

Prediction and prevention of preeclampsia, intrauterine growth restriction, prenatal stress and fetal programming of child's psychological development

Submission date 28/02/2007	Recruitment status No longer recruiting	☐ Prospectively registered
Registration date 06/09/2007	Overall study status Completed	☐ Protocol
Last Edited 05/07/2018	Condition category Pregnancy and Childbirth	☐ Statistical analysis plan
		☒ Results
		☐ Individual participant data

Plain English summary of protocol
Not provided at time of registration

Contact information

Type(s)
Scientific

Contact name
Dr Pekka Taipale

Contact details
Kuopio University Hospital
PL 1777
Kuopio
Finland
70210
+358400326981
ptaipale@hytti.uku.fi

Additional identifiers

Protocol serial number
2010

Study information

Scientific Title

Prediction and prevention of preeclampsia, intrauterine growth restriction, prenatal stress and fetal programming of child's psychological development

Acronym

PREDO (to PREDict preeclampsia with DOppler)

Study objectives

Study domain:

1. Prediction of preeclampsia and IUGR
2. Genetic markers predisposing to preeclampsia and affecting fetal growth
3. Maternal prenatal stress, including stress experiences arising from various life domains, anxiety and depression, and stress-predisposing psychological characteristics during pregnancy that may be relevant for understanding the development of preeclampsia.
4. The connection of heart diseases to maternal pre-eclampsia

Hypotheses:

1. To study the role of Doppler ultrasound measurement performed at 12th to 14th week of gestation in predicting preeclampsia and Intrauterine Growth Restriction (IUGR) in women whose medical history implies an increased risk for these conditions
2. To study the role of aspirin (AcetylSalicylic Acid; ASA) in preventing preeclampsia and IUGR in women at high risk for these conditions on the basis of early Doppler velocimetry abnormalities.
3. To study the role of biochemical markers (alone or in combination with Doppler velocimetry waveform assessment) in predicting preeclampsia or IUGR.
4. To study the effect of preeclampsia on fetal growth and metabolism.
5. To assess the additive and interactive effects of family history of cardiovascular and related disorders on the risk of preeclampsia.
6. To provide a basis for a follow-up study of later cardiovascular morbidity and risk factors in the mothers and children.

Ethics approval required

Old ethics approval format

Ethics approval(s)

Ethical Committee of Helsinki University Hospital, 09/02/2006, ref: 44/2006 Dnro 18/E9/06 and 19/E9/06

Primary study design

Interventional

Study design

Prospective double-blind randomised placebo-controlled longitudinal trial

Study type(s)

Prevention

Health condition(s) or problem(s) studied

Preeclampsia

Interventions

The subjects are enrolled among women who visit antenatal clinics at Hyvinkää Hospital, Helsinki, Tampere and Kuopio University Hospitals, Tampere City Hospital, Päijät-Häme, Joensuu and Iisalmi Hospitals. In Hyvinkää, Joensuu and Päijät-Häme the patients are enrolled when they come to the first ultrasound screening at 12 to 14 weeks of gestation.

Those women who belong to risk group on the basis of their medical history are screened by transvaginal ultrasound at 12th to 14th weeks of gestation. Subjects who have bilateral early diastolic notch in the uterine arteries will be randomized into the ASA or placebo group. Women who meet one of the inclusion criteria but who do not have bilateral notch in the uterine artery measurements will be included in the control group. Women with normal pregnancies, without the aforementioned risk factors and with normal ultrasound results will form a follow-up group.

The randomization will be stratified with each study centre being assigned an approximately equal number of subjects receiving ASA or placebo. The assignment will be conducted at the Pharmacy of the Tampere University Central Hospital.

The dose of ASA is 100 mg once a day (1-2 mg/kg/day) orally. The treatment is started at 12th to 14th gestational week and will continue until 34 completed weeks of gestation. Patients will be given oral and written information of the medication. The side effects of the medication will be followed by a notification form which the patients are asked to return if any side effects appear as well as instructions how to contact the obstetricians in charge. The effect and safety of ASA is described in more detail in the investigators brochure. The National Agency of Medicines will be given an announcement about this study.

