Immunocytochemistry of mesenteric lymph node fine-needle aspirates in the diagnosis of feline infectious peritonitis.

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Description

Immunohistochemistry (IHC) of tissue samples is considered the gold standard for diagnosing Feline Infectious Peritonitis (FIP), and, in cats without body cavity effusion, IHC is the only method available to establish definitive antemortem diagnosis. However, IHC requires invasive tissue sample collection. We evaluated sensitivity and specificity of an immunocytochemical assay of Fine-Needle Aspirates (FNAs) of mesenteric lymph nodes that can be obtained noninvasively by ultrasound-guided aspiration to diagnose FIP. FNAs of mesenteric lymph nodes were obtained postmortem from 41 cats suspected of having FIP based on clinical and/or laboratory findings. FIP was confirmed immunohistochemically in 30 cats. In the other 11 cats, a disease other than FIP, which explained the clinical signs, was diagnosed histopathologically. Immunocytochemistry (ICC) was performed as an avidin–biotin complex method using a monoclonal anti-FCoV IgG2A. Sensitivity, specificity, Negative and Positive Predictive Values (NPV, PPV, respectively) including 95% confidence intervals (95% CIs) were determined. ICC was positive in 17 of 30 cats with FIP, but also in 1 of 11 control cats that was diagnosed with lymphoma. Sensitivity of ICC was 53% (95% CI:34–72); specificity 91% (95% CI:59–100); NPV 42% (95% CI:22–63); and PPV 94% (95% CI:71–100). In a lethal disease such as FIP, specificity is most important in order to avoid euthanasia of unaffected cats. Given that a false-positive result occurred and FIP was correctly detected in only approximately half of the cases of FIP, ICC of mesenteric lymph node FNA alone cannot reliably confirm or exclude FIP, but can be a helpful test in conjunction with other diagnostic measures.

Feline Infectious Peritonitis

Feline Infectious Peritonitis (FIP) is a lethal disease that occurs worldwide within the cat population. There is no effective treatment. Definitive diagnosis therefore is crucial in order to avoid euthanasia of unaffected cats [1]. However, antemortem diagnosis of FIP in clinical cases is still challenging, especially in cats without body cavity effusion. The difficulty in establishing a diagnosis originates from the existence of 2 pathotypes of the causative agent, the Feline Coronavirus (FCoV), which cannot be distinguished by routine laboratory testing. After infection via the fecal–oral route and replication of Feline Enteric Coronavirus (FECV) in the intestinal epithelium, FECV can undergo mutations within an infected cat, by which Feline Infectious Peritonitis Virus (FIPV) arises. Both FECV and FIPV infect macrophages, but only the disease-causing FIPV is able to efficiently replicate within macrophages and to maintain replication at a level sufficient to cause disease. Additionally, various environmental and host factors have been proposed to play a role in FIP pathogenesis. Age at the time of infection, the proportion of cats shedding FCoV in a cattery or household, stress (e.g. of a surgery), and a complex genetic susceptibility have been shown to be associated with the risk of FIP development [2].

Macrophages

In general, assays performed on effusions, although not specific for FIP, have much better predictive value than assays using blood. Immunofluorescence staining of FCoV antigen in macrophages in effusion samples has previously been shown to have excellent specificity for the diagnosis of FIP [3]. However, more recent studies revealed false-positive results of immune staining of effusion samples in cats with diseases other than FIP. Moreover, in cats suspected of having FIP without effusion, an appropriate sample type has still to be identified. Positive immune staining of macrophages in the Cerebrospinal Fluid (CSF) of cats with FIP has been reported, but this approach requires tapping of CSF, and positive results in cats not suffering from FIP have been described. Newly developed reverse-transcription PCR (RT-PCR) tests seem capable of distinguishing FIPV and FECV pathotypes by detecting FCoV spike gene mutations [4-5]. However, RT-PCR methods also are not very useful in cats without effusion, because the sensitivity is very low if blood is used given the very low virus load.

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