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Children's Heart Imaging-Associated Cancer Risk Initially Low

The levels of low radiation, which children with heart disease are exposed to during X-rays, does not increase their lifetime cancer risk in a significant way, however as they undergo further complex imaging examinations involving higher radiation doses, the risk of cancer does increase slightly.

These are the findings of a study conducted by researchers at Duke Medicine and published June 9, 2014, in the American Heart Association journal Circulation. It is the largest of its kind, assessing heart disease-diagnosed children's exposure to cumulative radiation doses and evaluating the associated predictions of lifetime cancer risk.

Frequently subject to imaging tests, such as computed tomography (CT) scans, X-rays and cardiac catheterization, these young patients undergo a significant number of imaging studies. The more severe and complex their heart condition, the more often they will be tested.

Despite the fact that imaging techniques and procedures for children are less invasive and capable of providing more accurate diagnosis, the increase in radiation levels still represent potential health risks.

Kevin D. Hill, M.D., M.S., an interventional cardiologist and assistant professor of pediatrics at Duke University School of Medicine, and senior author, confirmed that the benefits of imaging are generally far more significant that the radiation exposure risk. Though it is already established that every one of the individual tests is associated with a small risk, it was the researchers' aim to investigate risk linked to repeated radiation exposure in children.

Together with this colleagues, Hill analysed 337 children aged six years and below, who had undergone heart disease surgery between 2005 and 2010. During this time frame, each of these patients had been subject to an average of 17 imaging tests before and after the time of their surgeries.

The radiation level emitted during the tests was estimated through a combination of existing radiation level data and simulations, which calculated radiation doses based on child-size models.

It was found that the children's radiation exposure was less than the annual background exposure in the United States, however it was confirmed that the group of children suffering from complex heart disease was exposed to higher cumulative radiation doses as a consequence of repeated imaging.

The detailed findings from the imaging exams were as follows:
92 percent of the tests were abdominal and chest X-rays, accounting for 19 percent of radiation exposure.
8 percent of tests were CT and catheterization (advanced imaging), these accounted for 81 percent of radiation exposure.

The resulting average increase in lifetime cancer risk was estimated to be 0.07 percent, with a risk increase between 0.002 percent for chest X-rays to 0.4 percent for complex imaging.

Commenting on the report, Hill stated that clinicians needed to evaluate risks versus benefits when deciding on the various imaging techniques, including those with higher radiation exposure. He emphasised that the study was not suggesting the elimination of complex imaging, but that it was stressing the importance to prioritise testing and recognise the significance of reducing children's radiation exposure.

It was noted that the younger the children's age at the time they were subject to imaging tests and radiation, the higher their lifetime cancer risk. A further finding mentioned in the report concerns gender differences: in comparison to boys, girls had double the cancer risk due to their increased chances of developing thyroid and breast cancers.

Source: Newswise

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