

Research Explained

Interstage Weight Gain Is Associated With Survival After First-Stage Single-Ventricle Palliation

Background

The National Pediatric Cardiology Quality Improvement Collaborative (NPC-QIC) is a multi-center effort to improve outcomes and standardize care for infants and children with single-ventricle congenital heart disease. Initiated in 2007, there are over 50 participating institutions that contribute registry data on more than 2000 monitored single-ventricle patients.

Low birth weight and low weight at the time of first-stage operation as well as low weight at the time of second-stage operation have been shown to be risk factors for death at the time of operation. However, no study has investigated the impact of weight gain between first- and second-stage operation on interstage survival. In this retrospective study, the NPC-QIC assessed the association between weight gain after first-stage operation and interstage survival (transplant-free survival from first-stage hospital discharge to second-stage admission). The study included 1,358 patients from 56 centers in 31 states over a period of almost 7 years.

Summary of What Was Done and What Was Found

The investigators used the NPC-QIC database, a patient registry open for enrollment to all patients with single-ventricle defects who are discharged alive after a first-stage operation. The 1,358 patients studied did not include those who underwent a hybrid as a first-stage operation (as opposed to a Norwood) or those lost to follow-up. This study, unlike previous studies that have investigated weight gain, utilized statistical analysis techniques that took advantage of multiple (mean = 9) weight measurements (rather than just two weight measurements). The study also used statistical analysis techniques to adjust for the impact of other variables on weight gain or survival such as additional illnesses/infections, socio-economic status, feeding difficulties, etc.

Among the 1,358 patients who underwent non-hybrid stage 1 palliation, overall transplant-free survival was 90%. The average duration of the interstage period was about 20 weeks, and the average interstage weight gain was 2.5 kilograms, or about 5.5 pounds (142 grams/week). An association between weight gain in the interstage period and survival was shown. Specifically, for every additional 100 grams of weight gain during the interstage period, the chance of survival increases by 3%. As one might expect, sicker single-ventricle patients during the first-stage hospitalization with more complications (arrhythmias, infection

requiring antibiotics, feeding difficulties [i.e. need for GT feeds], need for cardiac catheterization) were associated with less weight gain during the interstage period.

Limitations of the Study

All studies have limitations, and these do not necessarily make a study bad! First, as with all historical database studies, all patient information is not recorded. This is either because it is not a variable routinely entered into the database or because data is simply missing. Second, data for the NPC-QIC registry is entered by multiple centers. Each center is quite different with variable program sizes, populations, surgical techniques, preferred patient age for second-stage palliation and postoperative management styles. These variations may skew results.

Take Home Message

Interstage weight gain after first-stage palliation is associated with transplant-free interstage survival.