Ultrasound examination will be performed to all subjects at 12th to 14th weeks of gestation. Patients in the ASA and placebo groups will be re-examined between 18th to 20th and 26th to 28th weeks of gestation. Blood and urine samples are taken from all subjects as follows.

The women will fill in a detailed questionnaire about their medical and family history. Information from the Health Care Registers is collected for epidemiologic study.

The patient will be asked for consent to contact the family later for eventual follow-up studies on the effects of pregnancy conditions on later outcome. The data about patients health status, pregnancy and labour is recorded. Patients will be given a questionnaire about their health status.

Intervention Type

Drug

Phase

Not Applicable

Drug/device/biological/vaccine name(s)

Acetylsalicylic acid

Primary outcome(s)

1. Gestational weeks of 12th to 14th:
 - 1.1. Womens weight and blood pressure
 - 1.2. Ultrasound examination (Doppler velocimetry)

- 1.3. Blood for biochemical and genetic analysis (30 ml)
- 1.4. Urine (10 ml)
- 1.5. Randomisation for the ASA and placebo groups
2. Gestational weeks of 18th to 20th and 26th to 28th :
 - 2.1. Weight and blood pressure measurements are repeated
 - 2.2. Ultrasound examinations (Doppler velocimetry)
 - 2.3. Fasting blood (30 ml) and urine (10 ml) samples
 - 2.4. A 2-hour oral glucose tolerance test (only at 26th to 28th weeks of gestation)
3. At delivery:
 - 3.1. Information collected from the clinical records of the mother and the newborn
 - 3.2. Blood (30 ml) and urine (10ml) samples
 - 3.3. Cord blood sample
4. Biochemical measurements: samples are obtained at 12th to 14th, 18th to 20th and 26th to 28th weeks of gestation and within 12-24 hours after delivery. The biochemical measurements include:
 - 4.1. Indices of antioxidant status: serum uric acid (enzymatic assay using uricase)
 - 4.2. Indices of placental insufficiency:
 - 4.2.1. Serum activin A
 - 4.2.2. Inhibin A and B (two site enzyme immunoassay)
 - 4.2.3. Serum leptin (Radioimmunoassay [RIA] or Enzyme-Linked Immunosorbent Assay [ELISA])
 - 4.2.4. Serum Flt1 (ELISA)
 - 4.3. Indices of endothelial function:
 - 4.3.1. Serum asymmetric dimethylarginine (ADMA)
 - 4.3.2. Serum fibronectin (ELISA)
 - 4.3.3. Serum e-selectin (ELISA)
 - 4.3.4. Serum c-reactive protein (immunotubidimetry or immunonefelometry)
 - 4.4. Lipids:
 - 4.4.1. Serum triglycerides (enzymatic)
 - 4.4.2. Serum free fatty acids (enzymatic)
 - 4.5. Glucose metabolism:
 - 4.5.1. Serum insulin (RIA)
 - 4.5.2. Serum glucose (enzymatic)
 - 4.5.3. 2-hour glucose tolerance test
 - 4.5.4. Serum Sex Hormone-Binding Globulin (SHBG) (Time-Resolved Fluorescence Immunoassay [TR-FIA])
 - 4.6. Biochemical measurements from the cord blood
5. The biochemical compounds to be measured in the study population include:
 - 5.1. Insulin- insulin-like growth factor system:
 - 5.1.1. Serum insulin (RIA)
 - 5.1.2. IGF- I (RIA)
 - 5.1.3. IGF- II (RIA or ELISA)
 - 5.1.4. IGF-binding proteins 1 and 2 (ELISA)
 - 5.1.5. adiponectin (ELISA)
 - 5.2. Hypothalamic-pituitary-adrenal axis:
 - 5.2.1. Corticotrophin-releasing hormone
 - 5.2.2. Cortisol (RIA or LC-MS/MS)
 - 5.2.3. Cortisol-binding globulin (RIA)

5.3. Regulation of fetal cortisol exposure: 11 β -hydroxysteroid dehydrogenase 2 (determined from placental sample) (LC-MS/MS)

6. The incidence of pre-eclampsia in ASA and placebo groups

Key secondary outcome(s)

1. To test whether infants born to mothers with preeclampsia are characterized by greater behavioral difficulty in emotional, social and cognitive domains of development than infants born to mothers without preeclampsia. The aim is also to test whether infant developmental outcomes are predicted by maternal prenatal stress, depression and anxiety measured and the mothers stress-predisposing / buffering traits and characteristics, together or independently of preeclampsia and potential postnatal environmental factors.

