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Anesthetic mortality in small animal veterinary medicine: when things go wrong and a concise review of risk factors

Claudio Marcos Rocha de Souza^{1,2*} , Juliana Letícia Rossetto Marques³ , Frederico Ramos Virgílio de Lima³ 

¹Undergraduate Student of Veterinary Medicine. Faculdade de Medicina Veterinária, Universidade Santa Úrsula – USU – Rio de Janeiro, Rio de Janeiro, Brasil.

²Laboratório de Bacteriologia Aplicada à Saúde Única e Resistência Antimicrobiana (LabSUR). Instituto Oswaldo Cruz (IOC), Fundação Oswaldo Cruz (Fiocruz), Rio de Janeiro, Brazil

³Senior lecturer of Veterinary Medicine. Faculdade de Medicina Veterinária, USU, Rio de Janeiro, Rio de Janeiro, Brasil.

*Corresponding author: e-mail: claudio.rocha@ioc.fiocruz.br

Abstract. Anesthetic related mortality in small animals varies significantly across studies, dictated by patient health, institutional protocols, and regional practices. This narrative review evaluates literature from 1990 to 2026 to map historical baselines. While overall safety has improved, patients classified as ASA III–V, geriatric, or pediatric status remain at a substantially higher risk. Breed-specific vulnerabilities, particularly in brachycephalic animals and feline weight extremes, further complicate perioperative outcomes. Notably, recent worldwide mortality rates (0.63%–0.69%) contrast with higher Brazilian figures (1.16%), highlighting a persistent regional gap often linked to outdated protocols. Given that over 70% of fatalities occur in the postoperative period, extended vigilance is essential. Adopting locoregional anesthesia and multimodal analgesia is crucial to bridging these gaps and enhancing patient safety.

Keywords. ASA classification, mortality, risk factors, small animal, veterinary anesthetic.

Mortalidade anestésica em pequenos animais: quando o inesperado acontece e panorama atual dos fatores de risco

Resumo. mortalidade relacionada à anestesia em pequenos animais varia significativamente entre os estudos, sendo influenciada pela condição clínica dos pacientes, pelos protocolos institucionais e pelas práticas regionais. Esta revisão narrativa avalia a literatura publicada entre 1990 e 2026, com o objetivo de mapear os dados históricos. Embora a segurança anestésica tenha melhorado ao longo do tempo, pacientes classificados como ASA III–V, geriátricos ou pediátricos permanecem sob risco substancialmente maior. Vulnerabilidades específicas relacionadas à raça, particularmente em animais braquicefálicos e em felinos com extremos de peso corporal, tornam os desfechos perioperatórios ainda mais complexos. Notavelmente, as taxas de mortalidade recentes relatadas em estudos internacionais (0,63%–0,69%) contrastam com a taxa mais elevada observada no Brasil (1,16%), evidenciando uma possível diferença regional frequentemente associada ao uso de protocolos desatualizados. Considerando que mais de 70% dos óbitos ocorrem no período pós-operatório, a vigilância prolongada é essencial. A adoção de técnicas de anestesia locoregional e de analgesia multimodal é fundamental para reduzir essas diferenças e melhorar a segurança dos pacientes.

Keywords. ASA classificação, mortalidade, fator de risco, pequenos animais, anestesia veterinária.

Introduction

Historical perspective of anesthetic mortality

General anaesthesia is a fundamental component of modern veterinary practice, enabling complex surgical and diagnostic procedures in small animals ([Barcelos et al., 2021](#); [Paddelford, 2001](#)). However, it carries inherent physiological risks that may lead to severe complications and death ([Luz et al., 2012](#)). As anaesthetic-related mortality rates vary considerably according to patient status and clinical protocols, this review aims to evaluate anaesthetic-related mortality in dogs and cats, highlighting the principal risk factors, protective strategies, and contemporary ([Bille et al., 2012, 2014](#)).

