Genetic defect links respiratory disease and congenital heart disease

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The same genetic defect that causes a rare respiratory disease may also lead to some types of congenital heart disease, according to a study from the University of North Carolina at Chapel Hill School of Medicine.

The link between the two diseases starts with cilia, the tiny, hair-like extensions that help the lungs clear of mucus and remove contaminants such as dust. The researchers first noticed the connection in children with a respiratory disease that affects cilia, primary ciliary dyskinesia (PCD). A genetic mutation that impairs cilia movement causes the disease. A few children treated for PCD at UNC-Chapel Hill also had heterotaxy - an abnormal position of the heart and lungs associated with congenital heart disease.

The research team wondered if PCD and heterotaxy were related because
other types of cilia, called nodal cilia, are known to play a role in directing and organizing organs in developing embryo. Results of the new study indicate they are connected.

The prevalence of heterotaxy and congenital heart defects was 200-fold higher in people with PCD than in the general population (one in 50 versus one in 10,000), the study found. The research appears in the June 5, 2007, issue of the journal Circulation.

"This should spur physicians treating patients with congenital heart disease to be more vigilant about testing for and treating respiratory

defects," said Dr. Michael R. Knowles, professor of pulmonary and critical care medicine and study senior author. "It is critical for families and physicians to recognize when congenital heart disease develops."

Children with both heterotaxy and congenital heart disease typically undergo surgery to repair heart defects, and if they have respiratory complications after surgery, it's often assumed that the cause is their heart problems, Knowles said. But the study indicates these children's respiratory problems may also have an underlying genetic cause.

Knowles partnered with Dr. Margaret Leigh, professor of pediatrics, and Dr. Marcus P. Kennedy, then a fellow in pulmonary and critical care medicine at UNC-Chapel Hill, to examine the connection between PCD and heterotaxy.

Out of 337 patients with PCD, 21 (6. 3 percent) had heterotaxy. The researchers performed genetic testing on 12 patients with heterotaxy and found that seven of them had one of two genetic mutations identified as causing PCD.

"Now when we see a patient with heterotaxy and a heart defect, then we're going to know to look for ciliary dysfunction," said Dr. Blair V. Robinson, clinical associate professor of pediatrics at UNC-Chapel Hill and an author of the study. "In addition, the associations between ciliary function, the heart defects and the organization of organs in the chest and abdomen will hopefully lead to better understanding of how these defects develop."

Source: University of North Carolina School of Medicine