

ToxUpdate

Alabama Poison Information Center, Birmingham, AL

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Zinc for COVID-19 Prevention and Associated Toxicity

By Nick Harrison, Auburn University PharmD Candidate

When the COVID-19 pandemic first emerged, zinc was proposed as a supplementary intervention to assist with treatment and prevention. Zinc is an essential element that plays an important role in the regulation of the immune system. Zinc deficiency is known to impair immune function that may leave those with it susceptible to COVID-19 infection. In a small study among those infected with COVID-19, patients with zinc deficiency developed more complications and had a prolonged hospital stay. However, a study published in February 2021 reported that high dose zinc provided no additional benefit versus standard of care in reducing the duration of symptoms of COVID-19. Thus, zinc supplementation may be a relatively safe and inexpensive adjunct to maintain healthy immune function, especially among those at risk for zinc deficiency, although at this point, zinc supplementation has not been shown to improve treatment outcomes. Currently, the National Institute of Health recommends against using zinc supplementation above the recommended dietary allowance (11 mg/day in men and 8 mg/day in women) for the prevention of COVID-19.

In 2020, the Alabama Poison Information Center provided recommendations for 42 cases of zinc or multi-mineral dietary supplements exposure versus 12 cases in 2019. This increase in cases may presumably be due to the widespread belief held by the public that zinc can prevent or treat COVID-19. Although less toxic than other heavy metals such as lead or arsenic, there are reports of zinc poisonings with fatal outcomes. Means of exposure can include ingestion of oral supplements or U.S. pennies, inhalation of fumes during welding or from smoke bombs, or overapplication of denture cream or cosmetics. Zinc has corrosive effects on the gastrointestinal tract when ingested and common symptoms can include vomiting, nausea, and abdominal pain. Hepatic necrosis, pancreatitis, and renal failure have been reported with acute ingestions. Both acute and chronic ingestion of excessive zinc can cause copper deficiency, which can be characterized by anemia,

(Continued on page 3)



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Special Interest Articles

- Zinc for COVID-19
- KIDS Medication List

Did you know?

As of February 2021, the FDA has received 1320 reports of fraudulent products related to COVID-19. The FDA launched *Operation Quack Hack* in March 2020. It has reviewed thousands of websites, social media posts, and online marketplace listings with fraudulent claims.

KIDs List- Key to Potentially Inappropriate Drugs in Pediatrics

“The KIDs List was created as an evidence-based guide for healthcare professionals to improve patient safety by identifying medication with a high risk of adverse effects in pediatrics.”



By Megan Smith, Samford University PharmD Candidate

Last spring, the Pediatric Pharmacy Association (PPA) published a list of **Key Potentially Inappropriate Drugs** in Pediatrics referred to as the KIDs List. This list is comprised of multiple medications which have been found to be potentially inappropriate when prescribed to children of certain ages. The KIDs List was created as an evidence-based guide for healthcare professionals to improve patient safety by identifying medication with a high risk of adverse effects in pediatrics. In 1991, the American Geriatric Society published the Beers Criteria, a list of inappropriate medications to use in nursing home patients and those sixty-five years and older. The Beers Criteria list has allowed for safer prescribing in older adults and provided a standard of care. Based on the improved safety offered by the Beers Criteria list, the Pediatric Pharmacist Association appointed a group of seven pediatric pharmacists to research and create a list of medications that should be used with caution in the pediatric population.

The PPA group began with creating an initial list by evaluating primary, secondary and tertiary literature, Lexicomp database, FDA Pediatric Safety Communications, and panel opinions. The initial literature search provided over 4000 titles of interest, that was reduced to 210, based on a review of abstracts. Lexicomp introduced 619 drugs of interest while the FDA Pediatric Safety Communications provided 22. A literature review was then performed to further evaluate the drugs and their effects. The quality of evidence was examined, and the panel created a strength of recommendation. Upon completion of all literature reviews and panel discussion, the list was released to outside sources to allow for peer review from pediatricians, pharmacists and nurse practitioners. The list was revised and released for open comments to more than 1500 members of PPA before being finalized.

The final KIDs List consists of 67 drugs or drug classes and 10 excipients. The list provides an alphabetical list of drugs/drug classes, their associated risk/rationale, a recommendation, strength of the recommendation and quality of evidence. Twenty-three of the drugs are listed with a recommendation of *use with caution* while the remaining thirty-nine are listed as recommended to *avoid*. Although there are a variety of drugs and classes listed, some of the most commonly seen include antipsychotics, gastrointestinal agents, anti-infectives and dopamine antagonist. It is important to note that many of the drugs identified as dangerous within the KIDs List are listed on the WHO Model List of Essential Medicines for Children. The list is intended to serve as a guide and provide education to healthcare professionals and lead to safer prescribing in our pediatric populations.

EXAMPLES of MEDICATION on KIDS LIST on PAGE 3

References

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Examples of Medications on KIDS List

Drug	Risk/Rationale	Recommendation	Strength of Recommendation	Quality of Evidence
Benzocaine	Methemoglobinemia	Avoid in infants for teething or pharyngitis	Weak	Very low
Camphor	Seizures	Caution in children	Weak	Low
Codeine	Respiratory depression, death	Avoid in children unless pharmacogenetic testing is used	Strong	High
Dopamine antagonist: Haloperidol, Metoclopramide	Acute dystonia, increased risk of respiratory depression, extravasation, and death with intravenous use	Avoid in infants Caution in children	Strong: haloperidol Weak: Metoclopramide	Moderate
Lamotrigine	Serious skin rashes	Caution in children; titration needed	Strong	High
Loperamide	Ileus, lethargy	Avoid in infants for acute infectious diarrhea	Strong	High
Naloxone	Seizure	Avoid in neonates for postpartum resuscitation	Strong	High
TCAs: Desipramine Imipramine	Sudden cardiac death	Avoid in children (desipramine) Caution in children (imipramine)	Strong	High

Found in Table 1: The Journal of Pediatric Pharmacology and Therapeutics <https://doi.org/10.5863/1551-6776-25.3.175>

Zinc for COVID-19 Prevention and Associated Toxicity Continued from Page 1

neutropenia, and leukopenia. Zinc competitively interacts with copper in the gut where the excessive presence of zinc can cause decreased absorption and increased excretion of copper. There are reports of copper deficiency arising just two weeks after beginning zinc supplementation, but in other cases, it may take months to develop. Chronic toxicity of zinc should be considered when anemia caused by iron deficiency does not respond to iron supplementation.

Treatment for acute oral zinc toxicity is largely supportive; however, whole bowel irrigation can be used for gastrointestinal decontamination. Calcium disodium edetate is the chelator of choice, although other chelators such as DTPA (diethylenetriamine pentaacetate) have also been successfully used to decrease zinc levels in patients with toxicity. For patients with chronic zinc exposures, copper should be supplemented orally or intravenously if needed, but identifying and eliminating the exposure source is critical.

References

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Photo: nutraingredients.com