Study identifies risk factors for severe COVID-19 in individuals with sickle cell disease

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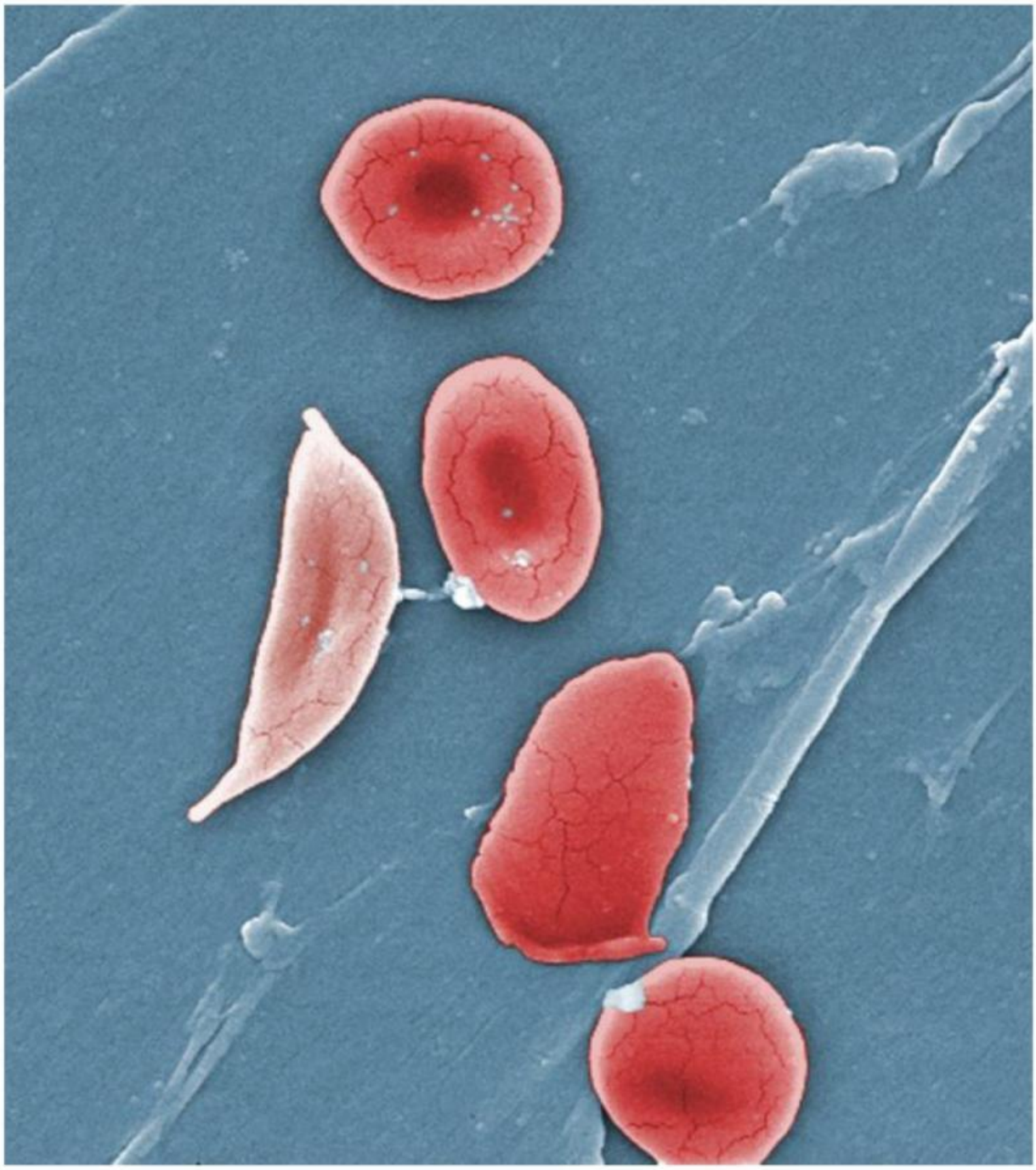

Normal blood cells next to a sickle-blood cell, colored scanning electron microscope image. Credit: Wikipedia/Illustration from Anatomy & Physiology

New research published today in the journal *Blood Advances* finds that certain factors, such as a history of severe pain episodes and coexisting organ conditions, increase the risk of severe COVID-19 illness, including hospitalization, in individuals living with sickle cell disease (SCD). According to researchers, the study results underscore the need for COVID-19 risk reduction strategies and vaccination for this medically vulnerable population.

