Clinicopathological Changes in Cats with FIP and SARS-CoV-2 Infection Compared to People with SARS-CoV-2 Infection

ECVIM-CA Online Congress, 2021

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Keynote Message

- The diagnosis of COVID-19 in people is mostly based on the molecular detection of SARS-CoV-2 in biological specimens of patients with clinical signs consistent with the disease. Haematological and hematobiochemical investigations in these patients are mostly focused on the detection and monitoring of signs consistent with the systemic inflammatory reaction (SIRS) or with the multiorgan dysfunction syndrome (MODS) that are negative prognostic factors in sick people or of changes in blood gas analysis associated with the respiratory distress.
- Several case reports on cats spontaneously infected with the SARS-CoV-2 or a few cases of experimental infections have been published. However, in the large majority of cases cats were non symptomatic or had mild and self-limiting respiratory or gastrointestinal signs. Clinicopathological abnormalities were present only in those cases on which other diseases were present (e.g., lymphoma, feline retrovirus infection) and were mostly consistent with the primary underlying disease.
- Contrarily to SARS-CoV-2 infection in people and cats, cats affected by feline infectious peritonitis (FIP), the systemic disease induced by the feline coronavirus (FCoV), have severe haematological or biochemical changes. These changes often have a diagnostic relevance and allow to differentiate FIP from other diseases with a similar clinical presentation (i.e., Yong cats with stunted growth, jaundice, fever, neurological or ocular symptoms, and/or intracavitary effusions). These changes include:
    - Non-regenerative, normocytic, normochromic anaemia, usually associated with microcytosis, that, however, may occur in several inflammatory or chronic diseases, and it is therefore not specific for FIP.
    - Neutrophilic leukocytosis usually without left shift, that, however, has a poor specificity.
    - Lymphopenia, that may be found also in other diseases, but it is particularly frequent in cats with FIP.
    - Hyperproteinemia, hyperglobulinemia and hypoalbuminemia with subsequent inverted albumin:globulin ratio. In a young cat with the clinical signs mentioned above, this protein profile is quite diagnostic for FIP, and its specificity may be further increased by performing serum protein electrophoresis, that typically reveals an increase in alpha2 and gamma-globulins.
    - Increased serum concentration of positive acute phase proteins, such as alpha1-acid glycoprotein (AGP) or serum amyloid A (SAA), or decreased activity of the negative acute phase protein paraoxonase 1 (PON-1). Among these, increased AGP and decreased PON-1 have a high sensitivity and overall high accuracy for FIP.
    - Analysis of the effusions, when present (i.e., in the so-called wet or effusive FIP): effusions from cats with FIP are typically yellow, sticky and may contain fibrin clots. The fluid usually has a high protein concentration, a high specific gravity, and a variable number of cells. Cytology reveals a nonspecific inflammatory pattern, mostly characterized by non-degenerated neutrophils, lymphocytes, and macrophages, as well as by a granular proteinaceous background. Moreover, due to the high protein concentration of the effusion, the Rivalta test is usually positive, and protein electrophoresis on effusion may reveal the same pattern described above for serum.

Although, as stated above and with the exception of tests on effusions, all the changes above are not “per se” consistent with FIP. Therefore, the clinicopathological profile should be interpreted as a whole, and along with the results of molecular tests or of immunodetection of the virus in body fluids or tissues. Results consistent with FIP may support the clinical diagnosis in cats on which history and clinical signs are potentially consistent with this disease.

Key References

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