

# The Probability of Clinical Signs in Hyperinsulinemic Horses With Pituitary Pars Intermedia Dysfunction

**Steve T. Grubbs – Boehringer Ingelheim; Dwana Neal – Boehringer-Ingelheim; Thomas Keefe – Colorado State University**

Pituitary pars intermedia dysfunction (PPID) has been described as the most common endocrinologic disorder of horses. Horses exhibiting one or more of the typical signs of PPID were enrolled in the study. The purpose of this study was to obtain epidemiological information from a large population of horses with PPID and hyperinsulinemia (HI). At initial visit, a physical examination was conducted and blood drawn for basal adrenocorticotrophic hormone (ACTH), insulin, and glucose. Plasma samples were analyzed for ACTH, insulin, and glucose by the Animal Health Diagnostic Center, Cornell University, Ithaca, NY. The association between PPID status, based on ACTH results, and each of the demographic variables and test results for insulin and glucose were statistically evaluated individually using the Pearson chi-square test. Odds ratios for significant predictors of PPID status were computed using multiple logistic regression analysis. Of the 2,994 horses enrolled, 605 (20.2%) were PPID<sup>+</sup>/IR<sup>-</sup>, 571 (19.1%) were PPID<sup>+</sup>/IR<sup>+</sup>, 593 (19.8%) were PPID<sup>-</sup>/IR<sup>+</sup>, and 1,225 (41%) were (PPID<sup>-</sup>/IR<sup>-</sup>). Insulin-resistant horses had approximately twice the odds (2.1X) of PPID compared to horses with normal insulin levels. The prevalence of PPID<sup>+</sup>/HI<sup>+</sup> was significantly greater among horses found to have delayed shedding ( $p < 0.001$ ), loss of muscle mass ( $p < 0.001$ ) and laminitis ( $p < 0.001$ ). The odds of abnormal sweating in PPID<sup>+</sup>/HI<sup>+</sup> was 1.7X when compared to PPID<sup>+</sup>/HI<sup>-</sup> horses. The odds of laminitis in PPID<sup>+</sup>/HI<sup>+</sup> was greater than 3X (3.1X) compared to PPID<sup>+</sup>/HI<sup>-</sup>. Based on the increased odds of laminitis in PPID horses with hyperinsulinemia compared to PPID horses with normal insulin, when evaluating horses with suspected endocrine disease, at a minimum, ACTH, insulin and glucose should be evaluated. Long term studies need to be conducted to further evaluate the occurrence and progression of clinical signs in horses with endocrine disease.