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Ad. 8. Summary

Investigation of large arteries by non-invasive methods with association to arterial hypertension and their application to clinical practice is the topic of this doctoral thesis.

Using SphygmoCor device we provided pulse wave analysis and pulse wave velocity in two main research projects: EPOGH – European Project on Genes in Hypertension, and Post-MONICA – continuing of MONICA study in Czech Republic (Monitoring Trends and Determinants of Cardiovascular Diseases).

EPOGH – project started in 1998, coordinated by J. A. Staessen, MD, University in Leuven, Belgium. Seven European countries is included in this project and one of the main goals is to establish the database of genetic background of hypertensive and normotensive families.

MONICA – project of World Health Organisation performed in many countries all over the world. In 1990´s the project was discontinued, but it can still continue as Post-MONICA according to the same protocol in Czech Republic (thanks to

the national grants). Coordinator of this study is R. Cífková, MD, Institute of Clinical and Experimental Medicine in Prague.

We provided non-invasive investigation of large vessels in our centre in both above mentioned projects. The goals were the following:

- to include the large artery investigation into research projects using non-invasive and relatively simple methods, mainly arterial stiffness and reflected wave
- to study arterial properties in a random population sample and from this to specify the associations with common risk factors of cardiovascular diseases
- to analyse arterial properties in normotensive and hypertensive families, especially to see how strong is the genetic influence on these properties and on blood pressure (BP)
- to study associations of the candidate genes of hypertension and their polymorphisms with arterial properties and with BP
- to study other specific questions in some smaller samples, for example the comparison of arterial properties in healthy and elderly subjects with and without manifest atherosclerosis, or the dependence of arterial properties on homocysteine levels

Main conlusions from EPOGH study:

- middle aged hypertensive patients had increased aortic stiffness and women (mothers and daughters) had higher reflected wave in spite of good control of their blood pressure
- offspring of hypertensive parents had significantly higher systolic blood pressure than offspring of normotensive parents, the aortic stiffness was slightly higher as well

Conclusions from Post-MONICA study:

- peripheral augmentation index (PAI), which is directly measured parameter, seems to be the most relevant parameter to study reflection arterial properties due to its very close correlation to central augmentation index (CAI)
- smoking causes higher reflected waves
- if we consider the central systolic blood pressure one of the most important haemodynamic parameter, then conventional classification of brachial blood pressure has limited value according to our results
- mild hyperhomocysteinaemia is associated with higher aortic stiffness in a population sample, this relationship exists even in case of slightly elevated levels of homocysteine
- slightly elevated levels of free thyroxine (still within normal range in a population) cause higher aortic stiffness; statistic significance developed only in combination with mutation of polymorphism in the gene for AT1-receptor of angiontensin II