Historically, anaesthetic-related mortality rates have varied widely depending on institutional practices, patient health status, and the period during which studies were conducted ([Clarke & Hall, 1990](#)). Early investigations from veterinary institutions in the United States reported relatively high mortality rates. For example, the Angell Memorial Animal Hospital in Boston documented mortality rates of 0.26% in dogs, 0.36% in cats, and 5% in other species ([Brodelt, 2009](#); [Payne et al., 2017](#)).

One of the first large multicentre studies conducted in the United Kingdom (1984–1986) evaluated 41,881 anaesthetic procedures. Overall mortality rates were 0.23% in dogs and 0.29% in cats. Among healthy animals (ASA I–II), these rates decreased to 0.21% in dogs and 0.18% in cats. In contrast, patients with significant systemic disease (ASA III–V) exhibited substantially higher mortality rates, exceeding 3% in both species. In healthy animals, deaths were primarily attributed to anaesthesia unless surgical complications were identified ([Clarke & Hall, 1990](#)).

Subsequently, a study conducted in Ontario, Canada, involving 16,789 anaesthetic procedures over a six-month period, reported mortality rates of 0.11% in dogs and 0.10% in cats. Among healthy patients (ASA I–II), mortality was considerably lower, at 0.067% in dogs and 0.048% in cats. In patients with systemic disease (ASA III–V), mortality increased to 0.46% in dogs and 0.92% in cats ([Dyson et al., 1998](#)).

The largest multicentre study to date, the *Confidential Enquiry into Perioperative Small Animal Fatalities* (CEPSAF), analysed 98,036 anaesthetic procedures in dogs and 79,178 in cats across 117 veterinary centres in the United Kingdom. Mortality rates were 0.17% for dogs and 0.24% for cats. Among healthy patients (ASA I–II), mortality decreased to 0.05% in dogs and 0.11% in cats, whereas patients with systemic disease (ASA III–V) exhibited mortality rates exceeding 1% in both species ([Brodelt et al., 2008](#)).

These findings demonstrate that anaesthetic safety has improved substantially over time, particularly for healthy patients. Nevertheless, animals with pre-existing disease and those belonging to higher-risk categories continue to require meticulous perioperative management. In specialized high-volume spay–neuter clinics, anaesthetic-related mortality has been reported to be as low as 0.009% in dogs, representing a marked reduction compared with the higher rates observed in general veterinary practices and referral hospitals managing more complex cases ([Levy et al., 2017](#)). Furthermore, recent scoping reviews have comprehensively documented this temporal evolution, confirming an overall decline in anaesthetic-related mortality while emphasizing that clinically important variations persist according to the healthcare setting, patient population, and perioperative management protocols ([Bille et al., 2012, 2014](#)).

Materials and methods

This concise narrative review is based on a literature search across PubMed, Scopus and Google Scholar. Search terms included anesthetic mortality, risk factors and ASA classification, combined with dogs or cats. The selection prioritized peer reviewed retrospective analyses, prospective cohorts and large multicenter enquiries published in English and Portuguese. Beyond electronic databases, additional relevant records were identified through manual citation tracking of selected manuscripts to ensure the inclusion of seminal historical data alongside contemporary trends from 1990 to 2026. This approach may capture global epidemiological baselines while allowing for a direct comparison with the current clinical context of veterinary anesthesia in Brazil.

Key risk factors

Despite its routine use for surgical and diagnostic interventions, general anaesthesia carries significant inherent risks, potentially leading to severe complications and mortality. Mortality rates in

dogs undergoing anaesthesia are notably higher in geriatric (>12 years) and paediatric (<3 months) patients, attributed to physiological limitations that reduce their ability to compensate for anaesthetic-related complications. Obesity is also a recognised risk factor due to its detrimental effects on cardiovascular and respiratory systems and its impact on the pharmacokinetics of anaesthetic agent ([Brodbelt et al., 2008](#); [Matthews et al., 2017](#)).

