Basal plasma adrenocorticotrophic hormone concentration for diagnosing pituitary pars intermedia dysfunction in horses: Comparative analysis of two systematic reviews

Anderson Fernando de Souza[a]* iD **| André Luis do Valle De Zoppa**[a] iD

[a]School of Veterinary Medicine and Animal Science, University of São Paulo, SP, Brazil.

*Corresponding author: anderson.sji@hotmail.com

Abstract The use of adrenocorticotrophic hormone (ACTH) as a diagnostic tool for pituitary pars intermedia dysfunction (PPID) in horses is the subject of numerous scientific research, and two systematic reviews were identified, addressing precisely this topic. This is a rare and curious fact in the veterinary literature, as it allows us to analyze how two groups of independent researchers approached the same problem. This short review aims to carry out a qualitative comparative analysis of these two articles to identify the perception of two different research groups about the effectiveness of ACTH as a diagnostic tool for PPID in horses.

Keywords: ACTH, Cushing's disease, diagnostic accuracy, equine PPID

1. Introduction

The pituitary pars intermedia dysfunction (PPID) in horses has been an increasing focus of research. With the popularization of diagnostic tests, it has been more frequently diagnosed and better managed, which has greatly increased equine survival. We currently have an excellent book on equine endocrinology available (Bertin et al 2020), demonstrating the great importance of this subject in equine medicine.

Recently, Tatum et al (2021) published a systematic review within a meta-analysis that sought to identify the accuracy of ACTH (adrenocorticotrophic hormone) as a biomarker for the diagnosis of PPID in horses. Coincidentally, another article with the same proposal and design was published in a scientific journal with a significant impact on veterinary sciences (Meyer et al 2022). He performed a meta-analysis associated with a systematic review. This is a rare and curious fact, as it allows us to analyze how two groups of independent researchers approached the same problem.

This short review aims to carry out a qualitative comparative analysis of these two articles to identify the perception of two different research groups about the effectiveness of ACTH as a diagnostic tool for PPID in horses.

2. Method

Initially, two articles were identified at random during an independent literature search (Meyer et al 2022, Tatum et al 2021). After, a complementary literature search was performed in the ScienceDirect, PubMed and CAB Abstracts databases, using the combination of the terms: "equine", "horse", "PPID", "ACTH", "systematic review", and "meta-analysis". There was no restriction on publication date or language. The qualitative comparative analysis followed the recommendations of Roig-Tierno et al (2017).

3. Topic covered

The complementary literature search found no other articles investigating the effectiveness of ACTH in diagnosing PPID in horses in the form of a systematic review with or without meta-analysis. Only the analysis of the two articles initially identified was performed.

It is worth highlighting the objectives of each one: in the article by Tatum et al (2021) "The aim of this systematic review was to collate and evaluate the current evidence regarding the sensitivity and specificity of the baseline ACTH diagnostic test for the diagnosis of PPID". And in the article by Meyer et al (2022) "To estimate the diagnostic accuracy of ACTH as a biomarker for PPID in adult horses and appraise potential causes of heterogeneity".

In the article by Meyer et al (2022) the methodology followed the Prisma recommendations (McInnes et al 2018), which is currently the most recognized method for preparing systematic reviews and meta-analyses using Medline, CAB Abstracts, and Scopus databases. Tatum et al (2021) built their method based on the recommendations of another scientific paper (McGowan et al 2016). They used the Pubmed/Medline, CAB Abstracts, Scopus, and IVIS databases, which probably affected the retrieved records and, consequently, the eligible articles at the end of the selection process.

The publication or registration of the research protocol was not described in any article, which made it impossible for a group to identify that a similar study was already being conducted. In the medical field, databases are dedicated to registering the protocols for this to happen, PROSPERO (https://www.crd.york.ac.uk/prospero/) is the main. However, there are also scientific journals devoted to reviewing and publishing review protocols, such as Systematic Reviews (ISSN: 2046-4053) (https://systematicreviewsjournal.biomedcentral.com/). There are also similar initiatives in the veterinary field, such as Syreaf (https://www.syreaf.org/), but they are not yet popular. An alternative is to present the protocols on Preprints platforms, which have become popular recently (Fraser et al 2021, Puebla 2021).

Both studies found 11 articles that met their inclusion criteria, six of which were similar in both (54.5%, 6/11). Both studies highlighted the heterogeneity of the included studies, but only Meyer et al (2022) conducted the meta-analysis based on specificity and sensitivity data. Interestingly, Tatum et al (2021) reported median values and interquartile ranges for these same indices, which go against the proposal of an objective analysis, which considers the sample size as an influencing weight on the final value.

The two studies concluded that baseline ACTH values are better indicators for confirming a suspected clinical case than identifying animals that have not yet manifested clinical signs. They also agreed on the need for better-designed articles so that biases are smaller.

4. Final considerations

Perception is intrinsically dependent on the individual. The analysis of these two articles made this clear: discussions and exchange of experiences are the best way to advance in scientific discovery and validation of hypotheses solidly.

Conflict of Interest

The authors declare that there is no conflict of interest.

Funding

References

Bertin FR, Fraser NS (2020) Equine endocrinology. Cabi, Boston.

Fraser N, Brierley L, Dey G, Polka JK, Pálfy M, Nanni F, Coates JA (2021) The evolving role of preprints in the dissemination of COVID-19 research and their impact on the science communication landscape. PLOS Biology 19:e3000959. DOI: https://doi.org/10.1371/journal.pbio.3000959

McGowan J, Sampson M, Salzwedel DM, Cogo E, Foerster V, Lefebvre C (2016) PRESS Peer Review of Electronic Search Strategies: 2015 Guideline Statement. Journal of Clinical Epidemiology 75:40–46. DOI: https://doi.org/10.1016/j.jclinepi.2016.01.021

McInnes MDF, Moher D, Thombs BD, McGrath TA, Bossuyt PM, PRISMA-DTA Group (2018) Preferred Reporting Items for a Systematic Review and Meta-analysis of Diagnostic Test Accuracy Studies: The PRISMA-DTA Statement. JAMA 319:388–396. DOI: https://doi.org/10.1001/jama.2017.19163

Meyer JC, Hunyadi LM, Ordóñez-Mena JM (2022) The accuracy of ACTH as a biomarker for pituitary pars intermedia dysfunction in horses: A systematic review and meta-analysis. Equine Veterinary Journal 54:457–466. DOI: https://doi.org/10.1111/evj.13500

Puebla I (2021) Preprints: A tool and a vehicle towards greater reproducibility in the life sciences. Journal for Reproducibility in Neuroscience 2:1–5. DOI: https://doi.org/10.31885/jrn.2.2021.1465

Roig-Tierno N, Gonzalez-Cruz TF, Llopis-Martinez J (2017) An overview of qualitative comparative analysis: A bibliometric analysis. Journal of Innovation & Knowledge 2:15–23. DOI: https://doi.org/10.1016/j.jik.2016.12.002

Tatum RC, McGowan CM, Ireland JL (2021) Evaluation of the sensitivity and specificity of basal plasma adrenocorticotrophic hormone concentration for diagnosing pituitary pars intermedia dysfunction in horses: A systematic review. The Veterinary Journal 275:105695. DOI: https://doi.org/10.1016/j.tvjl.2021.105695