

ABSTRACT

This habilitation thesis comprises my research activity after the sustaining of my PhD thesis on 27 April 2001.

The selected activity was considered relevant regarding the originality, importance and my research area that will further developed. The 19 ISI articles published were the first step in the elaboration of the seven chapters of my thesis. The participation in 7 grants, the submission of another 7 research projects at national competitions, postdoc researches, were the basis of my publications and my habilitation thesis.

The first guide of fetal cord ultrasound was published by the International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) in 2006, doubled by lectures on the same topic organized by this society. Nevertheless, the discovery of the fetal cardiac isolated anomalies remains low in comparison to other fetal anomalies. The presentations on the theme of the fetal heart, sustained by pediatric cardiologists and obstetricians managed to provide during the years, over 600 participants in the Center of Tg Mureș. At the same time, the number of 4 patients from 2007 reaching 93 patients in the first 10 months of 2015 with suspicion of fetal cord anomalies suffered an obvious increase in our center, as a reference center with combined teams of dedicated obstetricians, neonatologists, pediatrics cardiologists and cardiovascular surgeons. The lectures and the continuous training of the obstetricians who are directly involved in the screening for the identification of the fetal cardiac anomalies led to the obvious improvement of the results. This particular casuistic with cardiac malformations allowed us to publish our research but also to publish books with didactic aim. The possibility of the transplacental therapy determined us to take the first steps, as a team in fetal cardiology with encouraging results for flutter and atrioventricular block. In order to improve the first trimester ultrasound on which we focused, the first fetal cardiac anomalies discovered at the screening of 11- 13 weeks appeared in a number of 5 cases in 2015-2016.

As a particularly important observation of screening, investigating our casuistic of 23 de fetuses with persistence of superior left vena cava, among who 16 with severe cardiac pathologies, we concluded that this anomaly, which is relatively easy to see at ultrasound has a value of alarm sign for cardiac malformations.

The research in the area of speckle tracking in fetus, reduces as number, raised the problems of inter-observability and reproducibility. In practice, the complete different results of the measurements on different circles of the cardiac cycles in the same fetus represents one of the major problems.

The results of our research regarding aortic coarctation and fetal ventricular disproportion led to the development of a multiparameter score for the prognosis of this pathology even since the intrauterine life. The personal researches regarding the development of the fetal face bones and their achievement through multi-planar tridimensional ultrasound indicated the possibility of obtaining several images of the dental alveolar ridge, with implications in excluding the orofacial anomalies, the obtained images being similar to those from the pathological specimens, Also, the use of the 3D volumes processed multi-planary in order

to measure the nasal bone can represent an alternative to obtain the 'ideal' sagittal section through 2D ultrasound.

Investigating the role of the *fetal pyelectasis* in the neonatal life, we suggested that: the size of the pyelectasis or the fetal hydronephrosis is not a predicting factor for the severity of the fetal hydronephrosis. The most frequent pathology of the infant's urinary system was the vesicoureteral reflux followed by the pyelo-ureteral junction syndrome and the diagnosis of fetal pyelectasis.

Quantitative elastography, used for the assessment of the elasticity of the hepatic tissue in children with liver pathologies or after chemotherapy, providing data regarding the side-effects of these diseases or treatments that might replace the hepatic biopsy.

The testation of the tubal permeability through sonohysterosalpingography with contrast agent provides valuable data and only a minimum number of false negative results in the personal experience in comparison to the laparoscopy. It can be a first choice method for the investigation of the infertile couple.

We studied the manner in which the IL - 6 174 G>C and IL - 6 -572C>G gene polymorphisms influence the mothers' and newborn's weight and we noticed that the mutant genotype of IL - 6 -572C>G was a protective factor against the development of mother's obesity, while the IL-6 -174G>C polymorphism does not influence the mothers' and their children's nutritional status. The birth weight is positively correlated with the maternal fat mass, total body water, the rate of basal metabolism, metabolic age, and negatively correlated with the smoking status. All the variables taken under consideration in the final model explained the variance of 14.50% of the final results.

Also, in our research we noticed that the newborn's risk percentage for childhood obesity was higher for the T variant allele of the TGF -p1 869 T > C gene polymorphism, and also for the wild type C allele of the PPAR γ 2 34 C>G gene polymorphism.

Development plans in research: simulation as training in obstetrical and gynecological ultrasound for residents and specialist, the development of an adjusted soft; the research of the microdeletions responsible for the isolated cardiac anomalies, new studies on mothers and their children that involve multiple genes regarding transgenerational obesity.