

Classification of physical status and anesthetic risk of dogs undergoing osteosynthesis

Classificação do estado físico e risco anestésico de cães submetidos à osteossíntese

Clasificación del estado físico y riesgo anestésico de los perros sometidos a osteosíntesis

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Abstract

The majority of orthopedic events in small animals reported in routine clinical practice comprise traumatic fractures. In most cases, surgical treatment is indicated. All patients undergoing a surgical procedure need a careful preoperative evaluation to establish a safe anesthetic protocol. This evaluation reduces the risk of complications. The American Society of Anesthesiologists (ASA) classification is an important tool that links to the patient medical record and can potentially decrease anesthetic and surgical risks. The present study aimed to classify 33 canine patients referred for surgical osteosynthesis, according to their physical status and anesthetic risk corresponding to the American Society of Anesthesiologists classification. After clinical and laboratory evaluation, the patients were classified by a single evaluator. There was no ASA I patient because this category includes only healthy animals. The ASA II category comprised 12 patients (12/33; 36.36%), considered as suffering from mild systemic diseases. Nineteen patients were classified as ASA III (19/33; 57.57%); these presented with complicated fractures. Only one patient with polytrauma was classified as ASA IV. There were no patients in ASA V or VI and there were no deaths. The results show that among dogs referred for surgical osteosynthesis in the analyzed service and period, the majority were classified as ASA III.

Keywords: Fractures; Canines; ASA; Pre-surgical evaluation.

Resumo

A principal casuística de problemas ortopédicos na clínica de animais de pequeno porte são fraturas traumáticas. Na maioria dos casos de fraturas em cães e gatos está indicado o tratamento cirúrgico. Todo paciente submetido a procedimento cirúrgico necessita de uma avaliação pré-operatória minuciosa para que possa ser estabelecido um protocolo anestésico seguro. Tal avaliação reduz o risco de complicações. A classificação proposta pela *American Society of Anesthesiologists* (ASA) é uma ferramenta importante que, adicionada ao prontuário do paciente, minimiza os riscos anestésicos e cirúrgicos. O objetivo do presente estudo foi classificar pacientes caninos que foram submetidos a procedimentos cirúrgicos de osteossíntese de acordo com a classificação ASA. Foram avaliados 33 cães que foram submetidos à anestesia geral. Após avaliação clínica e laboratorial os pacientes foram classificados por um único avaliador. Não houve pacientes ASA I porque tal categoria abrange apenas pacientes saudáveis. Na categoria ASA II houve 12 pacientes (12/33; 36,36%), considerados como portadores de enfermidades sistêmicas leves. Houve 19 pacientes ASA III (19/33; 57,57%) que apresentavam fraturas complicadas. Apenas um paciente politraumatizado (múltiplas fraturas) foi classificado como ASA IV. Não houve pacientes ASA V e VI e não ocorreram óbitos. Concluiu-se que de todos os cães submetidos à osteossíntese cirúrgica no serviço e período analisado a maioria dos pacientes foi classificado como ASA III.

Palavras-chave: Fraturas; Canino; ASA; Avaliação pré-cirúrgica.

Resumen

La principal serie de problemas ortopédicos en la clínica de pequeños animales son las fracturas traumáticas. En la mayoría de los casos de fracturas en perros y gatos, está indicado el tratamiento quirúrgico. Todo paciente que se somete a un procedimiento quirúrgico necesita una evaluación preoperatoria completa para poder establecer un protocolo anestésico seguro. Tal evaluación reduce el riesgo de complicaciones. La clasificación propuesta por la *American Society of Anesthesiologists* (ASA) es una herramienta importante que, sumada al historial del paciente, minimiza los riesgos anestésicos y quirúrgicos. El objetivo del presente estudio fue clasificar a los pacientes caninos sometidos a procedimientos quirúrgicos de osteosíntesis según la clasificación ASA. Se evaluaron treinta y tres perros que se sometieron a anestesia general. Después de la evaluación clínica y de laboratorio, los pacientes fueron clasificados por un solo evaluador. No hubo pacientes ASA I porque esta categoría solo cubre a pacientes sanos. En la categoría ASA II, hubo 12 pacientes (12/33; 36,36%), considerados con enfermedades sistémicas leves. Había 19 pacientes ASA III (19/33; 57,57%) que tenían fracturas complicadas. Solo un paciente politraumatizado (fracturas múltiples) se clasificó como ASA IV. No hubo pacientes ASA V y VI ni muertes. Se concluyó que, de todos los perros sometidos a osteosíntesis quirúrgica en el servicio y período analizado, la mayoría de los pacientes fueron clasificados como ASA III.

Palabras clave: Fracturas; Canino; ASA; Evaluación prequirúrgica.