Recent global analyses have further refined these parameters by identifying breed-specific vulnerabilities. Large-scale studies have specifically flagged breeds such as the Yorkshire Terrier and Labrador Retriever as presenting elevated mortality odds alongside general brachycephalic populations ([Redondo et al., 2025](#)). However, while brachycephalic dogs demonstrate a higher crude mortality rate (0.82%) compared to non-brachycephalic breeds (0.65%), this increased risk is largely attenuated when adjusted for the patient's ASA physical status. This reinforces that, in canines, overall health impairment is a stronger predictor of death than breed conformation alone ([Redondo et al., 2025](#)).

Interestingly, this pattern diverges in felines. A 2024 study evaluating breed-specific mortality in 14,964 cats revealed that extreme brachycephalic breeds, such as Persians and Exotic Shorthairs, retain a significantly higher risk of anaesthetic-related death (RR 2.33) even after adjusting for ASA status. Furthermore, respiratory complications were identified as the predominant cause, accounting for 62% of deaths in these extremely brachycephalic cats, highlighting a profound anatomy-driven vulnerability that demands specific peri-anaesthetic airway planning ([Redondo et al., 2024a](#)).

Furthermore, the American Society of Anesthesiologists (ASA) classification strongly correlates with mortality. Dogs classified as ASA III-V show significantly higher mortality rates compared to ASA I-II, highlighting the critical importance of stabilizing compromised patients prior to induction ([Brodbelt et al., 2008](#); [Redondo et al., 2024a](#)). In feline patients, similar patterns emerge, but extreme variations in body weight act as critical determinants of survival. Both underweight felines (< 2 kg; or 6.5) and those exceeding 6 kg (or 4.0) exhibit markedly elevated mortality odds compared to normal-weight individuals. These extremes amplify vulnerabilities to hypothermia, hypoventilation, and dosing inaccuracies. Furthermore, the intraoperative use of mechanical ventilation has been uniquely associated with elevated mortality in this species [Redondo et al. \(2024b\)](#).

Emergency procedures and complex surgeries elevate mortality risks, particularly for polytraumatised patients undergoing thoracotomies or orthopaedic surgeries ([Itami et al., 2017](#); [Shoop-Worrall et al., 2022](#)). These procedure-specific risks are closely mirrored in cats, where abdominal, orthopaedic, neurosurgical, and thoracic surgeries significantly increase the likelihood of perianesthetic death ([Redondo et al., 2024b](#)). Inadequate monitoring is consistently linked to higher mortality rates, especially in short-duration procedures where advanced safety measures are often compromised.

Protective factors

Locoregional anaesthesia has been associated with lower mortality rates. Similar to human medicine, these techniques provide greater haemodynamic stability and reduce systemic anaesthetic requirements. Sevoflurane has also been demonstrated to be safer than isoflurane, likely due to reduced respiratory depression and faster recovery times. The use of sedatives, such as alpha-2 agonists combined with opioids or non-steroidal anti-inflammatory drugs (NSAIDs), is associated with improved survival ([Matthews et al., 2017](#); [Shoop-Worrall et al., 2022](#)). This protective multimodal approach has been robustly validated in recent worldwide feline cohorts, confirming that incorporating alpha-2 agonist sedatives, pure opioids during premedication, and locoregional techniques substantially reduces mortality odds in cats ([Redondo et al., 2024b](#)). A schematic overview summarizing these primary risk and protective determinants is illustrated in [figure 1](#).

Contemporary global data and recent findings

[Brodbelt et al. \(2008\)](#) reported an anaesthetic mortality rate of 0.17% in dogs overall and 1.33% in dogs with compromised health in the UK. Key risk factors included advanced age, poor physical condition, and emergency procedures. A subsequent study across 39 Spanish clinics (2007–2008) analysed 2,012 procedures, finding a 1.29% mortality rate, with 77% of deaths occurring postoperatively ([Gil & Redondo, 2013](#)). Mortality rose from 0.33% in ASA I-II dogs to 4.06% in ASA III-V. Thoracic

surgeries, longer procedures, and benzodiazepine use increased mortality, while multimodal analgesia reduced it ([Gil & Redondo, 2013](#)).

