Inhibition of Type I Feline Coronavirus Infection by Itraconazole

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In the Literature

Takano T, Akiyama M, Doki T, Hohdatsu T. Antiviral activity of itraconazole against type I feline coronavirus infection. *Vet Res*. 2019;50:5.

FROM THE PAGE ...

FIP is a fatal disease of cats[1] that is triggered by the systemic spread and replication of feline coronavirus (FCoV) and an aberrant host immune response to this viral infection. Two serotypes of FCoV exist: Serotype 1 is considered to be wholly feline, whereas serotype 2 is believed to have arisen from recombination events between serotype 1 FCoV and canine coronavirus.[2] Serotype 1 is most frequently encountered worldwide, although both serotypes can cause disease. Cholesterol plays a role in the infectivity of serotype 1 FCoV in cell culture but not serotype 2 FCoV.[3] Itraconazole, an antifungal agent, inhibits transport of cholesterol out of cells and has therefore been suggested as a potential therapeutic agent in the treatment of FIP.[4]

This in vitro study describes exposure of a feline-derived cell line (*Felis catus* whole fetus-4 cells) to serotype 1 and 2 FCoV derived from cats with FIP in the absence or presence of itraconazole. Itraconazole administration resulted in intracellular accumulation of cholesterol. The concentrations of itraconazole used were comparable to serum concentrations achieved during the treatment of feline fungal infections at the higher end of the oral dose range (10 mg/kg q12h). Response to treatment with itraconazole was assayed by comparing viral plaque formation with that of an untreated control and by measuring viral (ie, nucleocapsid) protein levels.

Production of serotype 1 FCoV was dose-dependently decreased following pretreatment of feline cells with itraconazole, as evidenced by both inhibition of plaque formation and decreased nucleocapsid levels. In contrast, production of serotype 2 FCoV was only equivocally inhibited by itraconazole and only at the highest concentration of itraconazole tested. Posttreatment of feline cells with itraconazole inhibited replication of serotype 1 FCoV to the same degree as when administered pretreatment.

... TO YOUR PATIENTS

Key pearls to put into practice:

1. Itraconazole is thought to decrease serotype 1 FCoV production via blockage of intracellular cholesterol transport.
2. Viral inhibition occurs at itraconazole concentrations comparable to serum concentrations achieved in the management of fungal disease.
3. Although data from this study are promising, clinical trials incorporating itraconazole with or without additional therapeutics may provide greater insight into the potential for clinical use of itraconazole in the treatment of FIP.

References

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4. Takano T, Endoh M, Fukatsu H, Sakurada H, Doki T, Hohdatsu T. The cholesterol transport inhibitor U18666A inhibits type I feline coronavirus infection. *Antiviral Res*. 2017;145:96-102.