1. Introduction

The majority of orthopedic events in small animals reporting to veterinary clinics are traumatic fractures corresponding to one-third of the animals served (Shiju et al., 2010). Fractures can occur due to falls, involvement in fights, projectiles, and other traumatic events such as auto accidents (Batatinha et al., 2021; Kumar et al., 2007). In dogs and cats, the pelvic limbs present a higher incidence of fracture, with the femur being the most affected bone (Ben Ali, 2013; Vidane et al., 2014; Libardoni et al., 2016; Uwagie-Ero et al., 2018).

When evaluating the age of the animals, those younger than one year were noted to present a higher incidence (Batatinha et al., 2021; Kemper & Diamante, 2015; Souza et al., 2011). The fact that fractures occur more frequently in young animals is probably related to the bone fragility characteristic of the age group, as they are in the growth phase. In addition, young dogs lack the ability to avoid severe injury (Batatinha et al., 2021; Vidane et al., 2014).

A preoperative evaluation with anamnesis, physical examination, and relevant tests should be performed for every patient who needs to undergo a surgical procedure before initiating anesthesia. This evaluation reduces the risk of intraoperative complications and also decreases the postoperative fatality rates (Schwartzman et al, 2011).

Know who are responsible for the surgical procedure is not only dependent on the severity of the surgery, but are also dependent on various factors involved with the physiology of patients. Therefore, important factors influencing mortality and postoperative morbidity in animals are considered, including age, physical status, and the nature of the surgery (elective or emergency) (Fernandes et al., 2010).

The classification according to American Society of Anesthesiologists (ASA) (2019) guidelines, of patients scheduled for surgical procedures has become an important tool to ensure safety (Schwartzman et al., 2011). Therefore, such classification should be included in the clinical record of the patient, minimizing the possible complications during the surgical and anesthetic procedures and providing a more accurate patient prognosis (Luz et al., 2012). The aim of this study was to classify the ASA anesthetic risk of canine patients who underwent osteosynthesis surgical procedures at a Teaching Veterinary Hospital (TVH).

2. Methodology

In the study in question, a qualitative method was adopted (Pereira et al., 2018) that included a descriptive analysis of the study variables with determination of percentage and numerical frequencies.

The present study was approved by the ethics committee of the institution where it was carried out, with protocol no. 063/11.

The study included 33 dogs were referred for osteosynthesis surgical procedures and underwent the same under general anesthesia.

All patients were evaluated clinically by a single evaluator and stabilized for surgical procedures while they were hospitalized for surgical preparation. The examination consisted of hematological and biochemical evaluation, mucosal staining, hydration status, and vital parameters (heart rate, respiratory rate, and temperature). Based on this clinical evaluation, the animals were classified according to their physical status and anesthetic risk according to the American Society of Anesthesiologists guidelines (ASA, 2019) (Table 1).

Table 1. Categories of anesthetic risk and physical status according to the American Society of Anesthesiologists.

ASA	Characteristics
ASA I	Normal and healthy patient
ASA II	Patient with mild grade systemic disease
ASA III	Patient with severe systemic disease
ASA IV	Patient with severe systemic disease that is a constant threat to life
ASA V	Patient dying, with no expectation of survival without surgery
ASA VI	Patient with brain death whose organs will be removed for donation purposes

E: Emergency qualifier

Source: ASA (2019).

All data obtained were carefully recorded on individual records. These data were arranged in tables and graphs with percentage frequencies and absolute numbers.

