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Serum Amyloid A (SAA) in Equine Septic Arthritis: Speaker Notes

Serum amyloid A (SAA), the major acute phase protein in horses, is found in very low or undetectable levels in the blood of healthy horses. SAA is synthesized in the liver in response to the production of pro-inflammatory cytokines following infection, inflammation, or trauma. SAA is also produced locally in response to inflammation, including in the synovium. SAA can be elevated in horses due to bacterial or viral infection, gastrointestinal disease, pulmonary disease, or local inflammation (cellulitis, wounds, surgical site infection). SAA rises quickly in response to inflammation and infection, peaking after 36-48 hours, and is therefore useful as a diagnostic test for active inflammation. SAA also decreases rapidly with resolution of inflammation, with a half-life of 24 hours. Recent data in equine pulmonary inflammatory diseases and experimental models of septic arthritis suggest that bacterial infection induces a larger SAA response than non-infectious inflammation. In synovial fluid from healthy joints, SAA is present in low or undetectable levels and does not increase following repeated arthrocentesis or lavage. Synovial fluid SAA was higher in clinical cases of septic arthritis compared to horses with non-septic inflammation. Unfortunately, in this study, sepsis was not confirmed in all cases and systemic SAA concentrations were not measured.

SAA can be measured by commercial immunoturbidometric assay (LZ test SAA, Eiken Chemical Co Tokyo, Japan) using an automated chemistry analyzer or by handheld immunoassay (StableLab, Epona Biotech Limited, Sligo, Ireland or Equicheck, Accuplex Diagnostics, Kildare, Ireland). The immunoturbidometric assay is available at a limited number of diagnostic labs in the United States, requiring that synovial fluid samples be frozen and shipped to a remote laboratory for testing. This delays results and potentially treatment decisions. In contrast, the handheld tests yield quantitative results in 10 minutes and can be performed stall-side. A recent study using the handheld test to measure SAA in experimental models of equine septic arthritis and non-septic synovitis showed good agreement between both assays in serum and synovial fluid and demonstrated that horses with septic arthritis had significantly higher serum and synovial fluid SAA concentrations than those with non-septic synovitis. Additionally, serum SAA increased more rapidly and was higher than synovial fluid SAA in horses with septic arthritis.

The prognosis for return to athletic use after septic arthritis decreases with increased duration of infection due to inability to clear the infection, persistent synovitis, and cartilage degradation. Early diagnosis and treatment of septic arthritis is therefore crucial to prevent long-term articular cartilage degradation and improve the prognosis for athletic function. SAA is a promising tool to aid in the diagnosis of septic arthritis in horses, especially with the availability of a rapid assay that can easily be used in the field to speed a decision for referral. However, no validated guidelines exist for interpreting SAA test results in clinical cases of septic arthritis. A multi-center study based at the Virginia-Maryland College of Veterinary Medicine (VMCVM) seeks to investigate the value of SAA in the diagnosis of septic arthritis and monitoring response to therapy in clinical cases septic arthritis in horses. We expect the results of our study to benefit horse owners and veterinarians by providing information on the value of SAA as a diagnostic and monitoring tool in equine septic arthritis.

Selected References