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Preliminary evaluation of the veterinary EPOC® point-of-care (POC) clinical analyser in horses by comparison with in-house analysis and establishment of reference values

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ORIGINAL STUDY: LONG VERSION

TITLE: PRELIMINARY EVALUATION OF THE VETERINARY EPOC® POINT-OF-CARE (POC) CLINICAL ANALYSER IN HORSES BY COMPARISON WITH IN-HOUSE ANALYSIS AND ESTABLISHMENT OF REFERENCE VALUES

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Introduction

Point-of-care (POC) devices are simple to operate, provide quick and relatively inexpensive results at the patient bedside. The main criticism of POC devices is their unproven accuracy e.g. when used in different species. The aim of the study was to evaluate the EPOC® in horses and establish reference intervals. Our hypothesis was that the EPOC® analyser would have acceptable agreement with the in-house analyser, making it a valuable tool for equine clinicians.

Methods

Blood samples were obtained from 28 horses (5-18 years-of-age, mainly Standardbreds) from the University's teaching herd maintained on pasture and supplemental hay. Horses were judged to be healthy based on routine physical examination. The study was approved by the Animal Ethics Committee of Adelaide University. Jugular venous blood was collected into two lithium-heparinised syringes, which were stored in horizontal position on ice (0-1°C) until analysis. Atmospheric air was prevented from entering the tubes by airtight closure of the needle. One of the paired blood samples from each horse was analysed by the EPOC® while the other was analysed by the in-house ABL725® blood gas analyser.

The correlation between the mean values of the blood parameters measured by the EPOC® and the ABL725® was calculated using a Pearson's correlation, classified as strong (> 0.7), moderate (0.3 – 0.7) or weak (< 0.3) correlation and the difference between means was determined to be significant or not, using a student t-test (P<0.05). The difference in values of each horse's blood parameters, when measured by the two analysers, was plotted using Bland-Altman plots. Reference intervals were calculated using non-parametric method for each blood parameter following removal of outliers, identified by Tukey Outlier Filter,

Results

The results show a strong correlation between the EPOC® and ABL725® measurements of pCO₂, BE_{ecf}, cHCO₃⁻, Na⁺, K⁺, glucose and lactate and a moderate correlation between measurements of pH, pO₂, sO₂, Ca²⁺ and haematocrit. Analysis showed a minor bias for pCO₂, glucose, Na⁺, K⁺ and pH, not considered clinically significant. A potential clinically significant positive bias was detected by EPOC® for HCO₃⁻, BE_{ecf}, pO₂, sO₂, a negative bias for Ca²⁺ and no bias was found for lactate. Comparison of the EPOC® with the manual analysed PCV, and ABL725® compared to manual PCV showed a bias less than +1% and +6.8%, respectively. Reference intervals for the EPOC® were calculated.

Discussion - Conclusion

Preliminary evaluation of the EPOC® data suggests that the Vet EPOC® is a valid and reliable tool. In this study, the agreement between the EPOC® and ABL725® was assessed in healthy horses; however, in the clinical setting, the EPOC® will be used in clinically unhealthy horses and the accuracy and precision may vary as the parameters approach extreme values. Therefore, the next stage of the evaluation of the EPOC® will be to test the agreement between the EPOC® and the ABL725® in horses with abnormal blood parameters e.g. exercised or anaesthetised horses and unhealthy horses at the hospital. In addition, a larger sample size is required to establish proper reference values.

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