

PAPER



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Are serum amyloid A or D-lactate useful to diagnose synovial contamination or sepsis in horses?

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Context

Synovial sepsis in horses is life threatening and accurate diagnosis is required to allow prompt treatment. Previous studies in animal species and people have indicated that concentrations of serum amyloid A (SAA) and D-lactate may aid rapid and accurate diagnosis of synovial sepsis.

This study assessed the diagnostic value of SAA and D-lactate in blood and synovial fluid as diagnostic markers of synovial sepsis in horses and correlated them with total nucleated cell count (TNCC), percentage of neutrophils and total protein in synovial fluid.

Main conclusion

Blood and synovial fluid SAA concentrations can be used to differentiate between septic or contaminated versus non-septic intrasynovial pathology or normal synovial cavities in our hospital population; however, SAA concentration should be interpreted as an adjunct diagnostic test. D-lactate concentrations in blood or synovial fluid were not useful to diagnose synovial contamination or sepsis in horses.

Approach

Blood and synovial fluid SAA and D-lactate concentrations were determined in a case-control observational study including 112 horses (38 with synovial contamination or sepsis [SCS], 66 with non-septic intrasynovial pathology

[NSISP] and eight controls). TNCC, percentage of neutrophils and total protein was measured for each sample, and then samples were stored at -80°C , until defrost and batch analysis. SAA concentration was determined using an automated chemistry analyser with a human SAA turbidometric immunoassay (Eiken Chemical company). D-lactate concentrations were determined using the lactate dehydrogenase technique with a commercial D-lactate analysis kit and Megacalc software (Megazyme International).

Results

Blood and synovial fluid SAA were significantly higher in SCS than in NSISP and control horses. SAA values were similar in NSISP and control horses. Synovial fluid SAA was moderately correlated with synovial TNCC, total protein and blood SAA. Blood and synovial fluid SAA were 82.4 per cent and 80 per cent sensitive and 88.9 per cent and 73 per cent specific for diagnosis of SCS, with cut-off values of 60.7 and 1.14 $\mu\text{g/ml}$, respectively (Fig 1). Blood and synovial fluid D-lactate concentrations were not significantly different between groups.

Interpretation

Blood and synovial fluid SAA concentration increases in horses with septic synovitis; however, this should be interpreted with caution in horses with concurrent inflammatory conditions, including those with large wounds or extensive soft tissue trauma as these may also have elevated SAA concentrations. The clinical advantage of SAA testing is the ability to provide additional evidence in cases with equivocal TNCC, percentage of neutrophils and total protein. Recommended cut-off values to indicate synovial sepsis is 1.14 $\mu\text{g/ml}$ for synovial fluid and 61 $\mu\text{g/ml}$ for blood.

Significance of findings

This study indicates that SAA is elevated in the blood and synovial fluid of horses with SCS but not in horses with NSISP or normal joints. SAA in blood and synovial fluid had moderate-to-high sensitivity and specificity for differentiating horses with SCS from horses with NSISP or horses with normal synovial structures in our population of horses. Therefore, blood and synovial fluid SAA concentrations could be used to aid diagnosis of SCS. On the contrary, levels of D-lactate were not useful for diagnosis of SCS.

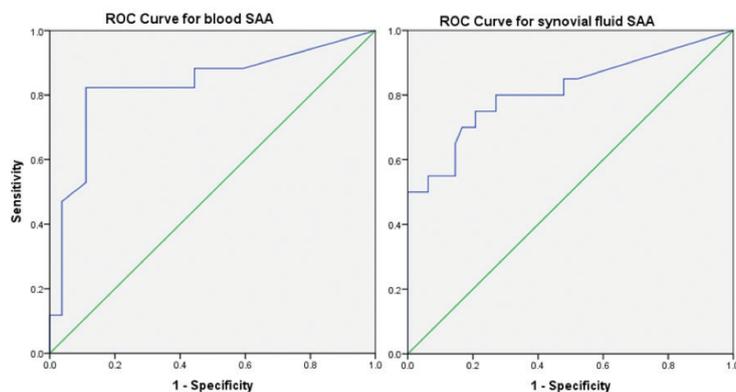


FIG 1: Receiver operating characteristics (ROC) curve for blood and synovial fluid serum amyloid A concentrations as a diagnostic marker for synovial sepsis or contamination in horses