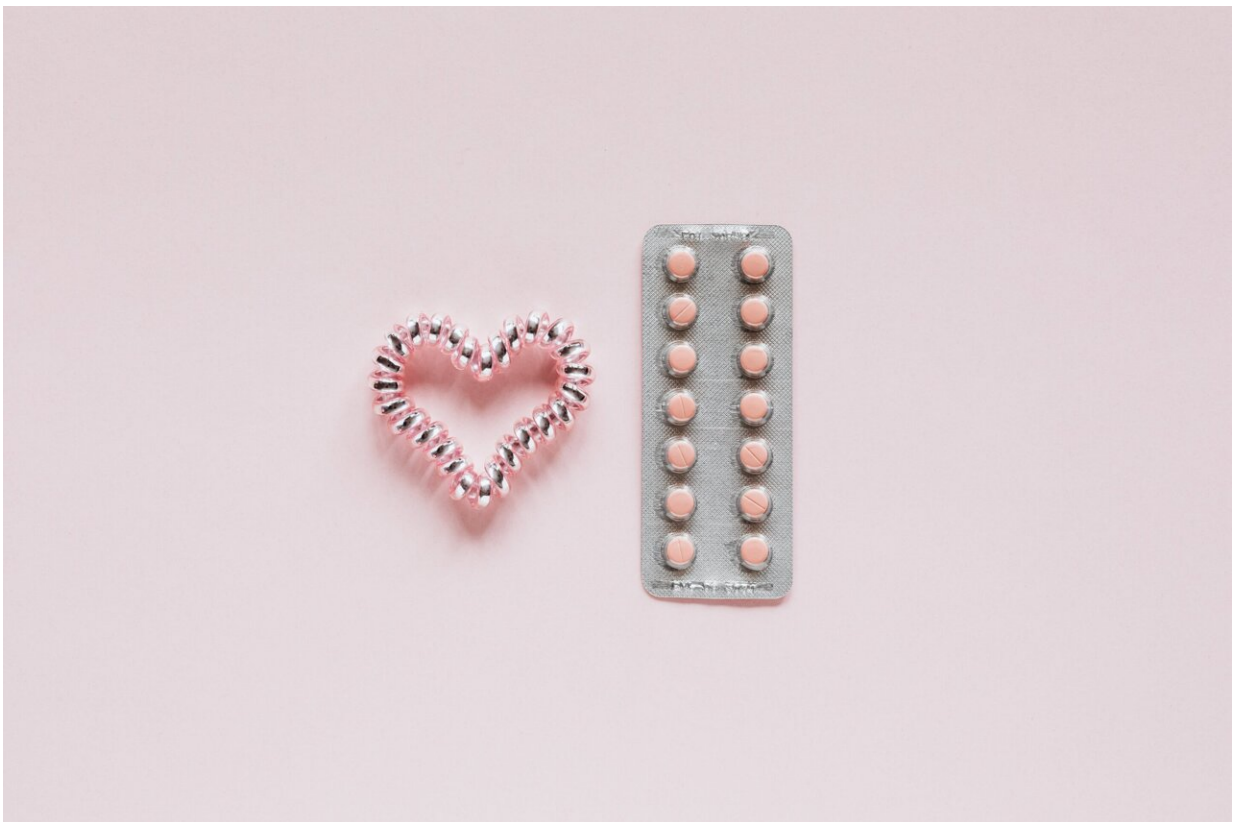


# Digoxin shows promise in enhancing post-surgery survival for infants with certain heart defects

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Credit: Karolina Grabowska from Pexels

A strong, rhythmic pulse is a lifelong companion for those with a healthy heart. But for about [1% of babies born in the U.S.](#) every year,

developmental heart problems compromise that steady beat.

One cluster of serious developmental anomalies results in single-ventricle physiology, or just one functioning pumping chamber in the heart. These are extremely rare, affecting about 5 out of every 100,000 newborns, but they pose grave danger to infants as they enter the world.

Reshma Reddy, M.D., a pediatric cardiac intensive care physician at the Medical University of South Carolina, said that babies born with single-ventricle physiology are likely the highest-risk group of patients cared for by pediatric cardiologists.

While there is no cure for this type of disorder, Reddy and researchers like her are constantly seeking new ways to help these patients. In a recent [study](#) published in the *Journal of the American Heart Association*, Reddy and her colleagues reported that treating certain single-ventricle patients with [digoxin](#) during a critical stage may enhance their survival and lead to better outcomes.

Single-ventricle disorders occur when there is a developmental problem that leads to a smaller, undeveloped lower heart chamber or a missing valve, and they include hypoplastic left heart syndrome, tricuspid atresia and double-inlet left ventricle, among others.

When a heart contends with having just one functional pumping chamber instead of the usual two, it must work harder and less efficiently to send oxygenated blood to the body and retrieve deoxygenated blood from the lungs. The body may not receive adequate oxygen delivery, and a whole host of medical issues can overwhelm the infant.

To survive being born with single-ventricle physiology, infants must undergo a series of surgeries that are not curative but can lead to a more

stable circulation that supports heart function. They often undergo their first surgery at 7 to 14 days of age, and then a second procedure is performed when they are older, generally around 3 to 4 months.

The time between surgeries is called the interstage period, and patients are critically ill and at high risk during this stage. But in their study, Reddy and her team found that digoxin was effective at lowering this risk for patients undergoing an approach called the hybrid procedure.

The hybrid procedure is an initial palliative surgery that can be used as an alternative to the classical Norwood procedure, a highly complex surgery that requires a long support period with a [heart-and-lung](#) bypass machine and leaves patients extremely vulnerable. With the hybrid procedure, babies undergo both catheterization and [surgery](#), but they usually do not need to spend time on the bypass machine. Removing that variable makes for less stress on this already vulnerable population.

In the study, the researchers examined data collected from 2008 to 2021 and reported to the National Pediatric Cardiology Quality Improvement Collaborative, a network of more than 60 pediatric cardiology care centers that care for more than 1,400 patients with single-ventricle disease.

The study looked at 259 infants who underwent the hybrid procedure at 45 different care centers. Half of these infants were treated with digoxin between their stage 1 and stage 2 surgeries, and half did not receive digoxin.

The results showed that the patients taking digoxin had significantly less mortality than those who did not receive it, and they were significantly less likely to need a transplant during the interstage period. The same results were previously reported for the Norwood procedure, and the current study confirms the parallel for patients undergoing the hybrid

procedure.

Because there is a lot of variation among care centers—many centers recommend the hybrid procedure for patients with certain [risk factors](#) and use the Norwood method for other patients—it was important to confirm that digoxin use is likely beneficial for these patients so long as they tolerate the medication well.

Reddy estimated that about 50% of centers prescribe digoxin for this purpose, and she hopes that this published confirmation will encourage a practice change in centers that were waiting for more certainty about this population.

"Researchers and providers are always looking for innovative strategies to help this patient population," she said. "And anything that we can do to increase survival for our sickest, most vulnerable patients in their most vulnerable period of life makes a huge difference."

**More information:** Reshma K. Reddy et al, Association of Digoxin Use With Transplant-Free Interstage Survival in Infants Palliated With a Stage 1 Hybrid Procedure, *Journal of the American Heart Association* (2023). [DOI: 10.1161/JAHA.123.029521](https://doi.org/10.1161/JAHA.123.029521)

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