The Effect of Restricted Diet and Slow-Feed Hay Nets on Morphometric Measurements and Blood Metabolites in Overweight Horses

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Modern horse management systems tend to limit a horse's opportunity to forage, rely on meal feeding, increase stalling duration and may contribute to the increases in equine obesity. The use of slow-feed hay nets represents an opportunity to extend foraging time while feeding a restricted diet. The objectives of this study were to determine if restricted feeding combined with the use of a slow-feed hay net would affect weight loss, morphometric measurements, and postprandial metabolite patterns in overweight adult horses. Eight adult Quarter horses (BW 562 kg ± 2 kg) were used in a randomized complete block design, with 4 horses assigned to feeding hay off the stall floor (FLOOR), and 4 horses assigned to feeding from a slow-feed hay net (NET). Horses were fed in individual stalls at 1% BW, split evenly between two meals at 0700 and 1600 hours. Bodyweight, body condition score (BCS), neck and girth circumference, cresty neck score, and ultrasound measurements of average rump fat, longissimus dorsi (LD) depth and LD thickness were taken on days 0, 14, and 28. Three, 24 hour blood samplings were conducted on days 0, 14, and 28. Sampling occurred every 30 minutes for 3 hours post feeding, with hourly samples occurring between feedings. The horses feeding from the FLOOR took less time to consume their hay meal compared to horses feeding from the NET ($P < 0.001$). All horses lost weight over the 28 day period ($P < 0.0001$), however; no difference was observed between treatments. There was no difference in BCS, neck and girth circumference, cresty neck score, rump fat, or LD depth between days or treatments ($P \geq 0.25$). There was an effect of day on LD thickness in horses feeding from the NET; LD thickness was less on day 28 compared to day 1 ($P = 0.0257$). Only time to peak insulin and peak cortisol were affected by treatment ($P \leq 0.037$) with horses feeding from the NET having lower values compared to horses feeding from the FLOOR. Average glucose, insulin, cortisol and leptin; AUC cortisol; and peak insulin were affected by day ($P \leq 0.0102$). Glucose and insulin values increased while cortisol and leptin levels decreased during the study. The use of a slow-feed hay net coupled with restricted diet appears to be an effective method of decreasing the stress associated with restricted feeding of over-weight horses.