

The Effect of Laminitis on Seasonal Changes in Metabolic Parameters in Horses

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INTRODUCTION & AIM

Insulin dysregulation is considered a **key mechanism of endocrinopathic laminitis** [1,2]. Hyperinsulinemia and **impaired glucose tolerance** significantly increase the risk of its development [3,4]. Therefore, the aim of our study was to assess the **stability of selected metabolic parameters during the grazing season** in mares with a history of laminitis compared to healthy mares. We hypothesized that mares with previous laminitis would **exhibit greater seasonal metabolic variability** and a less consistent metabolic response during grazing.

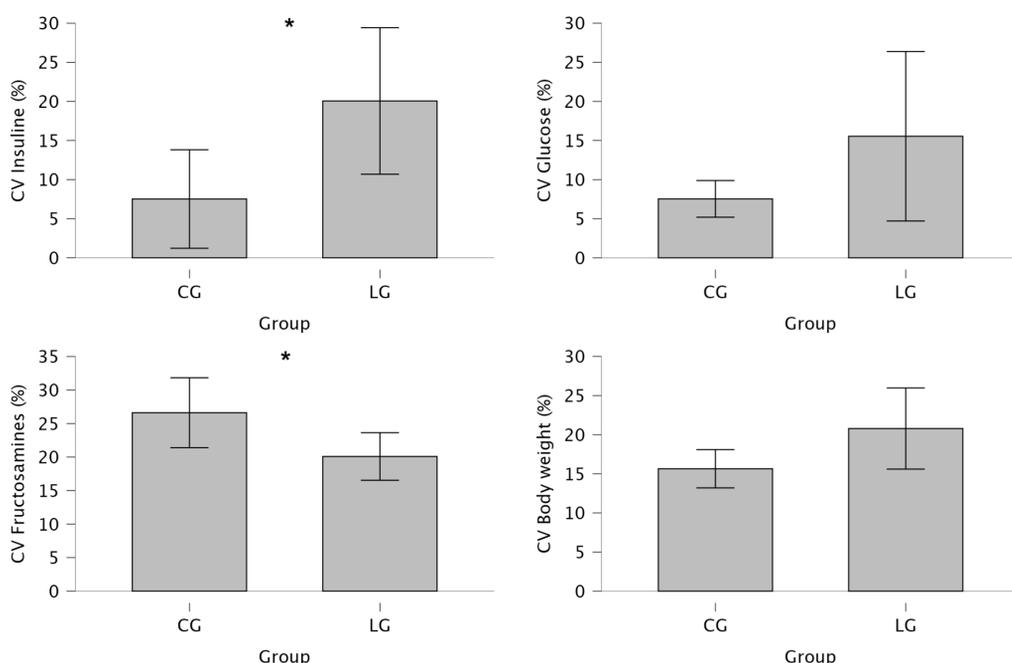
METHOD

Twenty cold-blooded mares were included in the study, ten with a history of laminitis (LG) and ten clinically healthy controls (CG). The study was conducted during the grazing season and included four sampling periods: March (S0), May (S1), July (S2), and September (S3). Glucose, insulin, fructosamine, and body weight were measured at each sampling. During the study period, the horses were maintained under a pasture-based management system under uniform conditions.

Seasonal within-horse variability was quantified using the coefficient of variation (CV) calculated across all four sampling periods. Between-horse variability within each sampling period was assessed using the F-test for equality of variances. Normality was evaluated using the Shapiro–Wilk test, and group differences were analyzed using the independent t-test or Mann–Whitney test, with statistical significance set at $p < 0.05$.

RESULTS & DISCUSSION

The figures (1) illustrate the comparison of seasonal variability (CV, %) of selected metabolic parameters between the control group (CG) and mares with a history of laminitis (LG). The LG group showed a significantly higher coefficient of variation for insulin (LG 20.06% vs. CG 7.52%; $p = 0.023$), indicating less stable insulin regulation during the grazing season. In contrast, fructosamine variability was higher in the control group (CG 26.61% vs. LG 20.09%; $p = 0.0312$). No statistically significant differences between groups were observed for glucose ($p = 0.279$) or body weight ($p = 0.0576$). These findings suggest that mares with a history of laminitis exhibit greater seasonal fluctuation in insulin, while the other evaluated parameters remain comparable between groups.