2. Healthcare register study

We collect data from the following sources:

2.1. National Population Register: to identify the parents and siblings (including half-siblings)

2.2. Medication reimbursement: hypertension, coronary heart disease, cardiac insufficiency, diabetes, asthma, death register (time and cause of death)

2.3. Hospital diagnosis register: diagnosis related to cardiovascular disease and obstetrics

2.4. Birth register: birth measurements, gestational age and possible pre- and postnatal complications of siblings and half-siblings of newborn infant

2.5. Hospital records of the women and their mothers: pregnancy follow-up and newborn

2.6. Permission to collect and link the data applied by the Ministry of Social and Health Affairs

Completion date

31/12/2010

Eligibility

Key inclusion criteria

Inclusion criteria (one of the following):

1. Preeclampsia in a previous pregnancy

2. IUGR in a previous pregnancy

3. Essential hypertension

4. Gestational diabetes in a previous pregnancy

5. Diabetes mellitus type 1

6. Previous pregnancy with fetal demise (> 22 gestational weeks or over 500 g)

7. Body Mass Index (BMI) greater than 30 kg/m² prior to pregnancy

8. Age younger than 20 or older than 40 years at the day of admission

9. Systemic Lupus Erythematosus (SLE)

10. Sjögren's syndrome

Definitions for inclusion criteria:

1. Preeclampsia is defined as de novo hypertension and proteinuria. Proteinuria is defined as presence of 0.3 g/day or more of protein in a 24-hour urine specimen

2. IUGR is defined as birth weight below -2 standard deviations below mean for sex and gestational age according to Finnish standards

3. Essential hypertension is defined as systolic blood pressure 140 mmHg or more and diastolic blood pressure 90 mmHg or more before 20th gestational week or medication for blood pressure

4. Gestational diabetes is defined by one or more abnormal values in two-hour oral glucose tolerance test

Subjects invited to participate in the study will be given written and oral information about the study. Each participant will sign an informed consent.

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Sex

Female

Key exclusion criteria

1. Asthma (diagnosed by a physician)
2. Allergy to ASA
3. Tobacco smoking (during pregnancy)
4. Previous peptic ulcer
5. Previous placental ablation
6. Inflammatory bowel diseases (Crohn's disease, colitis ulcerosa)
7. Rheumatoid arthritis
8. Hemophilia or trombophilia (previous venous or pulmonary thrombosis and/or coagulation abnormality)
9. Gestational weeks less than 12th more than 14th
10. Multiple pregnancy

Date of first enrolment

01/01/2007

Date of final enrolment

31/12/2010

Locations**Countries of recruitment**

Finland

Study participating centre

Kuopio University Hospital

Kuopio

Finland

70210

Sponsor information

Organisation

Academy of Finland (Finland)

ROR

<https://ror.org/05k73zm37>

Funder(s)**Funder type**

Government

Funder Name

Academy of Finland (Finland)

Alternative Name(s)

Academy of Finland, Suomen Akatemia, Finlands Akademi, AKA

Funding Body Type

Government organisation

Funding Body Subtype

Research institutes and centers

Location

Finland

Funder Name

Helsinki and Kuopio University Hospitals (Finland)

Funder Name

The Academy of Finland, Helsinki and Kuopio University Foundations (Finland)

Funder Name

Sohlberg Foundation (Finland)

Funder Name

Suomen Lääketieteen Säätiö

Alternative Name(s)

Finnish Medical Foundation

Funding Body Type

Private sector organisation

Funding Body Subtype

Trusts, charities, foundations (both public and private)

Location

Finland

Results and Publications

Individual participant data (IPD) sharing plan**IPD sharing plan summary****Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	03/07/2018		Yes	No