Characterization Of Laminitis Using PET

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This study will validate the use of PET scans for identifying disease pathology and progression in insulin associated laminitis in horses.

The unique and inaccessible anatomy of the equine hoof has been the major factor that has impeded the ability to understand the events that lead to the structural failure of the foot in equine laminitis. The recent adaptation of the diagnostic imaging method, positron emission tomography (PET) to characterize inflammation and metabolism in the equine limb has provided an opportunity to non-invasively examine structural and functional changes during the different phases of laminitis in the live horse.

The goal of this research is to define how PET can be used in diagnosis, prognosis and rehabilitation management for horses with laminitis. First, PET imaging will be compared to clinical, radiological and pathological markers in early experimental cases of laminitis. Next, PET imaging will be used to characterize the acute, subacute and recovery phases in clinical cases of laminitis. Together, completion of these aims will improve our understanding of how clinical and radiological findings relate to PET findings and how PET can be used to better treat cases of laminitis in practice.

Importance to the Equine Industry: Laminitis is a highly painful disease of the equine foot in which the soft tissue structures (lamellae) that attach the hoof wall to the coffin bone fail, leading to rotation and sinking of the coffin bone. There are more than 100,000 cases of laminitis each year in the US, 5-8% of these resulting in euthanasia. Yet despite the importance of laminitis to the equine industry and horse owning population, there are few effective treatments or proven recommendations for management.

In this study, we will examine the utility of a new diagnostic method PET to aid in diagnosis and monitoring of laminitis. Using PET scans to identify the disease processes of laminitis within the equine hoof without a need for invasive or terminal biopsies will have a profound impact on the equine industry. The ability to monitor ongoing functional and structural changes in the foot of the live horse will greatly aid in development of future effective therapies and pharmaceuticals. Using PET scans to recognize clinical cases of laminitis earlier than current methods may mean quicker interventions and more horses with a positive outcome. In addition, data from this study will serve in the generation of specific recommendations on appropriate rest time to ensure resolution of laminitis.

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