Prenatal diagnostics of heritable diseases, possibilities of prevention

Prenatal diagnostics

The modern methods of the medical genetics allow us to diagnose nearly any of the heritable diseases (monogenic diseases) prenatally. The real challenge is to identify the pregnancies where we really expect particular monogenic disease. There are hundreds of known (well documented) monogenic diseases, yet there is no targeted screening examination that could possibly identify pregnancies with higher risk of monogenic diseases in general.

Anyway, there are some special situation when we are able to perform targeted molecular genetic examination for the fetus. The possible referrals are as follows:

- **Positive family history**: Possibly the most important clinical referral. When we are aware about the (confirmed) diagnosis of monogenic disease in the family, and there is a a significant theoretical risk the fetus could be affected as well - we can perform invasive prenatal diagnostic procedure (AMC, CVS) and analyse the obtained sample for the particular gene/mutation.
- **Suspicious ultrasound finding**: Sometimes even the ultrasound examination can show some hints that can lead to the indication of molecular genetic examination for he fetus. E.G. hyperechogenic bowel sign can be typical for cystic fibrosis, long bones (femur) shortening can be sign of various skeletal dysplasias (achodnroplasia etc.).
- **Suspicious biochemical screening results**: Very rare indication for targeted molecular genetic examination. But extremely low values of UE3 can be suspicious regarding Smith-Lemli-Opitz syndrome.

The procedure is nearly always the same - the invasive prenatal diagnostic (CVS, AMC) is indicated and DNA is isolated from he obtained sample. The appropriate targeted molecular genetic analysis (clinical suspicion/family history) is performed. Whenever possible, the rest of the obtained sample is used for the routine cytogenetic analysis in order to exclude the chromosomal aneuplodies (e.g. Down syndrome) as well.

Prevention

There is no specific prevention regarding monogenic diseases. Whenever there is a positive family history regarding regarding particular monogenic disease, the couple should be refereed to genetic counselling. Same applies also in the case the partners are relatives (consanguinity). Males shoudl consider not to postpone their reproduction for too long since the risk of new dominant mutations in sperms is increasing along with the paternal age.