A retrospective analysis at a Greek university veterinary hospital (2018–2019) revealed an overall anaesthetic mortality rate of 0.6%. For dogs, mortality was 0.1% in ASA I-II patients but rose to 2.6% in ASA III-V. Cats showed higher risks: overall mortality was 0.8%, increasing from 0.5% in ASA I-II to 2.2% in ASA III-V ([Varkoulis et al., 2023](#)). Across these studies, higher ASA classifications consistently indicate increased mortality. The data consistently show cats facing higher anaesthetic mortality than dogs, reflecting their unique physiological vulnerabilities and greater sensitivity to anaesthetics.

A recent prospective cohort study encompassing 55,022 dogs across multiple countries established an anaesthetic-related mortality rate of 0.69%. This translates to approximately one in every 145 dogs succumbing to anaesthesia-related causes between pre-anaesthetic medication administration and the first 48 hours post-extubation ([Redondo et al., 2024a](#)). Complementing this, an equally robust global study evaluated 14,962 cats, establishing a feline mortality rate of 0.63% ([Redondo et al., 2024b](#)). Crucially, this study highlighted that 74.5% of feline deaths occur during the postoperative period, emphasizing the absolute necessity of extended vigilance well beyond the surgical intervention itself ([Redondo et al., 2024b](#)).

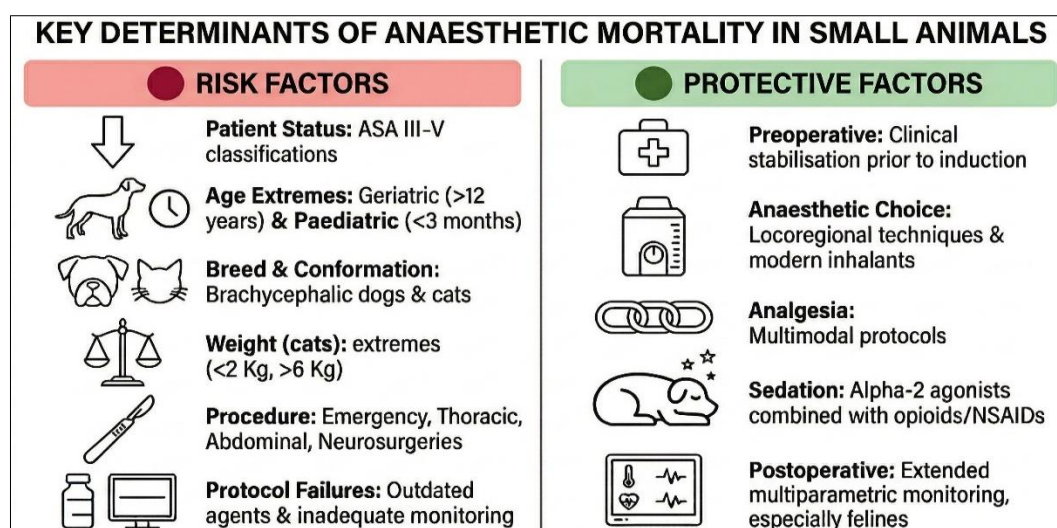


Figure 1. Key determinants of Anaesthetic Mortality in Small Animals. A schematic overview illustrating primary risk and protective factors. Risks include high ASA status (III–V), age and feline weight extremes (<2 kg, >6 kg), breed conformation, and protocol failures. Protective measures involve preoperative clinical stabilisation, locoregional and modern inhalant techniques, multimodal analgesia, combined sedation, and extended multiparametric monitoring. Infographic created with the Canva platform using non-proprietary visual assets.

