Fetal/neonatal alloimmune thrombocytopenia (FNAIT)

Introduction

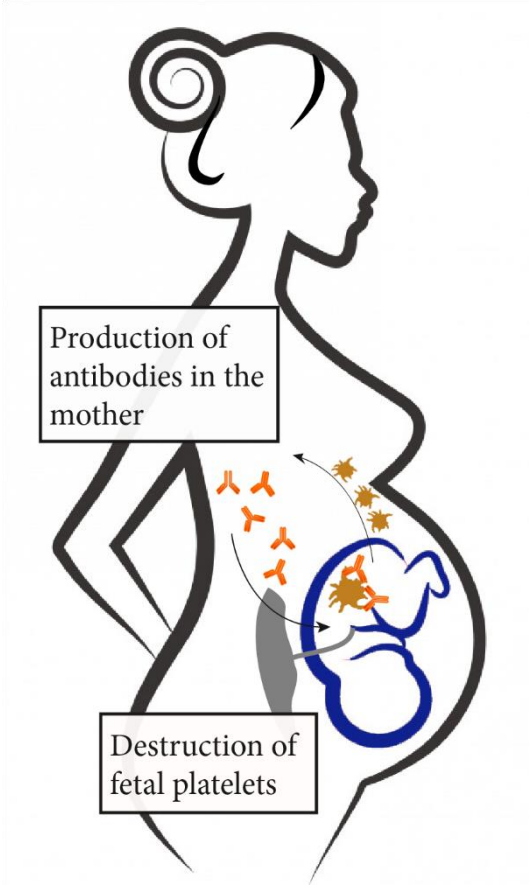
Fetal/Neonatal Alloimmune Thrombocytopenia (FNAIT) is a rare condition where the fetus or newborn suffers from a lack of platelets due to maternal antibodies, and thus are at increased risk of bleeding. FNAIT occurs in about 1 in 1,000 pregnancies.

Platelets are small blood cells that affect the blood's ability to clot, preventing bleeding. All platelets have natural surface proteins called human platelet antigens (HPA). There are many types of HPAs, and the expression of these determine your platelet type. In the Western world, about 2% of people have a rare platelet type (HPA-1bb). While these platelets function normally, pregnant women with this platelet type have a higher risk of having a baby with FNAIT.

The baby inherits its platelet type from both parents. During pregnancy, some of the baby's platelets enter the mother's bloodstream. Normally, this is not an issue, but in some cases, the mother's immune system recognizes these platelets as foreign and start producing antibodies against the HPA inherited from the father. These platelet antibodies (anti-HPA antibodies) can then pass through the placenta to the baby, where they bind to the baby's platelets, leading to their removal from circulation. This can result in a platelet deficiency in the baby and an increased risk of bleeding, with brain hemorrhage being the most serious complication. Although rare, this can have significant consequences for the baby's health.

There are several types of anti-HPA antibodies that can lead to FNAIT, and in our part of the world, anti-HPA-1a is the most common cause. About 10% of pregnant women with the uncommon platelet type (HPA-1bb) develop anti-HPA-1a antibodies, but only 10% of these women will have babies with FNAIT. The antibodies do not affect the mother and will only bind to platelets that are different from her own. Also, there are other platelet antibodies that also can cause FNAIT, and although not frequently found, they are tested for in the routine laboratory work up.

Laboratory investigation of FNAIT is performed at the Norwegian National Unit for Platelet Immunology (NNUPI) at the University Hospital of North Norway.



Investigation and Diagnosis

FNAIT is a rare condition, and currently there are no established screening programs to identify pregnancies at risk. As a result, the diagnosis of FNAIT is usually made after birth when a baby shows signs such as:

- A rash caused by skin bleeding (petechiae and ecchymoses)
- Other forms of bleeding
- Low platelet count in a blood test

To confirm the diagnosis of FNAIT, blood samples from the mother, father, and baby are analyzed. The laboratory at UNN compares their platelet types and looks for maternal HPA-antibodies that might bind to the baby's platelets. Pregnant women at risk of delivering a child with FNAIT are monitored regularly during pregnancy according to the Norwegian FNAIT management program.[1,2] Blood samples from the mother are analyzed for platelet antibodies (HPA antibodies) in pregnancy weeks 20-23 and 34, as well as 6 weeks after delivery. If HPA antibodies are found, the levels are monitored more often, and the mother is offered a clinical examination including evaluation with fetal ultrasound by an obstetrician.

Treatment

The of platelets in the baby often correlates with the level of maternal antibodies. If the antibody level is equal to or above 3 IU/mL, the pregnant women is offered caesarean section 1-2 weeks before term. For pregnant women with low levels of anti-HPA-1a, there is generally no need for caesarian section. If

the pregnant woman previously has given birth to a child with FNAIT and intracranial hemorrhage, she is offered treatment with weekly high-dose intravenous immunoglobulins from pregnancy week 20.

After birth, the baby's platelet count is checked. If low, or if there are signs of bleeding, the baby receives a platelet transfusion, preferably with HPA-compatible platelets, to prevent or stop bleeding. In some cases, immunoglobulin treatment is also given. Doctors may perform an ultrasound of the baby's head to check for brain bleeds. Mothers are allowed to breastfeed.

An international drug study (Freesia-1) is currently underway with the aim of preventing FNAIT. Pregnant women who have previously given birth to a child with FNAIT without brain bleed can participate. In Norway, the study will be conducted at the university hospitals in Oslo, Bergen, Trondheim and Tromsø, and patient inclusion will continue until 2027. For more information about this study please contact us at blodplatelab@unn.no or phone: +47 776 28086.

Follow-up

Babies with FNAIT without serious bleeding recover fully, and typically do not need additional follow-up after being discharged from the hospital. After delivery the maternal antibodies are rapidly cleared from the baby's blood and the platelet count usually normalizes within a week. In case of complications such as intracranial hemorrhage, the baby will receive appropriate treatment and follow-up by pediatricians.

Women with the platelet type HPA-1bb are advised to have a blood test six weeks after delivery to check for antibodies. These HPA-1a-immunized women are followed according to the Norwegian FNAIT management program[1, 2] in subsequent pregnancies. Ideally, women with platelet antibodies should receive blood from donors with the same platelet type. However, in case of emergency and if such blood products are not available, it is considered safe to transfuse blood from an unmatched donor. Women with platelet antibodies are not accepted as blood donors.

For more information, please contact the Norwegian National Unit for Platelet Immunology (NNUPI)

Phone: +47 776 28 086 E-mail: blodplatelab@unn.no

References:

1. Tiller H, Ahlen MT, Akkök CA, Husebekk A. Fetal and neonatal alloimmune thrombocytopenia – the Norwegian management model, Transfus Apher Sci (2020) DOI: 10.1016/j.transci.2019.102711

2. Tiller et al. Alloimmunisering trombocytt. Fødselshjelp (NFG), version 1.1 https://metodebok.no/emne/HZPsaEZA (In Norwegian)