

Offline Vascular Measurements in Mothers and Children

Zoe A. Brown, Hanneke Bakker. Eric A.P. Steegers, Vincent W.V. Jaddoe The Generation R Study Group, Erasmus MC – Sophia Children's Hospital

Introduction

The Generation R study is a large population based prospective cohort study from early pregnancy onwards until adulthood in the city Rotterdam in the Netherlands. The study is designed to identify early environmental and genetic causes and pathways leading to normal and abnormal growth, development and health during fetal life, childhood and adulthood. Specific interest is in the effects of fetal and early childhood conditions on health and disease in later life. One of the many main outcomes in the Generation R study are new or well known risk factors in childhood and adulthood for cardiovascular diseases ⁽¹⁾. This study is the first to examine the association of vascular-related pregnancy disorders with maternal and childhood vascular and cardiac function using novel and unique techniques, in a large prospective cohort design. The measurements will form a basis for further follow-up studies in which risk factors of cardiovascular disease will be studied.

Research

Detailed measurements have been performed in pregnancy and early childhood. Follow up measurements in both mothers and children are conducted in a dedicated well-equipped research center located in the Erasmus MC - Sophia Children's Hospital, Rotterdam, Netherlands. These measurements include detailed measurements of the cardiovascular status. For measuring intimamedia thickness, ultrasound images in both mothers and children are made of the left and right carotid artery. This results in a videoclip with a length of 9 heartbeats. In mothers we want to investigate whether vascular-related pregnancy complications are associated with specific cardiovascular risk profiles 9 years after pregnancy, and to identify lifestyle factors that underlie these associations. The ability to identify young women at increased risk cardiovascular disease, for future through pregnancy



complications, may enable unique programs of secondary prevention. In the children we want to study whether fetal and early childhood characteristics, for example maternal smoking during pregnancy and nutritional factors, and childhood body mass index influence intima media thickness (IMT) and distensibility.

Challenge

At our research center we make the video-clips. The actual analyses are made on a later time-point. We were in need to find software to make this able in an easy and sufficient way which is also compatible with our sonography videos. Specifically, we were interested in software measuring the intima media thickness (IMT) and proxies for elasticity (for example distensibility and Young's module).

Findings

In mothers, we have performed a technical inter- and intraobserver variability study to evaluate the intra- and



interobserver variability. For both the IMT and the Young's module the intraclass correlations coefficients were all above 0.90. In the near future we will also perform a practical inter- and intraobserver variability study in which we'll measure mothers and children several times to also evaluate the practical intra-and interobserver variability.

Conclusion

In conclusion, the Cardiovascular Suite is being used in the Generation R Study. In our research it is useful to analyze multiple data offline in an easy and efficient way, which is applicable for maternal and childhood data. With these results we will be able to do research in assessing cardiovascular health in both mothers and children which allows us to develop preventive strategies in the future to reduce risk of cardiovascular diseases.



-QUIPU

Quipu srl is a spin-off company of the Italian National Research Council and the University of Pisa, Italy. The mission of Quipu is to provide products and services in hightech diagnostic and preventive medicine. In particular, the core business is the development and production of systems and techniques for assessing early markers of cardiovascular risk. Quipu's main product is Cardiovascular Suite, which is a software program for assessing markers of cardiovascular risk from ultrasound images. The suite consists of two applications: (i) FMD Studio, for assessment of endothelial function; (ii) Carotid Studio, for assessment of carotid stiffness and intima media thickness. The advantages of the Suite are: high reliability and accuracy, high integration, ease of use, real-time processing. Furthermore Quipu offers consultation services, image reading services and training programs.

Contacts

Dr. Vincent W.V. Jaddoe Generation R Postbus 2040 3000 CA Rotterdam, THE NETHERLANDS Tel nr: +31 10 704 3405

Quipu srl Via Moruzzi 1 56124 Pisa ITALY Tel nr: +39 050 315 2612

www.generationr.nl www.quipu.eu