Epidemiology of anaesthetic mortality in Brazil

Brazil still lacks robust national data on anaesthetic mortality in small animals. This gap likely stems from the absence of centralized reporting systems and widespread underreporting in primary care settings. A retrospective study (1996–2006) examined anaesthetic-related deaths at the Veterinary Clinical Hospital of the State University of Santa Catarina (UDESC), analysing 7,012 patients (5,500 dogs and 1,512 cats). The overall mortality rate was 0.9%, with 0.89% in dogs and 0.92% in cats. The highest mortality in dogs (20.4%) occurred with an outdated protocol using atropine, xylazine, thiopental, and halothane. Similar trends were observed in cats, though no specific protocol was significantly isolated ([Corrêa et al., 2009](#)).

Despite global advances, more recent Brazilian data suggest that anaesthetic mortality remains a significant challenge. A contemporary retrospective study by [Soares et al. \(2022\)](#) evaluated transoperative and postoperative mortality in dogs and cats, reporting an overall mortality rate of 1.16. The authors demonstrated a strong statistical correlation between higher ASA classifications and the occurrence of perianesthetic deaths, reinforcing that the patient's physical status is the primary determinant of risk.

This recent mortality rate of 1.16% is notably higher than the modern global averages of 0.63% to 0.69% reported by worldwide cohorts, exposing a persistent regional gap. The historical reliance on older anaesthetic agents, coupled with the lack of comprehensive multiparametric postoperative monitoring in many Brazilian facilities, emphasizes an urgent need to update and track clinical practices nationwide. A chronological summary of the main epidemiological studies evaluating perioperative mortality in small animals, including incidence rates and major risk factors, is presented in [table 1](#).

Table 1. Chronological summary of key epidemiological studies evaluating anaesthetic-related mortality in dogs and cats, highlighting incidence rates and major risk factors

Reference	Location/Scope	Species, sample size	Mortality rate, %	Key findings & risk factors
Clarke & Hall (1990)	United Kingdom	Dogs & Cats (n = 41,881)	0.23% (Dogs) 0.29% (Cats)	Early large-scale study. Mortality exceeded 3% in animals (ASA III–V).
Dyson et al. (1998)	Ontario, Canada	Dogs (n = 8,087) Cats (n = 8,702)	0.11% (Dogs) 0.10% (Cats)	Healthy patients had substantially lower rates (0.067% dogs, 0.048% cats).
Brodelt et al. (2008)	United Kingdom	Dogs (n = 98,036) Cats (n = 79,178)	0.17% (Dogs) 0.24% (Cats)	Largest historical multicentre study. Advanced age, high ASA, and emergency procedures identified as major risks.
Corrêa et al. (2009)	Brazil	Dogs (n = 5,500) Cats (n = 1,512)	0.89% (Dogs) 0.92% (Cats)	Highest mortality linked to outdated protocols (atropine, xylazine, thiopental, halothane).
Gil & Redondo (2013)	Spain	Dogs (n = 2,012)	1.29%	77% of deaths occurred postoperatively. Multimodal analgesia reduced mortality.
Levy et al. (2017)	High-Volume Clinics	Dogs (n = 42,349) Cats (n = 71,557)	0.009% (Dogs) 0.05% (Cats)	Exceptionally low mortality in specialized spay-neuter clinics for healthy patients.
Soares et al. (2022)	Brazil	Dogs (n = 1,600) / Cats (n = 129)	1.16% (Overall)	Contemporary local data showing higher mortality than global averages. Strong correlation with ASA status.
Varkoulis et al. (2023)	Greece	Dogs (n = 1,187) Cats (n = 250)	0.6% (Dogs) 0.8% (Cats)	Reaffirmed cats face higher risks than dogs. Cardiac arrest occurred in 1.1% of canine cases.
Redondo et al. (2024a)	Worldwide	Dogs (n = 55,022)	0.69%	Modern global baseline. Identified Yorkshire Terriers, Labradors, and inadequate monitoring as specific risks.
Redondo et al. (2024b)	Worldwide	Cats (n = 14,962)	0.63%	74.5% of feline deaths occurred postoperatively. Cachexia and mechanical ventilation identified as risks.
Redondo et al. (2025)	Worldwide	Dogs (n = 55,019)	0.82% (Brachycephalic)	Adjusted risk showed that overall health impairment (ASA) is a stronger mortality predictor than brachycephalic conformation alone.
Redondo et al. (2026)	Worldwide	Cats (n = 14,964)	Higher risk (RR 2.33)	Extreme brachycephalic cats (e.g., Persians) face a 2.33x higher risk of death, independent of ASA status. 62% of these deaths are respiratory.

