

Clinical Signs Associated with PPID Status in a Large Population of Horses¹

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Introduction

Pituitary pars intermedia dysfunction (PPID) has been considered the most common endocrinologic disorder of aged horses. Few studies exist that describe the epidemiological characteristics of horses with PPID. Additional epidemiologic studies are needed to determine the prevalence of PPID in a larger population, not just aged horses.

Study Purpose

The purpose of this study was to obtain epidemiological information at initial PPID diagnosis (new cases) from a large population of horses that included age, breed, sex, clinical signs and insulin/glucose status.

Materials and Methods

Horses of any age, breed and sex from the continental US were eligible for study enrollment as long as they were documented to be exhibiting one or more of the following clinical signs: generalized or regional hypertrichosis, muscle wasting, abnormal fat distribution, lethargy, laminitis (unknown etiology), polyuria, polydipsia, susceptibility to infections, abnormal sweating, and/or inappropriate lactation. Normal horses were excluded from the study. At initial visit horses were evaluated based on the following: demographic data, signalment, a physical examination was conducted, clinical signs documented, blood was drawn for basal ACTH, and fasting insulin and glucose. Blood samples were processed and shipped overnight to the Animal Health Diagnostic Center, Cornell University, Ithaca, NY for analysis. Non-PPID horses (PPID-) were characterized with ACTH levels <35 pg/mL (November-July) and ACTH <100 pg/mL (August-October).² PPID+ horses were characterized with ACTH levels >35 pg/mL (November through July) and ACTH >100 pg/mL (August-October). Hyperinsulinemia was characterized as fasting insulin >20 uIU/mL. Glucose was considered to be elevated if >113 mg/mL.²

Statistical Analysis

In order to evaluate the combined effects of these variables on PPID status, multiple logistic regression (MLR) analysis was applied to PPID status using backward elimination of variables at the 5% level of significance. Odds ratios for the significant predictors of PPID status in the MLR analyses were computed along with their corresponding 95% confidence intervals.

Results

The prevalence of PPID was significantly ($P < 0.015$) greater among horses found to have 5 of the 11 clinical signs present: abnormal sweating, decreased athletic behavior, delayed shedding, loss of muscle mass, and weight loss. Although not statistically significant ($P > 0.25$), PPID prevalence was greater when three of the remaining clinical signs were present (excessive thirst, excessive urination, and laminitis) and was actually less when four of the remaining signs were absent (cresty neck, fat pads, pot belly, weight gain, and recurrent infections). Based on only the data on clinical signs, both delayed shedding and weight loss were found to be significantly associated with PPID status ($P \leq 0.002$). Specifically, the odds of PPID among horses showing delayed shedding was four times that for horses not showing delayed shedding, and the odds of PPID among horses showing weight loss was approximately twice (1.9) among horses not showing weight loss. Based on the combined data on demographic variables, insulin levels, and all eleven interpretable clinical signs, age and insulin status were still seen to be significantly associated with PPID status, but only one clinical sign, delayed shedding, was found to be a significant predictor of PPID after accounting for age and insulin status. The odds ratio of PPID for horses showing delayed shedding (3.4) decreased only slightly after accounting for age and insulin status of the horse.



Discussion

Based on the data from this population of horses, delayed hair coat shedding and weight loss were significant predictors of PPID status. The prevalence of PPID was also significantly greater when certain clusters of clinical signs were present. Long-term studies need to be conducted to further evaluate the occurrence and progression of clinical signs in horses with PPID and other endocrine diseases.

Take Home Message

The prevalence of PPID was greater in horses found to have the following clinical signs present: abnormal sweating, decreased athletic behavior, delayed shedding, loss of muscle mass and weight loss. Of the horses that were reported to have abnormal sweating at the initial examination, 60% of these horses were subsequently diagnosed with PPID.

References

1. Grubbs S, Neal D, Keefe T. Clinical signs associated with PPID status in a large population of horses. *J Vet Intern Med* 2016; 30: 1502.
2. Equine Endocrinology Group. 2021 Recommendations for the diagnosis and treatment of pituitary pars intermedia dysfunction (PPID).