Role of aspirin in the prevention of preeclampsia

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Abstract

Pre-eclampsia, or toxaemia, is a potentially fatal condition characterized by extremely high blood pressure (hypertension). Usually, it appears 20 weeks after pregnancy when blood pressure is normal. There is a risk for the mother and the baby to suffer severe complications, if not death. There is an incidence of it of 2-8% in pregnancy around the world. There are a majority of women who have preeclampsia who have healthy babies. There are 13 million premature babies born each year due to preeclampsia. When a baby is born before 37 weeks of gestation, it is considered preterm. There are several common symptoms, such as hypertension, proteinuria, swelling of the legs, and retention of water. A person's vision may also be affected by changes such as temporary blindness, blurred vision, and sensitivity to light. Women who are pregnant are more likely to suffer from hypertension disorders such as gestational hypertension. Several factors increase the risk of toxicity, including obesity, diabetes type 1 and type 2, renal disease, and autoimmune diseases. In addition to placental abruption, HELLP syndrome, fetal growth restriction, and preterm birth, pre-eclampsia can also result in organ damage such as strokes and cardiovascular disease. An individual who has a preeclamptic condition is twice as likely to suffer a heart attack or stroke later in life. The root cause of preeclampsia is still unknown. The miR-200 family has been linked with preeclampsia and upregulated in preeclamptic plasma and placenta. Furthermore, aspirin suppressed the miR-200 family, and these miR-200 family-mediated cell activities, such as cell invasion and EMT alterations, were entirely reversed. The most recent clinical studies back up the use of low-dose aspirin to prevent pre-eclampsia. Prescriptions for low-dose aspirin are issued to prevent placental complications and foetal growth restriction.

Keywords: hypertension, proteinuria, placental abruption, pre-term births, aspirin.

Introduction

Preeclampsia is characterized by new-onset hypertension, which usually occurs after 20 weeks of gestation and evidence of end-organ dysfunction. is also associated with adverse neonatal outcomes, usually secondary to iatrogenic preterm delivery and an increased risk of fetal growth restriction and placental abruption. The adverse intrauterine environment associated with preeclampsia is thought to contribute to the association between maternal preeclampsia and childhood and adult chronic diseases in the offspring, such as obesity, diabetes, hypertension, and neurodevelopmental abnormalities.

Contemporary evidence suggests that preeclampsia is a two-stage disease. The first stage is an asymptomatic early pregnancy stage caused by poor placentation due to abnormal trophoblast invasion and spiral artery remodeling. This results in the second stage of the disease, characterized by a placental ischemia/reperfusion injury and a maternal immune-mediated response. Aspirin is a non-steroidal anti-inflammatory drug that acts by non-selectively and irreversibly inhibiting COX, resulting in anti-platelet and anti-inflammatory effects by preventing the conversion of arachidonic acid to thromboxane and prostaglandins. Aspirin also inhibits hypoxia-induced sFlt-1 overexpression by inhibiting COX-1 as an added mechanism of counteracting preeclampsia. Aspirin is currently the only medication recommended for the prevention of preeclampsia. Aspirin inhibits epithelial-to-mesenchymal transition (EMT) in trophoblasts due to the inhibition of preeclampsia-associated miRNAs, namely the miR-200 family. MiR-200-mediated trophoblast biology is reversed by aspirin through the network signaling of TGF-β1/ZEB1/miR-200. Aspirin is proven to be an effective drug in preventing preeclampsia. The findings provide an intervention target for the network.

Stages of preeclampsia

Stage 1:

- The inherited epigenetic architecture and acquired environmental factors
- Decreased expression of HLA class 1 molecule

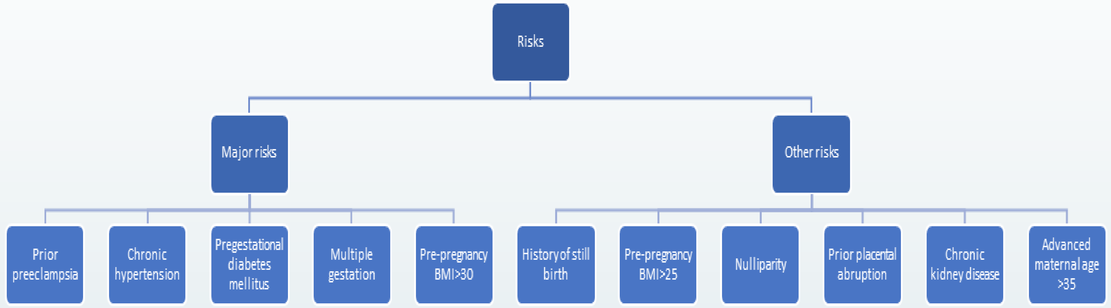
Stage 2:

- Inadequate EVT invasion and failure of spiral artery remodeling
- Poor blood supply and enhanced oxidative stress and inflammation

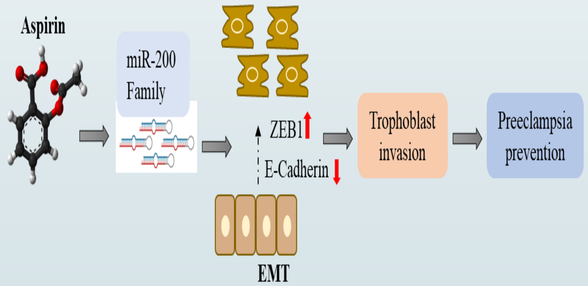
Stage 3:

- Production of anti-angiogenic factors
- Generalized maternal endothelial dysfunction and end organ dysfunction

Risk factors



An overview of the role of aspirin in preventing preeclampsia



Conclusion

A study has shown that aspirin can prevent preeclampsia. This study provides a target for the network's intervention. The miR-200 family has been linked with preeclampsia and upregulated in preeclamptic plasma and placenta. Aspirin suppressed the miR-200 family, and this resulted in a significant reduction in miR-200 family-mediated cell activities, such as cell invasion and EMT alterations. The most recent clinical studies back up the use of low-dose aspirin to prevent pre-eclampsia.

References

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