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Breastfeeding and Respiratory Antivirals: Coronavirus and Influenza

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With the ongoing concern about COVID-19,* caused by the coronavirus, SARS-CoV-2, that originated in Wuhan, China, and is spreading worldwide causing a severe acute respiratory syndrome, thoughts turn to treatment in general and of nursing mothers, in particular. The short answer is that currently there is no antiviral proven to be effective against this new infection.

However, one investigational drug appears promising, remdesivir. Remdesivir was developed to treat Ebola, but it shows very good activity against COVID-19 in vitro and in some animal models. It is now in phase III clinical trials, meaning that its toxicity was acceptably low in phase I and II trials. In China, it is being studied in a randomized controlled trial in patients with SARS-CoV-2. Some patients evacuated from the Diamond Princess cruise ship in Yokohama Harbor to isolation in Omaha, Nebraska, are also enrolled in the trial.[1]

In addition, a patient with confirmed SARS-CoV-2 was treated in Seattle with intravenous (IV) remdesivir and appeared to respond well with no side effects.[2] Nothing is known about the passage of remdesivir into breast milk, but one newborn infant with Ebola was treated with IV remdesivir following treatment with the monoclonal antibody ZMapp and a buffy coat transfusion from an Ebola survivor. The infant experienced no adverse effects, was virus free on day 20 of life, and discharged on day 30.[3]

Perhaps of greater immediate concern in the United States is the treatment of season influenza. As of February 21, 2020, 342 women of childbearing age (15–44 years) had been hospitalized in the United States with influenza during the current flu season. Drugs used for influenza include the neuraminidase inhibitors oseltamivir, peramivir, and zanamivir and the endonuclease inhibitor, baloxavir. All remain highly active against the strains that have been tested by the Centers for Disease Control and Prevention. Oseltamivir is indicated only for influenza A, which is more common in adults than influenza B. Limited data indicate that oseltamivir and its active metabolite are poorly excreted into breast milk.[4,5] Maternal dosages of 150 mg daily would not be expected to cause any adverse effects in breastfed infants. No studies have been done on zanamivir during breastfeeding, but it is estimated that an exclusively breastfed 5 kg infant would receive only about 0.075 mg/day orally in breast milk after an inhaled maternal dose of 10 mg, which is less than 1% of the inhaled pediatric dose. In addition, because zanamivir is poorly absorbed orally, it is not likely to reach the bloodstream of the infant in clinically important amounts.

Peramivir is also poorly absorbed orally, and not likely to reach the bloodstream of the infant. Because baloxavir is 93% bound to plasma proteins, the amount in milk is likely to be low. However, because no information is available on the use of these two drugs during breastfeeding, oseltamivir and zanamivir are preferred.

Many strains of influenza A are resistant to the older drugs amantadine and rimantadine. In addition, amantadine and possibly rimantadine, can suppress lactation by decreasing serum prolactin. These drugs should not be used to treat influenza.

*Addendum: Kindly note nomenclature definition per the CDC: ''The virus has been named ''SARS-CoV-2'' and the disease it causes has been named ''coronavirus disease 2019'' (abbreviated ''COVID-19'').'' https://www.cdc.gov/coronavirus/2019-nCoV/summary.html, accessed March 8, 2020.

Disclosure Statement

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References

1. Fauci A. Interviewed on *The World*, Public Radio International, February 21, 2020. https://www.pri.org/stories/2020-02-21/controlling-spread-coronavirus-key-stopping-true-pandemic-nih-head-says
2. Holshue M, DeBolt C, Lindquist S, et al. First case of 2019 novel coronavirus in the United States. *N Engl J Med*. 2020. DOI:10.1056/NEJMoa2001191.
3. Dornemann J, Burzio C, Ronsse A, et al. First newborn baby to receive experimental therapies survives Ebola virus disease. *J Infect Dis.* 2017;215:171–174.
4. Greer L, Leff R, Rogers V, et al. Pharmacokinetics of oseltamivir in breast milk and maternal plasma. *Am J Obstet Gynecol.* 2011;204:524.e521–524.
5. Wentges-van Holthe N, van Eijkeren M, van der Laan J. Oseltamivir and breastfeeding. *Int J Infect Dis.* 2008;12:451.

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2. Melis DENİZ, Hasan TEZER, A TAPİSİZ. 2020. YENİDOĞAN VE GEBELERDE YENİ CORONAVİRÜS HASTALIĞI 2019 (COVID 19). *Turkish Journal of Pediatric Disease* 1-5. [Crossref]
3. Paulo Ricardo Martins-Filho, Victor Santana Santos, Hudson P. Santos. 2020. To breastfeed or not to breastfeed? Lack of evidence on the presence of SARS-CoV-2 in breastmilk of pregnant women with COVID-19. *Revista Panamericana de Salud Pública* **44**, 1. [Crossref]