Figures 1

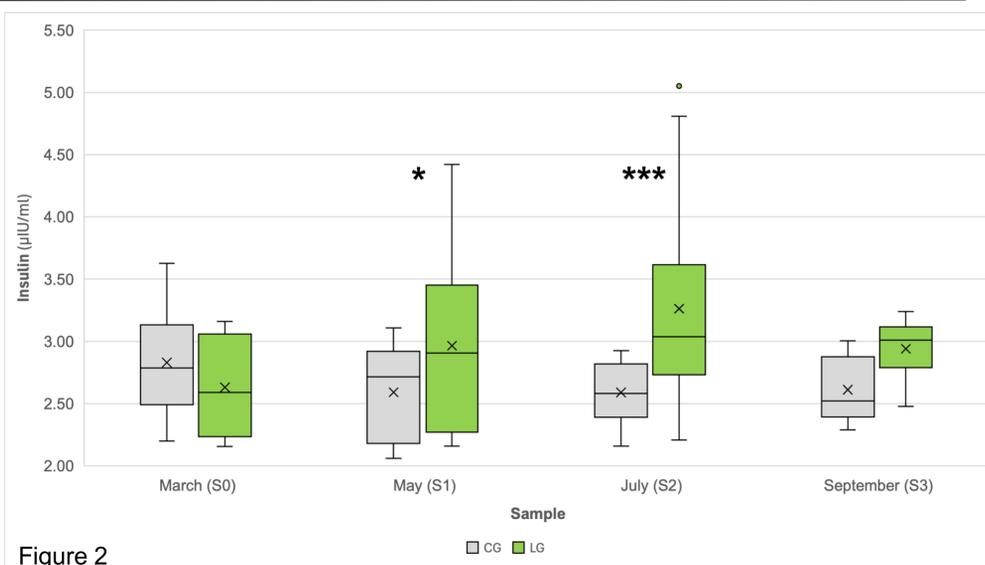


Figure 2

Figure 2 illustrates between-horse variability of insulin across the individual sampling periods. Statistically significant differences were observed in S1 ($p = 0.0329$) and particularly in S2 ($p = 0.0007$), where the LG group exhibited markedly higher variability compared to CG. This difference was most pronounced during the peak of the grazing season (S2), supporting the conclusion of reduced stability of insulin regulation in mares with a history of laminitis.

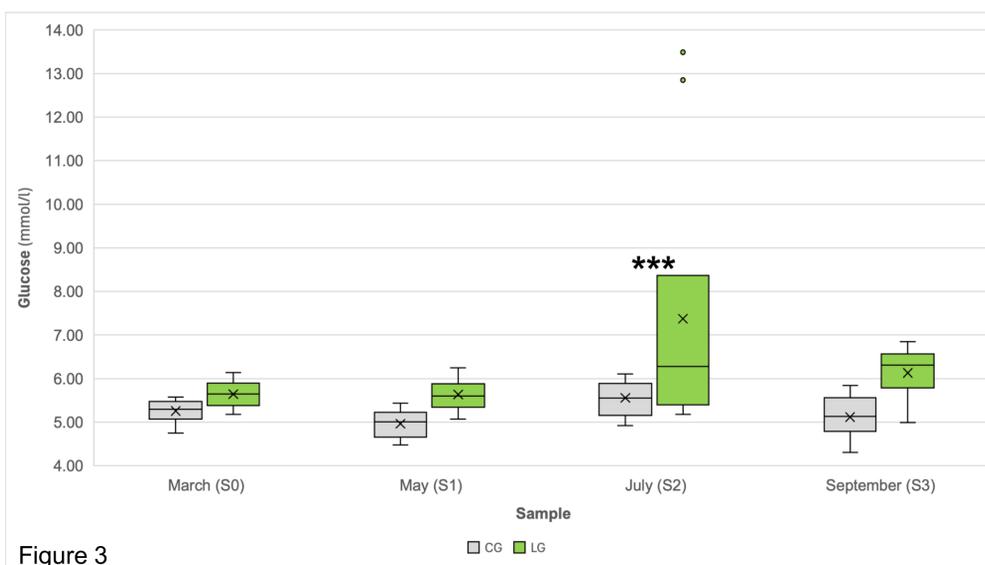


Figure 3

Figure 3 shows between-horse variability of glucose across the sampling periods. A statistically significant difference was detected exclusively in S2 ($p < 0.0001$), where the LG group demonstrated substantially greater variability compared to the control group. This finding indicates increased heterogeneity of the metabolic response during the peak grazing period in mares with a history of laminitis.

CONCLUSION

Mares with a history of laminitis exhibited **greater seasonal fluctuations in insulin**, indicating reduced stability of its regulation. During the peak of the grazing season, **increased between-horse variability in metabolic parameters was also observed**, particularly in glucose and insulin.

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FUTURE WORK / REFERENCES

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