability (Portier; Ida, 2018). Another key limitation is that the classification considers only the patient's physical status, without directly incorporating factors such as the type of surgical procedure, anesthetic technique, or duration of anesthesia—elements that significantly influence anesthetic risk. For example, an ASA PS III patient (with stable chronic kidney disease) presents substantially higher risk when undergoing an emergency celiotomy than during an elective dental extraction. Similarly, thoracic or neurological surgeries impose additional risks not captured by ASA PS. Thus, two patients with the same ASA PS score may have entirely different outcomes depending on the procedure performed (Redondo *et al*., 2024; Rodrigues *et al*., 2018). Furthermore, the classification does not explicitly incorporate variables such as species, body condition score (BCS), and age, which are relevant factors that may significantly impact anesthetic prognosis (Brodbelt *et al*., 2008).

In light of these limitations, the need for an integrated pre-anesthetic assessment becomes evident, in which ASA PS is used as a complementary tool. The combination of ASA PS classification with a detailed anamnesis, thorough physical examination, and laboratory testing allows for a more accurate assessment of anesthetic risk (Alef; Von Praun; Oechtering, 2008; Mitchell *et al*., 2018).

Studies have shown that integrating clinical and laboratory parameters into the ASA PS classification contributes to the individualization of anesthetic protocols, particularly in patients with comorbidities, systemic diseases, advanced age, or those undergoing highly complex procedures. In a prospective study involving more than 30,000 dogs and cats, Brodbelt *et al*. (2008) observed that anesthetic mortality in ASA PS III–V individuals was up to ten times higher than in ASA PS I–II patients, and that the inclusion of laboratory tests (complete blood count and biochemical analysis) and targeted clinical assessment reduced complications in elderly animals and those with subclinical cardiac disease. Similarly, Portier and Ida (2018) reported that incorporating parameters such as blood gas analysis, electrolytes, and renal function into the ASA PS score enabled protocol adjustments (such as dose reduction and selection of less depressant drugs) and reduced adverse events in patients with renal and hepatic disease.

These groups present higher risk for specific reasons: systemic diseases such as renal failure, hepatopathy, diabetes, and cardiac disease compromise the functional reserve of target organs, impairing drug metabolism and excretion and reducing the capacity to respond to hypotension and hypoxemia. Elderly patients, in turn, experience progressive physiological decline, including reduced muscle mass, diminished renal and hepatic function, and decreased cardiac and respiratory reserve, making them more vulnerable to hemodynamic fluctuations and postoperative complications. High-complexity procedures (thoracic, neurological, extensive oncological surgeries, or emergencies) impose greater surgical stress, increased blood loss, prolonged anesthetic time, and greater manipulation of vital organs, thereby increasing the likelihood of adverse events even in ASA PS I–II patients. Therefore, integrating ASA PS with clinical and laboratory assessment allows for more precise risk stratification and individualized management, including the selection of drugs with lower cardiovascular impact, advanced monitoring, and intensified postoperative care, particularly in these higher-risk groups (Brodbelt *et al*., 2008; Portier; Ida, 2018; Redondo *et al*., 2024). Furthermore, an integrated pre-anesthetic assessment facilitates communication regarding anesthetic risk among members of the veterinary team and the animals' caregivers.

Clinical Implications of the ASA PS Classification in Anesthetic Planning

The ASA PS classification has a direct influence on anesthetic planning, particularly regarding drug selection, monitoring intensity, and the definition of perioperative care (Portier; Ida, 2018). As discussed previously, a single ASA PS category may encompass different levels of risk. For patients classified as ASA PS ≥ III, more conservative anesthetic protocols are recommended, based on clinical experience and veterinary anesthesiology guidelines. In such cases, induction may be performed using propofol titrated to effect (often at reduced doses) or etomidate, instead of barbiturates (Bednarski *et al*., 2011; Lamont *et al*., 2024). Maintenance should be achieved with low concentrations of isoflurane or sevoflurane, combined with potent opioids such as methadone or morphine (Bednarski *et al*., 2011; Lamont *et al*., 2024).

Whenever possible, the use of balanced anesthesia and locoregional techniques is recommended (Muir *et al*., 2012), combined with rigorous monitoring, including capnography, blood pressure measurement, and continuous electrocardiography. Invasive monitoring and blood gas analysis are indicated when available (Bednarski *et al*., 2011). In this context, Table 3 summarizes monitoring recommendations for each ASA PS category, constituting a guiding proposal that should be adapted to the reality of each service and professional judgment.

