

over time. Interleukin-1 β expression peaked at 16 hours (8.1 ± 1.4 -fold increase), IL-8 expression showed peaks at 8 (13.0 ± 4.1 fold increase) and 20 hours (20.8 ± 5.5 fold increase), IL-10 expression peaked at 16 hours (7.3 ± 1.7 -fold increase), and IL-6 expression peaked at 16 hours (7.5 ± 3.3 -fold increase). No significant change in TNF α mRNA expression was detected.

DISCUSSION

Systemic inflammation develops in response to alimentary carbohydrate overload and this problem may occur when horses are grazing on pasture.

CLINICAL RELEVANCE

Alimentary carbohydrate overload is an inflammatory event and should be treated accordingly.

CONCLUSION

Systemic inflammation may be an important component of pasture-associated laminitis in equids.

Hind Laminal Proinflammatory Response Is Present After Carbohydrate Overload

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TAKE HOME MESSAGE

Laminal inflammatory events occur to a similar extent in the hind lamina as in the front in the CHO model of laminitis.

INTRODUCTION

Laminitis most frequently affects the forelimbs of the horse and infrequently involves the hindlimbs. It is unknown if increased prevalence in forelimbs is due to greater forces sustained by forelimbs, or due to a difference in severity of pathologic events in the hindlimbs.

MATERIALS AND METHODS

Sixteen horses were administered carbohydrate; these horses were anesthetized either after a two degree increase in rectal temperature (DEV) or at the onset of Obel grade II lameness (OGI). Control horses (CON) were anesthetized 24 hours after administration of deionized water.

Quantitative real-time PCR for selected pro-inflammatory mediators was performed on the collected laminal tissue in addition to MAC387 immunohistochemistry for leukocyte migration determination. The data were analyzed non-parametrically to compare groups.

RESULTS

Similar increases in laminal MAC387-positive leukocytes and laminal mRNA concentrations ($P < 0.05$) for IL-1 β , IL-6, COX-2, CXCL1 and CXCL8 were present in hindlimb and forelimb laminae from horses with OGI lameness (vs. CON). CXCL1 and CXCL8 were also similarly increased in forelimb and hindlimb laminae at the DEV time (vs. CON).

DISCUSSION

This suggests that additional factors such as weight may play an important role in the ultimate failure that occurs more frequently in the front feet.

CLINICAL RELEVANCE

Evidence of inflammation in the hind lamina suggests that it should be addressed in the septic horse at risk for laminitis; however, laminitis may be less likely to occur due to other factors such as weight bearing.

CONCLUSIONS

Laminal failure is likely to require not only inflammatory injury to cellular structures, but also downward force causing separation of the injured laminae.

Equine Neutrophil Elastase in Plasma, Laminal Tissue, and Skin of Horses Administered Black Walnut Heartwood Extract (BWHE)

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TAKE HOME MESSAGE

Elastase concentrations are increased in the integument of horses during the developmental phase of BWHE-induced laminitis.

INTRODUCTION

Current evidence suggests the involvement of neutrophils and myeloperoxidase (MPO), a strong oxidative enzyme in the development of laminitis. Elastase is a protease recognized as a component of inflammatory disorders. Neutrophil elastase concentrations were measured in plasma, skin and laminar tissues from control horses and horses given BWHE

MATERIALS & METHODS (INCLUDING STATISTICAL ANALYSES)

The study included 4 groups, a control group (water) and 3 experimental groups (BWHE). Plasma was obtained hourly until euthanasia of BWHE-treated horses at 1.5 (n = 5), 3 (n = 6), and 12 hours (n = 10 plasma/n = 6 tissue) and control horses at 12 hours (n = 7 plasma/n = 5 tissue). Elastase concentrations were determined via ELISA. Log-transformed data were analyzed with 1-way ANOVA (tissues) and unpaired t-test (plasma); significance was set at $P < 0.05$.

RESULTS

Plasma elastase concentrations in the BWHE group were significantly higher at 6, 8 and 10h compared to the control group. Concentrations in skin and laminar tissue were significantly higher at 3 and 12h in the BWHE group. Elastase concentrations were significantly higher in skin than in lamina at 12h in BWHE group.

DISCUSSION

Increased elastase concentrations are consistent with dynamic changes in circulating leukocytes in horses given BWHE. Collectively, MPO and elastase have the potential to cause significant tissue damage during the development of laminitis.

CLINICAL RELEVANCE

Elastase may become an important target as new treatments for laminitis are developed.

CONCLUSION

Elastase concentrations increase in the integumentary system during the development of laminitis and may participate in the disintegration of the hoof basal membrane.

Prostaglandins E_2 And $F_{2\alpha}$ as Inflammatory and Vasoactive Mediators in Black Walnut Heartwood Extract-Induced Equine Laminitis

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TAKE HOME MESSAGE

The increases in plasma levels of prostaglandins E_2 (PGE_2) and $F_{2\alpha}$ at an early stage of laminitis are consistent with systemic inflammatory events and alterations in laminar microvascular function.

INTRODUCTION

Links between the inflammatory and vascular events during the prodromal stages of laminitis have yet to be identified. The aim of this study was to provide initial insights into the role that PGE_2 and $F_{2\alpha}$ may play in the development of laminitis induced by black walnut heartwood extract (BWHE).

MATERIALS AND METHODS

Blood samples were collected before and after administration of either water (control horses) or BWHE for white blood cell counts and plasma concentrations of PGE_2 and $F_{2\alpha}$. Laminar tissue was collected for the isolation of laminar vessels, and responses of these vessels to PGE_2 and $F_{2\alpha}$ were determined. The data were analyzed by repeated measures analysis of variance (ANOVA). Differences between individual means were identified by Student's modified *t*-test using the Bonferroni correction for multiple comparisons between means using the error mean square term from the ANOVA.

RESULTS

Plasma levels of PGE_2 and $F_{2\alpha}$ increased transiently and coincided with the nadir in white blood cell counts in BWHE horses. PGE_2 elicited small dilator responses in laminar veins from control horses, but elicited a small constrictor response in laminar veins from BWHE horses. $PGF_{2\alpha}$ was