



Sneha Joy\*

## Multisystem Inflammatory Syndrome in children

**M**ultisystem inflammatory syndrome (MIS-C) is a potentially serious illness in children that appears to be a delayed, post-infectious complication of COVID-19 infection. MIS-C was first identified in April 2020 at children's hospitals in the United States and the United Kingdom.

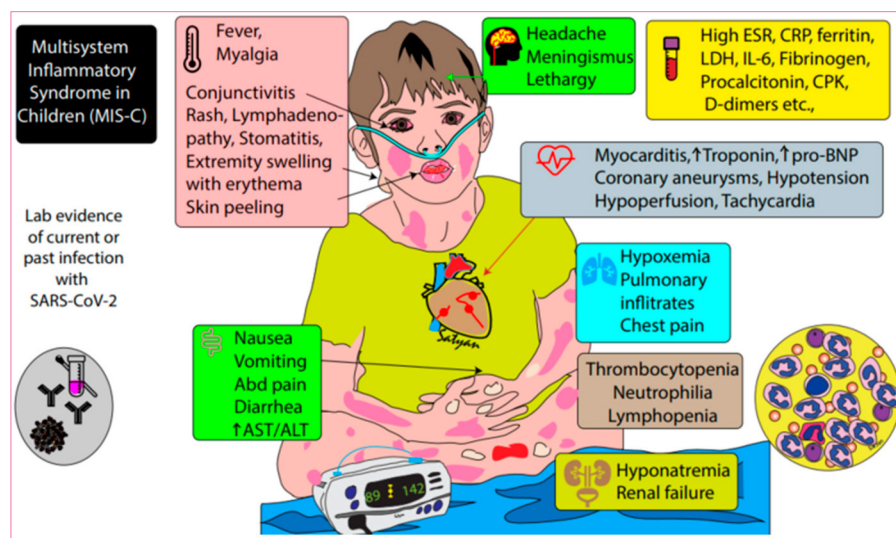
Most children who become infected with the COVID-19 virus have only a mild illness. But in children who go on to develop MIS-C, some organs and tissues such as the heart, lungs, blood vessels, kidneys, digestive system, brain, skin or eyes become severely inflamed<sup>1</sup>.

### Incidence and risk factors

- The median age of patients with MIS-C was 9 years. Half of children with MIS-C were between the age of 5 and 13 years.
- 99% of children had a positive test result for SARS CoV-2, the virus that causes COVID-19. The remaining 1% of patients had contact with someone with COVID-19.
- 60% of reported children were male<sup>2</sup>.

### Causes

The exact cause of MIS-C is not known yet, but it appears to be an excessive immune response related to COVID-19. Many children with MIS-C have a positive antibody test result. This means they've had a recent infection with the COVID-19 virus. Some may have a current in-



fection with the virus<sup>2</sup>.

### Signs and symptoms

Signs and symptoms of multisystem inflammatory syndrome in children include

- Fever that lasts 24 hours or longer
- Vomiting
- Diarrhea
- Pain in the stomach
- Skin rash
- Feeling unusually tired
- Fast heartbeat
- Rapid breathing
- Red eyes
- Redness or swelling of the lips and tongue
- Redness or swelling of the hands or feet
- Headache, dizziness or light-headedness

- Enlarged lymph nodes

### Emergency warning signs of MIS-C

- Severe stomach pain
- Difficulty breathing
- Pale, grey or blue-coloured skin, lips or nail beds — depending on skin tone
- Confusion, irritability
- Inability to wake up or stay awake

### Diagnosis

An antibody test with a positive result means that the child's immune system developed blood proteins (antibodies) that fought the COVID-19 virus.

Lab tests, such as blood and urine tests, including tests that look for an abnormal level of inflammatory markers in the blood

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Imaging tests, such as a chest X-ray, an echocardiogram, an abdominal ultrasound or a CT scan

Other tests, depending on signs and symptoms<sup>3</sup>

## Treatment

Most children with MIS-C need to be treated in a hospital. Some need treatment in a pediatric intensive care unit. Treatment usually involves supportive care and measures to reduce inflammation in any affected vital organs to protect them from permanent damage.

### Supportive care may include

- Fluids, if levels are too low (dehydration)
- Oxygen to help with breathing
- Blood pressure medications to normalize low blood pressure related to shock or to help with heart function
- A breathing machine (ventilator)
- Medications that reduce the risk of blood clots, such as aspirin or heparin
- In very rare cases, extracorporeal membrane oxygenation (ECMO) using a machine that does the work of the heart and lungs<sup>4</sup>.

### Treatment to reduce swelling and inflammation may include:

- Antibiotics
- Steroid therapy
- Intravenous immunoglobulin (IVIG), a blood product made up of antibodies
- Other types of treatment, such as targeted therapies aimed at reducing high levels of proteins called cytokines, which can cause inflammation<sup>5</sup>.

## Prevention

The CDC, (Centers for Disease Control and Prevention) recommends

following these precautions for avoiding exposure to the virus that causes COVID-19:

- Keep hands clean and use sanitizer frequently.
- Practice social distancing.
- Wear double mask in public settings.
- Avoid touching nose, eyes and mouth.
- Cover the mouth with a tissue or elbow when sneeze or cough.
- Clean and disinfect high-touch surfaces such as door-knobs, light switches, remotes, handles, countertops, tables, chairs, desks, keyboards, faucets, sinks and toilets.
- Wash clothing and other items as needed<sup>5</sup>.

## Conclusion

Multisystem inflammatory syndrome in children associated with SARS-CoV-2 led to serious and life-threatening illness in previously healthy children and adolescents. MIS-C could lead to severe multisystem dysfunction, including myocardial dysfunction and coronary artery dilation or aneurysms.

Children with MIS-C need close observation by pediatric specialists in rheumatology, cardiology, critical care.

Children need to be followed after discharge from the hospital, with repeat echocardiograms to monitor their heart and coronary arteries. Children who are fully recovered at six months no longer need close follow-up<sup>6</sup>.

## References

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