Note: n = sample size; ASA = American Society of Anesthesiologists physical status classification; CEPSAF = Confidential Enquiry into Perioperative Small Animal Fatalities; RR = Relative Risk.

The human factor

The true rate of anaesthetic mortality is likely much higher than studies suggest due to widespread underreporting. Unlike human medicine, veterinary clinics rarely have mandatory systems to audit morbidity and mortality. This often creates a culture where surgical successes are highlighted, but anaesthetic complications are hidden or simply blamed on the patient's initial health status ([Oxtoby & Mossop, 2019](#)). Without a transparent environment that allows professionals to openly discuss adverse events, gathering accurate data is almost impossible. This culture of silence prevents the improvement of safety protocols and creates a false sense of security ([Mcmillan, 2014](#)).

Another major, yet frequently ignored, risk factor is the human element itself. In human medicine, having a rigorously trained specialist is mandatory, but veterinary medicine still struggles with a lack of deep specialization ([Grubb et al., 2020](#); [Grubb & Lobprise, 2020](#)). Many professionals monitoring anaesthesia possess only superficial knowledge of applied pharmacology and physiology. Even within postgraduate training, programmers are short, and residents are sometimes restricted by mentors who prefer outdated, standard protocols over modern, individualized care. Furthermore, there is a clear bias in everyday clinical practice. While pet owners and clinicians carefully select the best surgeon or imaging specialist, the choice of the anaesthetist is rarely critically assessed. Frequently, the decision comes down to cost or convenience rather than actual expertise ([Mcmillan, 2014](#)). This gap in training and professional valuation directly contributes to the higher mortality rates seen in everyday veterinary practice.

Final considerations

O manejo anestésico requer uma abordagem individualizada que considere a condição clínica do paciente, sua classificação do estado físico pela ASA, idade, tipo de procedimento e fatores de risco

associados. Esta revisão destaca que as taxas de mortalidade relatadas no Brasil são superiores às observadas em alguns estudos internacionais recentes; entretanto, essas diferenças devem ser interpretadas com cautela devido às variações nas populações estudadas, nos contextos clínicos, nos protocolos anestésicos, nas práticas de monitoramento e nas definições de mortalidade relacionada à anestesia. A redução da mortalidade perioperatória requer avaliação e estabilização pré-anestésicas adequadas, monitoramento multiparamétrico contínuo, vigilância pós-operatória prolongada e uso apropriado de analgesia multimodal e técnicas de anestesia locorregional. O fortalecimento da formação especializada, da cultura de segurança do paciente e da notificação sistemática de eventos adversos também pode contribuir para a identificação de fatores de risco evitáveis e para a melhoria da assistência anestésica em pequenos animais.

