Diagnostic Value Of C-reactive Protein In Dogs With Tick Paralysis

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Tick paralysis is often complicated by aspiration pneumonia[1] and thoracic radiography can exacerbate respiratory compromise in unstable patients. C-reactive protein (CRP) was investigated as an alternative means to identify pneumonia and guide clinical management.

Our prospective cohort study enrolled 20 client-owned dogs with tick paralysis. Dogs received standard care, including tick antiserum administration and supportive measures. CRP, complete blood count, and thoracic radiographs were performed, and aspiration pneumonia was quantified using a Thoracic Radiograph Severity Score (TRSS)[2]. Additional data included SpO_2, SpO_2/FiO_2 ratio, systemic inflammatory response syndrome (SIRS) criteria, antimicrobial use and outcome. Statistical analyses included Pearson and Spearman correlations to explore associations between CRP, TRSS, and hematologic/physiologic markers. A mixed effects model accounted for repeated measures within individual dogs.

CRP <20mg L^{-1} predicted lung pathology with a specificity of 0.86 (95% CI 0.57 – 0.98) and sensitivity of 0.86 (95% CI 0.49 – 0.99). CRP correlated positively with TRSS ($p < 0.001$). CRP was negatively correlated with monocyte count, heart rate, SpO_2, and SpO_2/FiO_2 ratio, while TRSS was negatively correlated with total WBC, monocyte, lymphocyte, and neutrophil counts.

These findings support the clinical utility of CRP as an indicator of pneumonia in dogs with tick paralysis. CRP measurements correlate strongly with radiographic pneumonia severity (TRSS) and may allow safer detection while minimising the risks associated with radiography.

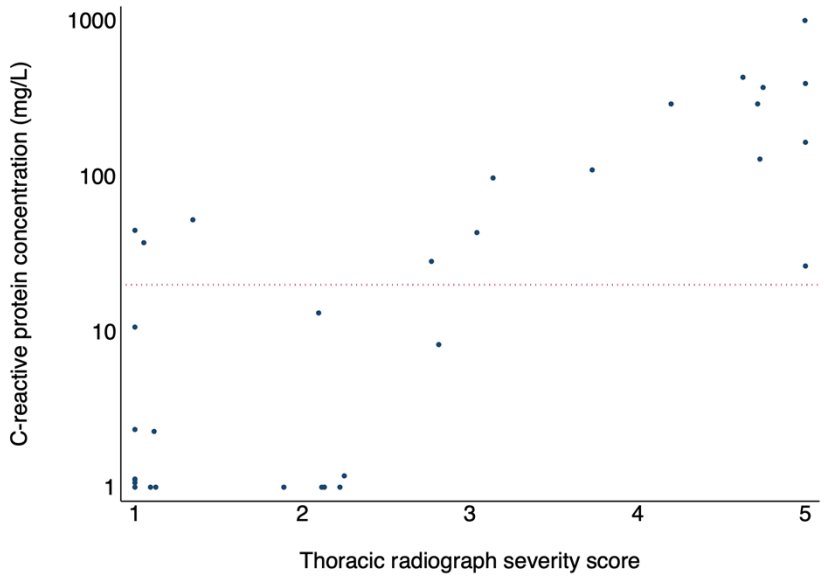

Figure 1. Scatter plot of CRP concentration against TRSS. Red dotted line indicates the threshold between negative and equivocal (20mg/L) as recommended by the kit manufacturer. Higher TRSS scores corresponded with increased CRP concentrations.

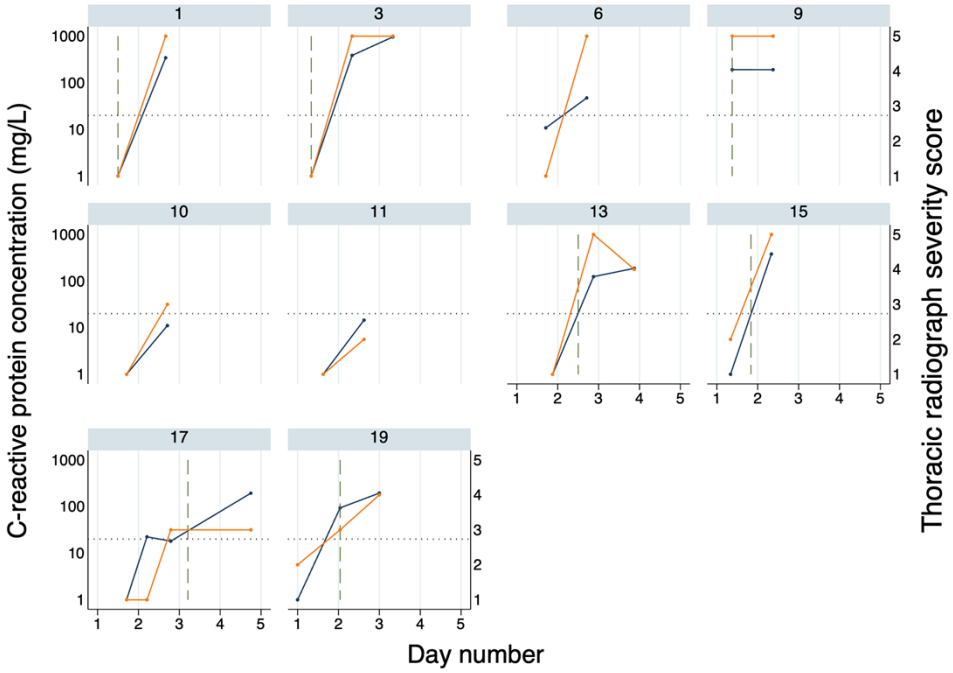

Figure 2. Temporal patterns in CRP concentration (blue line; left y axis) and TRSS (orange line; right y axis) by day number (x axis) for individual dogs (Dog ID blue shaded area). The vertical dashed green line indicates when antimicrobials were first commenced and the horizontal dotted line indicates CRP concentration of 20mg/L.

References

1. Webster R, Mackie J, Haskins S. Histopathological changes in the lungs from dogs with tick paralysis: 25 cases (2010–2012). *Aust Vet J* 2013;91:306–311.

2. Menard J, Porter I, Lerer A et al. Serial evaluation of thoracic radiographs and acute phase proteins in dogs with pneumonia. *J Vet Intern Med* 2022;36:1430–1443.

Ethical Approval Statement

This study was performed in accordance with the Australian Code for the Care and Use of Animals for Scientific Purposes (2021) and approved by the Queensland Government Animal Ethics Committee (Reference Number CA 2023/11/1805).