

New system aids cardiovascular risk diagnosis

March 17 2014



Fundus camera. Credit: Asociacion RUVID

Researchers from the Universitat Politècnica de València, the Hospital General de Valencia and the Ophthalmology Unit of the Foundation for the Health and Biomedical Research of the Comunitat Valenciana (FISABIO-Oftalmología Médica) have developed a new software to aid cardiovascular risk diagnosis based on fundus image processing. The

Paediatrics Unit of the Hospital General de Valencia has incorporated this software in a study of cardiovascular characteristics.

The application makes it easier to measure the [vessels](#) and it allows [clinical staff](#) to have more uniform information. At the same time, it is capable of determining characteristics that could imply a higher cardiovascular risk when the child reaches adulthood.

Paediatric patients undergo various non-invasive tests and all of them are interpreted together, giving as a result an approximation of what is happening in the [children's](#) vessels. "We analyse the pulse wave –its morphology–, the wave speed –how fast the blood travels through the vessels and how it returns. But we also need to know if there is any change we can make to all these parameters to get more authentic information", explains Empar Lurbe, head of the Paediatrics Unit of the Hospital General.

Another way to study the vessels is scanning the fundus with a non-mydratic retinal camera, which is a non-invasive way to study the retina.

"We want to know the caliber and the branching angle of the retinal vessels because that information helps us to understand how the blood is circulating. The measurement of the branching angles and the characteristics of the vessels' caliber –if they are wider or narrower or if the branching angle is bigger or smaller–, tells us if the child who has a different branching angle could have an increase in blood pressure over the years", states Lurbe.

For Valery Naranjo, scientific coordinator at the LabHuman of the Universitat Politècnica de València, the software "allows clinical staff to simplify these kinds of tests in their day-to-day work and it helps them to personalize patient care. This data is included in the overall assessment of the [cardiovascular risk](#) of the child".

Early detection in children with low birthweight

The team from UPV, the Unit for the Study of Cardiovascular Risk in Children and Teenagers of the Hospital General and FISABIO-Oftalmología Médica are using this software to make an in-depth study of the retinal microvascular architecture of children born with low birthweight.

In this way, researchers and paediatricians are analyzing the relationship between the measurements of these children and diseases such as hypertension or cardiovascular problems in adult life to learn more about these pathologies.

Lurbe states that children with intrauterine growth retardation "are those who are at a greater risk of developing cardiovascular diseases, such as hypertension or type 2 diabetes. Because of this, we are using the measurements to see if the branching angles of the vessels of children who have intrauterine growth retardation are different than those who do not".

This joint work between engineers and paediatricians aims to provide better care for paediatric patients. "Our system permits us to establish objective connections between different vessels and help clinical staff to detect these pathologies at the earliest stage. As a result they will help give more personalized treatments", concludes Sandra Morales, researcher at the LabHuman of the Universitat Politècnica de València.

Provided by Asociacion RUVID

Citation: New system aids cardiovascular risk diagnosis (2014, March 17) retrieved 25 April 2024 from <https://medicalxpress.com/news/2014-03-aids-cardiovascular-diagnosis.html>

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