References

- Barcelos, L. C., Tameirão, E. R., Gonzaga, L. W. F., Bastos, L. S., Oliveira, C. F. A., Almeida, J. V. F. C., Felix, L. A., & Ferrante, M. (2021). Anestesia em pequenos animais durante procedimentos cirúrgicos: Revisão. *PUBVET*, 15(10), 1–14. <https://doi.org/10.31533/pubvet.v15n10a933.1-14>.
- Bille, C., Auvigne, V., Bomassi, E., Durieux, P., Libermann, S., & Rattez, E. (2014). An evidence-based medicine approach to small animal anaesthetic mortality in a referral practice: the influence of initiating three recommendations on subsequent anaesthetic deaths. *Veterinary Anaesthesia and Analgesia*, 41(3), 249–258. <https://doi.org/10.1111 / vaa.12116>.
- Bille, C., Auvigne, V., Libermann, S., Bomassi, E., Durieux, P., & Rattez, E. (2012). Risk of anaesthetic mortality in dogs and cats: an observational cohort study of 3546 cases. *Veterinary Anaesthesia and Analgesia*, 39(1), 59–68. <https://doi.org/10.1111 / j.1467-2995.2011.00686.x>.
- Broadbent, D. (2009). Perioperative mortality in small animal anaesthesia. *The Veterinary Journal*, 182(2), 152–161.
- Broadbent, D. C., Blissitt, K. J., Hammond, R. A., Neath, P. J., Young, L. E., Pfeiffer, D. U., & Wood, J. L. N. (2008). The risk of death: the confidential enquiry into perioperative small animal fatalities. *Veterinary Anaesthesia and Analgesia*, 35(5), 365–373. <https://doi.org/10.1093 / bja / aem229>.
- Clarke, K. W., & Hall, L. W. (1990). A survey of anaesthesia in small animal practice: AVA/BSAVA report. *Journal of the Association of Veterinary Anaesthetists of Great Britain and Ireland*, 17(1), 4–10. <https://doi.org/10.1111/j.1467-2995.1990.tb00380.x>.
- Corrêa, A. L., Oleskovicz, A. L. C. N., & Moraes, A. N. (2009). Índice de mortalidade durante procedimentos anestésicos: estudo retrospectivo (1996-2006). *Ciência Rural*, 39(9), 2519–2526.
- Dyson, D. H., Maxie, M. G., & Schnurr, D. (1998). Morbidity and mortality associated with anesthetic management in small animal veterinary practice in Ontario. *Journal of the American Animal Hospital Association*, 34(4), 325–335. <https://doi.org/10.5326 / 15473317-34-4-325>.
- Gil, L., & Redondo, J. I. (2013). Canine anaesthetic death in Spain: a multicentre prospective cohort study of 2012 cases. *Veterinary Anaesthesia and Analgesia*, 40(6), e57–e67. <https://doi.org/10.1111 / vaa.12059>.
- Grubb, T., & Lobprise, H. (2020). Local and regional anaesthesia in dogs and cats: Overview of concepts and drugs (Part 1). *Veterinary Medicine and Science*, 6(2), 209–217. <https://doi.org/10.1002/vms3.219>.
- Grubb, T., Sager, J., Gaynor, J. S., Montgomery, E., Parker, J. A., Shafford, H., & Tearney, C. (2020). 2020 AAHA anesthesia and monitoring guidelines for dogs and cats. *Journal of the American Animal Hospital Association*, 56(2), 59–82. <https://doi.org/10.5326/JAAHA-MS-7055>.
- Itami, T., Aida, H., Asakawa, M., Fujii, Y., Iizuka, T., Imai, A., Iseri, T., Ishizuka, T., Kakishima, K., Kamata, M., Miyabe-Nishiwaki, T., Nagahama, S., Naganobu, K., Nishimura, R., Okano, S., Sano, T., Yamashita, K., Yamaya, Y., & Yanagawa, M. (2017). Association between preoperative characteristics and risk of anaesthesia-related death in dogs in small-animal referral hospitals in Japan. *Veterinary Anaesthesia and Analgesia*, 44(3), 461–472. <https://doi.org/10.1016/j.vaa.2016.08.007>.

