Newborns with congenital heart disease have enlarged kidneys

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The hearts and brains of babies born with congenital heart disease are not the only organs affected by this common medical condition. Surprisingly, their kidneys tend to be enlarged at birth, says Gemma Scholes of the University of Melbourne in Australia, who is lead author of a study in the Springer Nature-branded journal *Pediatric Research*.

The research is the first of its kind to investigate the renal development of newborn babies with congenital heart disease.

Congenital heart disease encompasses a range of heart defects and is the most common medical condition occurring in newborns, affecting around nine in every 1000 babies born. Congenital heart disease not only causes defects in the heart, but subsequently may also impair the growth of a baby's brain and body in general. This is due to the "brain-sparing phenomenon", in which the body protects the brain at all costs. In fetuses with congenital heart disease, this means that blood flow is prioritized towards the growing brain, having adverse effects on other organs and the general development of the baby.

Scholes and her colleagues started their study with the hypothesis that fetuses with congenital heart disease will have smaller kidneys. To test this they measured the kidney length of 452 newborn babies by looking at ultrasounds taken before children with congenital heart disease were first operated on.

Surprisingly, the results showed that the kidneys of babies with

congenital heart disease are significantly enlarged and were on average 4.5 centimeters long. The kidneys of children who have left heart obstruction were consistently larger than normal. Those with cyanotic heart disease (a range of defects that alter the way in which blood flows through the heart and lungs) tended to have either normal or enlarged kidneys.

"It is still unclear what the nature of this size discrepancy is, or how it will influence the future health of the child," says Scholes, who explains that this study is the first study to provide an indication that renal alterations exist at the time of birth.

Even patients who were born small for their gestation age because of the presence of too little amniotic fluid in the placenta had enlarged kidneys. This contrasts with observations that fetal growth restriction due to placental insufficiency or preeclampsia results in smaller kidneys.

The study further showed that the type of congenital abnormality that a baby is born with influences the subsequent size of its kidneys differently. The kidneys of newborns with cyanotic congenital heart disease tended to be smaller than those with left heart obstruction, but still larger than what is considered normal.

More information: Gemma B. Scholes et al, Altered in utero kidney development in newborns with congenital heart disease, *Pediatric Research* (2018). DOI: 10.1038/s41390-018-0163-0

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