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LETTER TO THE EDITOR

CEPEF4: update and plan

Mortality related to anaesthesia is higher in horses than in other domestic species. Overall mortality rates in dogs, cats and rabbits were 0.17%, 0.24% and 1.34%, respectively, in the multicentre, prospective, cohort study reported by Brodbelt et al. (2008). Several studies have been published establishing mortality rate and factors associated with the risk of death in horses; however, many studies were single-centre and/or retrospective (Senior 2013).

It is almost 20 years since Johnston et al. (2002) published the Confidential Enquiry into Perioperative Equine Fatalities 2 (CEPEF2) study. This is still the largest multicentre investigation with a collection of 41,824 cases from 62 clinics worldwide spanning 6 years. The CEPEF2 study reported an overall equine mortality rate of 1.9%. This was reduced to 0.9% when only elective procedures in healthy horses were included, and increased to 11.7% in horses with colic. This study included 7 days follow-up after anaesthesia. Subsequently in 2004, CEPEF3 was published as a randomised controlled trial investigating the relative outcomes after halothane or isoflurane anaesthesia (Johnston et al. 2004).

In retrospect, it is clear that much has changed since 2004. For instance, halothane was then the most commonly used inhalant agent whereas it is now neither manufactured nor used in many countries. Other advancements have been made, including new drugs and anaesthetic protocols, more sophisticated monitoring, improved anaesthesia machines, ventilators and ancillary equipment, such as infusion pumps, all considered likely to improve safety. The ultimate aim is to provide anaesthesia and recovery with minimal complications, thereby reducing mortality and morbidity related to anaesthesia.

With these new developments we should expect that the death rate of one healthy horse out of 100 anaesthetized is reduced. However, Dugdale & Taylor (2016) in their narrative review claimed that even with all these improvements, *"we are still a long way from greatly reducing the mortality associated with equine anaesthesia"*. Indeed, their statement *"we still lose horses after anaesthesia to a range of catastrophes that would not occur if the horses were not anaesthetized"* has been taken up in recent years with a move towards avoiding general anaesthesia when possible, using more refined techniques for long term sedation and analgesia and inclusion of the in vogue ultrasound-guided locoregional techniques.

In an editorial in this journal, Gent & Bettschart-Wolfensberger (2013) declared the need for an update to identify any change in mortality rates from that reported previously in CEPEF2. That is already 7 years ago, providing incentive for initiating CEPEF4. The main aim is to collect an up-to-date dataset as comprehensive as CEPEF2 to document mortality related to equine anaesthesia, but also to identify current trends in equine anaesthesia and analgesia. Highlighting any associations with successful or unsuccessful outcomes should show which, if any, of the new developments are beneficial and point the way to further improvement.

A CEPEF4 team has been created; more information can be found at https://cepef4.wordpress.com/cepef-4-team/. Unfortunately, a presentation describing the proposed CEPEF4 scheduled during the 2020 spring meeting of the Association of Veterinary Anaesthetists in Dublin was lost to the COVID-19 pandemic. This presentation proposed a digital questionnaire based on previously presented methodology for small animals, adapted to the particularities of horses requiring anaesthesia. The questionnaire is user-friendly for use on phone, tablet or laptop and is designed for collecting anaesthetic and horse related data to describe the current worldwide equine anaesthetic practice and to detect factors associated with mortality. The questionnaire builds on the experience of CEPEF2. In particular, the end point of 'alive or dead' at 7 days may be reduced to 3 days to facilitate reliable data collection. However, this change is still under consideration because it would impair comparison with CEPEF2.

Launching this study during the COVID-19 pandemic would have biased the case logs in the first months of the study by exerting unnecessary pressure on potential collaborators already dealing with the uncertainties of veterinary care at that time. Instead, we have used our professional network to involve researchers and clinicians with a special interest in this subject to evaluate and comment on the proposed investigation. We are extremely grateful for the invaluable feedback that has undoubtedly improved the quality of the questionnaire.

We hope that this letter will encourage all veterinarians treating horses to participate in CEPEF4 so that the current equine anaesthetic-related mortality rate can be documented. The results may identify areas that can be improved and we hope that CEPEF4 will become a shared resource to stimulate and enable further research for all involved in equine anaesthesia. November 2020 is the scheduled start of CEPEF4. If you are interested in helping, please do not hesitate to contact us via https://cepef4.wordpress.com.

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Conflict of interest statement

The authors declare no conflict of interest.

Miguel Gozalo-Marcilla[a], *Jose I Redondo*[b], *Mark Johnston*[c], *Polly Taylor*[d] & *Regula Bettschart-Wolfensberger*[e]
[a] The Royal (Dick) School of Veterinary Studies and The Roslin Institute, University of Edinburgh, Edinburgh, UK
[b] Universidad Cardenal Herrera — CEU, CEU Universities, Valencia, Spain
[c] Vetstream Ltd, Cambridge, UK
[d] Taylor Monroe, Little Downham, Cambridgeshire, UK
[e] Vetsuisse Faculty, University of Zürich, Zürich, Switzerland
E-mail: miguelgozalomarcilla@gmail.com (M Gozalo-Marcilla)

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Tracheal misplacement of a temperature probe in a dog during general anaesthesia

Cuffed endotracheal tubes (cETTs) play a vital role in modern anaesthesia by allowing the administration of volatile anaesthetics and medical gasses with the advantage of preserving airway patency. In addition, the presence of an inflatable cuff creates a seal that protects the lungs from the aspiration of foreign material, facilitates effective positive pressure ventilation and reduces contamination of the work environment with waste anaesthetic gases. However, in humans, different cETT complications have been reported (El-Orbany & Salem 2013). Air leakages around the ETT cuffs occur with an incidence ranging between 7% and 24% of mechanically ventilated patients (Szekely et al. 1993; Rashkin & Davis 1986). The consequences of air leakage from an ETT cuff may range from an insignificant gurgling noise to a life-threatening ventilatory failure along with interference with patient monitoring (Schmalisch et al. 2012).

A 7-year-old, male castrated Basset Hound, weighing 26 kg, was presented with an acute onset of non-ambulatory paraplegia. The animal underwent general anaesthesia for diagnostic investigations and surgery. Magnetic resonance imaging (MRI) revealed an intervertebral disc extrusion at the level of thoracic vertebrae 12 and 13 for which haemilaminectomy was required. Orotracheal intubation was performed using a Flexicare sterile cETT (ProAct Medical Ltd, UK) with a 10.5 mm internal diameter. The cuff of the ETT was inflated while a breath was administered until no audible leak was heard. In the operating theatre the animal was positioned in sternal recumbency. The following variables were monitored — heart rate from the electrocardiogram, arterial blood pressure via oscillometric and invasive blood pressure measurement, respiratory rate, end-tidal carbon dioxide ($P_E'CO_2$), end-tidal gas monitoring via capnography, haemoglobin oxygen saturation via pulse oximetry and body temperature using a thermistor positioned in