- Levy, J. K., Bard, K. M., Tucker, S. J., Diskant, P. D., & Dingman, P. A. (2017). Perioperative mortality in cats and dogs undergoing spay or castration at a high-volume clinic. *Veterinary Journal*, 224, 11–15. <https://doi.org/10.1016/j.tvjl.2017.05.013>.
- Luz, L. C., Muccillo, M. S., van der Laan, F. A., Ledur, G. R., Kasper, P. N., & Contesini, E. A. (2012). Mortalidade em anestesia de cães e gatos: estudo retrospectivo de 5.366 procedimentos anestésicos. *Archives of Veterinary Science*, 17(Sup.), 1–5.
- Matthews, N. S., Mohn, T. J., Yang, M., Spofford, N., Marsh, A., Faunt, K., Lund, E. M., & Lefebvre, S. L. (2017). Factors associated with anesthetic-related death in dogs and cats in primary care veterinary hospitals. *Journal of the American Veterinary Medical Association*, 250(6), 655–665. <https://doi.org/10.2460/javma.250.6.655>.
- Mcmillan, M. (2014). New frontiers for veterinary anaesthesia: The development of veterinary patient safety culture. *Veterinary Anaesthesia and Analgesia*, 41(3), 224–226. <https://doi.org/10.1111/vaa.12123>.
- Oxtoby, C., & Mossop, L. (2019). Blame and shame in the veterinary profession: Barriers and facilitators to reporting significant events. *Veterinary Record*, 184(16), 501. <https://doi.org/10.1136/vr.105137>.
- Paddelford, R. R. (2001). *Manual de anestesia em pequenos animais* (1st ed., Vol. 1). Roca, São Paulo.
- Payne, J. R., Brodbelt, D. C., & Fuentes, V. (2017). Blood pressure measurements in 780 apparently healthy cats. *Journal of Veterinary Internal Medicine*, 31(1), 15–21. <https://doi.org/10.1111/jvim.14625>.
- Redondo, J. I., Martínez-Taboada, F., Hernández-Magaña, E. Z., Domenech, L., Viscasillas, J., & Otero, P. E. (2025). Breed-Specific Anaesthetic Mortality in Dogs: Evidence from an Analysis of 55,019 Cases. *Animals*, 15(21), 3112. <https://doi.org/10.3390/ani15213112>.
- Redondo, J. I., Martínez-Taboada, F., Viscasillas, J., Doménech, L., Marti-Scharfhausen, R., Hernández-Magaña, E. Z., & Otero, P. E. (2024). Anaesthetic mortality in cats: A worldwide analysis and risk assessment. *Veterinary Record*, 195(1), e4147. <https://doi.org/10.1002/vetr.4147>.
- Redondo, J. I., Otero, P. E., Martínez-Taboada, F., Doménech, L., Hernández-Magaña, E. Z., & Viscasillas, J. (2024). Anaesthetic mortality in dogs: A worldwide analysis and risk assessment. *Veterinary Record*, 195(1), e3604. <https://doi.org/10.1002/vetr.3604>.
- Redondo, J. I., Otero, P. E., Martínez-Taboada, F., Hernández-Magaña, E. Z., Domenech, L., & Viscasillas, J. (2026). Breed-Specific Anaesthetic Mortality in Cats: Evidence from an Analysis of 14,964 Cases. *Animals*, 16(2). <https://doi.org/10.3390/ani16020196>.
- Shoop-Worrall, S. J. W., O'Neill, D. G., Viscasillas, J., & Brodbelt, D. C. (2022). Mortality related to general anaesthesia and sedation in dogs under UK primary veterinary care. *Veterinary Anaesthesia and Analgesia*, 49(5), 433–442. <https://doi.org/10.1016/j.vaa.2022.03.006>.
- Soares, T. J., Carareto, R., Shiguihara, D., Barazetti, L., Rezende, L. M., & Severiano, M. N. (2022). Mortalidade de cães e gatos no período transoperatório e pós-operatório: Estudo retrospectivo. *PUBVET*, 16(1), 1–6. <https://doi.org/10.31533/pubvet.v16n01a1012.1-6>.
- Varkoulis, K., Savvas, I., Anagnostou, T., Kazakos, G., & Pavlidou, K. (2023). A Retrospective Study on Canine and Feline Mortality during Anaesthesia at a University Clinic in Greece. *Animals*, 13(15). <https://doi.org/10.3390/ani13152486>.

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