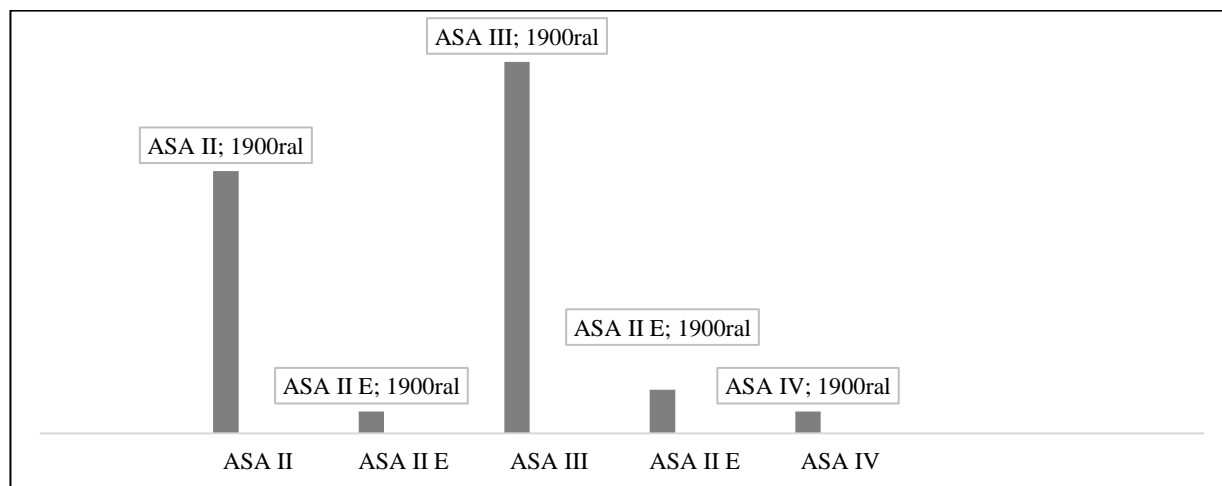
3. Results and Discussion

All patients of the present study were classified into ASA categories to establish anesthetic risk. Such classification helps to make care decisions before, during, and after surgery (Luz et al., 2012; Rodrigues et al., 2018; Schwartzman et al., 2011). It is also important to note that the higher the ASA classification, the greater the possibility of complications and death (Rodrigues et al., 2017; Rodrigues et al., 2018; Schwartzman et al., 2011). Therefore, ASA classification is a very important method for measuring the risk of complications during surgical procedures and predicting the postoperative prospects (Rodrigues et al., 2017; Rodrigues et al., 2018; Schwartzman et al., 2011).

In cases of fractures in animals is common occurs bone or cartilage continuity ruptures, involvement of vulnerable areas, injury to surrounding soft tissues, as well as blood supply (Piermattei, Flo & Decamp, 2006). In this way, none of the 33 patients referred for surgical osteosynthesis were classified as ASA I, since this category includes healthy patients (ASA, 2019) undergoing elective surgery (Shmon, 2007).

A total of 12 dogs (36.36%, 12/33) (Figure 1) were classified as ASA II; the category includes patients with mild systemic diseases (ASA, 2019; Rodrigues et al., 2017; Rodrigues et al., 2018) undergoing surgeries for simple fracture reduction (Figure 2). One patient was classified as ASA II E because of a mandibular fracture, considered to be an emergency, due to malocclusion, which could lead to anorexia with malnutrition and further complications.

Figure 1. Number in different categories of anesthetic risk and physical status according to the American Society of Anesthesiologists guidelines of 33 dogs submitted to surgical osteosynthesis at a Teaching Veterinary Hospital over a seven-month period.



ASA I: Healthy patient; ASA II: Patient with mild grade systemic disease; ASA III: Patient with severe systemic disease; ASA IV: Patient with severe, life-threatening systemic disease; ASA V: Patient dying, with no expectation of survival. E: emergency. Source: ASA (2019).

Nineteen patients referred for surgical osteosynthesis for complicated fractures were classified as ASA III (57.57%, 19/33) (Figure 1). Thus, ASA III patients constituted the majority in the present study. In studies on the classification of animals undergoing to surgical procedures, ASA III patients had a high degree of representation (Rodrigues et al., 2016, Rodrigues et al., 2018). Those classified as ASA III evidenced signs of moderate systemic disease (Futema, 2002) related to the alterations produced by fractures, such as local edema, stress, pain, leukocytosis, and others clinical signs (Horta & Rezende, 2014).

Figure 2. Male mongrel dog, thirty days old, with simple fracture in the left femur, after a surgical procedure.



Source: Personal archive.

Only one patient, who presented multiple fractures, was classified as ASA IV for having presented with polytrauma. Animals affected by polytrauma can present with severe systemic complications with a constant threat to life (Table 1, ASA, 2019). This patient, however, recovered after clinical stabilization and surgical treatment. No patients were classified as ASA V or VI (Table 1).

During the study period, there were no deaths among patients who were administered general anesthesia for correction of fractures. In patients classified as ASA II, the death rate is low (Rodrigues et al., 2018), varying from 0.12% (Bille et al., 2012) to 0.55% (Luz et al., 2012). Among the ASA III category animals, the frequency of deaths has been reported between 0,9% to 2% (Luz et al., 2012; Itami et al., 2017; Rodrigues et al., 2018), and may be higher in patients with systemic impairment (Bille et al., 2012). In a study of 90 dogs with aural hematoma, all patients were classified as ASA II or III, and no deaths were reported (Rodrigues et al., 2016).

4. Conclusion

All dogs undergoing osteosynthesis with general anesthesia in the analyzed service were classified as ASA II, III, or IV, with the majority of the patients being classified as ASA III. There were no deaths among the patients included in the study.

Studies on anesthetic classification and perioperative mortality in animals are scarce in Brazil. It is considered important to carry out studies on the subject, involving other species and other surgical procedures. Such studies may contribute to reducing morbidity and mortality among animals undergoing anesthetic procedures.

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