

Erectile dysfunction drug may benefit cardiac function in young patients with heart defects

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Sildenafil, also known as the erectile dysfunction drug Viagra, may give a boost to underdeveloped hearts in children and young adults with congenital heart defects. Researchers from The Children's Hospital of Philadelphia report that sildenafil significantly improved echocardiographic measures of heart function in children and young adult survivors of single ventricle heart disease palliation.

"Although researchers will need to evaluate clinical benefits over a longer period with a larger number of patients, this finding offers a potential advance in the management of patients with these types of heart defects," said study leader David J. Goldberg, M.D., a pediatric cardiologist at The Children's Hospital of Philadelphia.

The study appeared online recently in the journal *Pediatric Cardiology*.

The researchers randomly assigned 27 children and young adults at Children's Hospital to receive either sildenafil or a placebo for six weeks. After a six-week break in treatment, the subjects were switched to the opposite treatment course. The study team used echocardiograms to measure myocardial performance index (MPI), an indicator of the heart's overall ability to pump blood.

The patients in this double-blind, short-term study, who had a mean age of 14.9 years, had undergone a Fontan operation in early childhood, a

mean of 11.3 years previously. The Fontan surgery redirects [blood circulation](#) in patients born with a severely underdeveloped ventricle, one of the heart's two pumping chambers. The operation is the third in a staged series of surgeries for life-threatening single-ventricle defects.

Although surgical advances over the past 20 years have dramatically improved survival for single-ventricle defects, patients with the condition continue to have long-term illness and risk of early death. The staged surgeries do not recreate normal [heart circulation](#), but instead redirect blood flowing from the veins directly to the lungs, bypassing the heart. However, blood vessels in the lungs develop resistance to this blood, often reducing a patient's ability to tolerate exercise.

Sildenafil, which reduces blood vessel resistance to the flow of blood, is already used to treat pulmonary hypertension (high blood pressure in lung vessels), as well as erectile dysfunction. Because sildenafil has also shown promise as a treatment for adults with heart failure, the Children's Hospital researchers are exploring whether it may benefit younger patients with certain types of congenital [heart disease](#).

The current study is part of a broader phase 2 clinical trial at The Children's Hospital of Philadelphia, the Sildenafil After the Fontan Operation (SAFO) trial. A previous study from the same research team, published in March 2011, found improvements in exercise performance, as measured by ventilator efficiency, in children and young adults with single-ventricle disease who took sildenafil compared to those who took placebo.

The current study was the first to show that sildenafil improved echocardiographic measures of ventricular performance in children and [young adults](#) with single-ventricle physiology. The biological mechanisms that affect ventricular performance are not fully understood, said Goldberg, but he noted that studies in other patients

with heart disease suggest that inhibiting the abnormally high levels of the enzyme phosphodiesterase E5 (PDE5) may produce the physiological benefits seen in the single-ventricle patients.

Goldberg cautioned that further research should be pursued to determine if the observed improvements in ventricular performance persist beyond the short term and if they provide clear quality-of-life benefits. "If sildenafil is safe over the medium and long-term, and if it produces durable functional improvements, patients with single-ventricle [heart](#) disease could have their first effective long-term treatment," he added.

Provided by Children's Hospital of Philadelphia

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