SCD is the most common inherited red blood cell disorder in the United States, affecting an estimated 100,000 people. According to the Centers for Disease Control and Prevention, SCD affects one out of every 365 Black or African American births and one out of every 16,300 Hispanic American births. The condition can cause severe pain, joint and organ damage, and stroke; these conditions predispose individuals with SCD to worse outcomes with infections, including infection with COVID-19. Previous research has shown patients with COVID-19 and SCD are at greater risks for hospitalization compared with Black individuals without SCD who become infected.

The new study draws data from SECURE-SCD, an international registry that collects information about COVID-19 infections in individuals living with SCD, including details on hospitalization, severity, management strategies, and complications.

Researchers assessed reports on 750 children and adults submitted to the registry between March 2020 and March 2021. Half the patients they studied were children aged 18 and under, and half were adults with a median age of 31 years old. Ninety percent of participants were identified as Black and 7% as Hispanic or Latino.

The researchers found that children living with SCD who had previously suffered more than two pain events requiring acute care were 2.2 times more likely to be hospitalized for COVID-19 and more than 3 times

likely to suffer severe COVID-19 illness. A history of pain events was also found to be a risk factor for adults, as those with more than two prior acute care visits for pain were 1.8 times more likely to be hospitalized with COVID-19 and 1.9 times more likely to suffer severe COVID-19 illness. SCD-related heart, lung, and kidney conditions were associated with higher risk of severe illness in children, while SCD-related heart and lung conditions were also associated with higher risk of hospitalization. However, these conditions did not have the same effect in adults.

"This study tells us that all individuals with sickle cell disease are not at equal levels of risk," said study author Lana Mucalo, MD, of the Medical College of Wisconsin. "Patients with a history of pain, as well as individuals with coexisting organ conditions, need to be even more careful to avoid COVID-19 infection than those without any comorbidities," said Dr. Mucalo.

Dr. Mucalo also noted that now that COVID-19 vaccines are available, physicians and patients alike need to recognize these risk factors when considering vaccination. "Providers that care for individuals living with sickle cell disease should recommend vaccination, particularly for those with these comorbidities that put them at greater risk."

Pain is the most common complication of SCD, and severe pain is the leading cause of emergency department visits and hospitalizations for people with this disease. Notably, this study found that pain was also the most common presenting symptom during COVID-19 illness in both children and adults living with SCD, and that many patients only had pain as their presenting COVID-19 symptom. "This means individuals with sickle cell disease who come to the hospital presenting with pain should also be tested for COVID-19," said Dr. Mucalo.

The research team also sought to understand the effects of hydroxyurea,

a drug commonly prescribed to individuals with SCD to reduce the frequency of pain episodes, on COVID-19. About half of the 750 patients studied were taking hydroxyurea, and the researchers found that hydroxyurea use was associated with lower risk of presenting with pain during COVID-19 in adults living with SCD. However, hydroxyurea did not affect whether an individual would develop a serious case of COVID-19 or need to be hospitalized in children or adults.

"Early in the COVID-19 pandemic, physicians were worried about whether to use hydroxyurea simply because we did not yet know the effects," said Dr. Mucalo. "Now we can see that while it does not affect COVID-19 severity, it does help to lower the incidence of pain episodes in adults with sickle cell disease, so those who are using it for treatment of their sickle cell conditions should not stop using it."

The analysis was limited to patient data reported to SECURE-SCD; given the voluntary reporting system of the registry, it does not capture all known cases of patients with sickle cell disease and COVID-19 infection.

More information: Lana Mucalo et al, Comorbidities are risk factors for hospitalization and serious COVID-19 illness in children and adults with sickle cell disease, *Blood Advances* (2021). DOI: 10.1182/bloodadvances.2021004288

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