Patients classified as ASA PS ≥ III with clinical instability present severe systemic disease and reduced physiological reserve, limiting their ability to compensate for changes in blood pressure, oxygenation, and acid–base balance. In such cases, complications such as hypotension, hypoxemia, and metabolic disturbances may progress rapidly in the absence of adequate monitoring, increasing the risk of perioperative mortality due to delayed implementation of hemodynamic and ventilatory support measures, as recommended by the ACVAA (Bailey *et al*., 2025; Brodbelt *et al*., 2008; Redondo *et al*., 2024).

Thus, advanced monitoring constitutes an essential tool in anesthetic management and intensive support for these patients, contributing to greater anesthetic safety and improved surgical outcomes.

Table 3 – Suggested Monitoring According to ASA PS Category in Anesthetic Planning for Dogs and Cats

ASA PS	Patient Complexity	Recommended Monitoring	Implications for Anesthetic Planning
ASA PS I	Healthy patient, no evident disease (e.g., young animal for elective neutering).	Minimal (intermittent): clinical observation (HR, RR, mucous membrane color), temperature.	Conventional protocols; low anesthetic risk; rapid recovery expected.
ASA PS II	Mild, controlled systemic disease (e.g., mild obesity, moderate dental disease, advanced age).	Basic to intermediate (continuous): add SpO_2, ECG, non-invasive MAP (oscillometric) every 5 minutes.	Minor dose adjustments (e.g., <20% reduction in induction agents); use of preemptive analgesia.
ASA PS III	Moderate systemic disease with functional impact (e.g., CKD stage II, compensated cardiac disease).	Intermediate to advanced (continuous): add capnography, invasive MAP (consider), hourly urine output.	Individualized protocols (cardiostable drugs); greater caution during induction; strict thermal support and fluid therapy.
ASA PS IV	Severe, unstable systemic disease, life-threatening (e.g., sepsis, major trauma, cardiac decompensation).	Advanced (continuous): arterial blood gas analysis, central venous pressure, dynamic hemodynamic monitoring (e.g., PVI, PPV).	Mandatory pre-stabilization; balanced anesthesia (e.g., opioids + benzodiazepines); vasoactive support readily available.
ASA PS V	Moribund patient, not expected to survive without surgery (e.g., massive hemorrhage, multiple organ failure).	Advanced and continuous (as in ASA IV) + coagulation monitoring (TEG/ROTEM, if available).	Rescue approach; primary focus on hemodynamic and transfusion support; anesthesia often opioid-based.

HR: Heart Rate; RR: Respiratory Rate; SpO_2: Peripheral Oxygen Saturation; ECG: Electrocardiogram; MAP: Mean Arterial Pressure; CKD: Chronic Kidney Disease; PVI: Pleth Variability Index; PPV: Pulse Pressure Variation; TEG: Thromboelastography; ROTEM: Rotational Thromboelastometry.

T Source: adapted from Portier and Ida (2018), Brodbelt *et al.* (2008) and Redondo *et al.* (2024).

T Note: this is a guiding proposal and should be adapted to each service's reality and professional judgment. Resources such as CVP, PPV, TEG/ROTEM, and similar tools are recommended when available or in centers with advanced support.

Final Considerations

It is concluded that the ASA PS classification is a widely used tool in the pre-anesthetic evaluation of veterinary patients, contributing to risk stratification, selection of anesthetic protocols, and monitoring planning. However, it presents relevant limitations, particularly regarding subjectivity in category assignment and its inability, when used in isolation, to fully reflect the complexity of the underlying disease and the surgical procedure.

Examples discussed, such as cardiac patients classified within the same category as animals with mild clinical alterations, demonstrate that individuals within the same group may present

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different levels of risk, which may lead to underestimation or overestimation of anesthetic risk when the classification is used alone.

From the authors' perspective, although indispensable, the ASA PS classification is often overvalued as a sole stratification criterion, potentially compromising clinical decision-making. Therefore, its interpretation should be critical and integrated into a comprehensive pre-anesthetic assessment, including clinical examination, complementary testing, and analysis of surgical complexity.

Its application should be individualized, avoiding automatic classification. Common errors include disregarding the functional severity of the underlying disease and failing to adjust anesthetic planning within the same category. Situations such as the presence of an asymptomatic cardiac murmur may lead to inappropriate classification, while indiscriminate use of the ''E'' suffix in non-emergency conditions also represents a frequent mistake. Additionally, periodic review of the classification by the clinical team, through training and checklists, may improve interobserver agreement and reduce variability. It is essential to recognize that a single ASA PS score does not imply equivalent risk; proper interpretation requires evaluation of both the patient's clinical status and the complexity of the procedure.

In practice, classification should be based on thorough anamnesis and physical examination, avoiding oversimplifications such as subclassifying patients with subclinical alterations. Thus, ASA PS is most reliable when applied in a contextualized manner, combined with clinical judgment and comprehensive patient assessment, contributing to improved anesthetic safety and better clinical outcomes. &

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