

# Acute Kidney Injury Common in Children with COVID-19 Multisystem Inflammatory Syndrome

By Bridget M. Kuehn

**A**cute kidney injury (AKI) is common among children hospitalized with COVID-19 Multisystem Inflammatory Syndrome (MIS-C), but it usually resolves quickly, a trio of recent studies suggests.

Studies have shown that about one-third of adults hospitalized with COVID-19 develop AKI (1). Fewer children have been hospitalized with acute COVID-19 or MIS-C, a rare Kawasaki disease-like syndrome linked with recent COVID-19 infections in children (2). But the three new studies suggest that AKI is also a frequent complication in this age group affecting 8% to 20% of children hospitalized with acute COVID-19 and 18% to 46% of children hospitalized with MIS-C.

“Acute kidney injury was a common finding among pediatric patients with MIS-C, but thankfully it was mild and with a shorter recovery period, which differed significantly with what we’ve seen with AKI in adults with primary COVID infection,” said Natalie Uy, MD, assistant professor in the Division of Pediatric Nephrology at Columbia University Irving Medical Center.

## Rapid resolution

One study analyzed data on 157 pediatric patients hospitalized with either acute COVID-19 or MIS-C at one of the four hospitals in the Northwell Health System between early March and mid-August 2020 (3). It found that about 8% of the children hospitalized with acute COVID-19 and 18% of the children hospitalized with MIS-C had AKI. Most children with acute COVID-19 had stage I AKI, and most children with MIS-C had stage I or II AKI.

“The MIS-C patients were overall sicker and had increased inflammation,” said lead author Abby Basalely, MD, MS, assistant professor of pediatrics at the Zucker School of Medicine at Hofstra/Northwell and attending pediatric nephrologist at the Cohen Children’s Medical Center in New York.

A multi-center retrospective study at three tertiary care centers in Saudi Arabia found that 21% of children admitted for COVID-19 developed AKI, mostly stage I or II (4). About one-third of children with COVID-19 and AKI required intensive care compared with only about 3% of COVID-19 patients without AKI. About 40% of the pediatric patients with both COVID-19 and AKI died. Almost 10% of the children with COVID-19 and kidney injury had kidney impairment at discharge. The patients who developed AKI or kidney impairment at discharge were more likely to have other co-morbid conditions, such as lung or heart diseases, blood disorders, pre-existing kidney disease, diabetes, or cancer. Overall, the authors concluded that AKI was milder in children than adults hospitalized with COVID-19; none of the children required dialysis.

A third study looked at 57 pediatric patients admitted to New York-Presbyterian Morgan Stanley Children’s Hospital for MIS-C between mid-April and late September 2020. Nearly half of the children had AKI. The hospital houses the largest pediatric intensive care unit in New York City.

“The majority of the children with AKI had mild AKI that was present on admission,” said Uy, who is also a pediatric nephrologist at Morgan Stanley and the study’s senior author. “We found that children with AKI and MIS-C have swift resolution of AKI.”

Uy and her colleagues also found higher levels of inflammation in the children who developed AKI and that the children with AKI tended to be older and were more likely to have cardiac dysfunction.

The studies were not large enough to determine the exact cause of the MIS-C related AKI. But Basalely suspects that dehydration as a result of the vomiting and diarrhea many patients experienced likely contributed, and that inflammation also plays a role. Uy also cited a potential lack of blood flow to the kidneys, possibly exacerbating decreased cardiac function.

Both Uy and Basalely emphasized the importance of fluid resuscitation for these patients.

“If AKI is diagnosed by the clinician during the admission, try to mitigate it and not to add fuel to the fire,” Basalely said. “Consider utilizing medications that are not nephrotoxic and make sure that you’re carefully working with your clinical team and pharmacists to renally dose medication.”

## Long-term questions

The long-term prognosis for pediatric patients who develop AKI as a result of COVID-19 or MIS-C isn’t yet clear. But the findings that few children in either study required dialysis and most had recovered at discharge were hopeful.

“We’re seeing that hospitalized children have less evidence of kidney injury [than adults],” Basalely said. “That said, a little over 10% of our total population of children with acute COVID-19 and MIS-C had acute kidney injury, which should not go unnoticed because kidney injury in children can—even if it resolves—have implications for kidney health and kidney reserve later in life.”

Basalely and her colleagues are following a few children with MIS-C who recovered from AKI but continued to have elevated blood pressure. She recommends physicians monitor blood pressure in pediatric patients who have recovered from MIS-C–related AKI at every visit and that patients or their parents know that having had MIS-C and AKI is an important part of their medical history they should share with all their physicians.

“Surveillance of borderline blood pressure should be a little higher in these patients,” she said. ■

## References

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