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Improvement of Placentaly Mediated Maternal Medical Disorders before the Delivery - An Alarming Sign from the Fetus

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Opinion

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Abstract

Both gestational diabetes mellitus (GDM) and hypertensive disorders in pregnancy (HDIP-gestational hypertension, pre-eclampsia, eclampsia and HELLP syndrome) can be considered as placentally mediated disorders. That is the reason for all most complete cure in such disorders after the delivery. Improvement of such disorders before the delivery can be considered as failing of the placenta. Urgent delivery of the fetus should be considered in such occasions after considering the fetal maturity. This article attempts to highlight the importance of this through three case reports.

Keywords: Gestational Diabetes Mellitus; Gestational Hypertensive Disorders; Pre-Eclampsia; Intrauterine Fetal Death

Abbreviations: GDM: Gestational Diabetes Mellitus; HDIP: Hypertensive Disorders in Pregnancy; hPL: Human Placental Lactogen; HELLP: Hemolysis Elevated Liver Enzymes Low Platelet.

Introduction

Placenta and the membranes are the structures that anatomically separate the fetus from the mother. Genetic composition of the placenta is not 100% identical to the mother. Thus, it can be considered as an allograft with in the maternal body who serves as the host. So, the placenta has to develop with in the maternal body while escaping from the maternal immune response. Considering about the pregnancy as an allograft like this, will help to understand the many disease entities in obstetric medicine. This is very important when teaching to the medical students to understand the disease mechanism, rather than by hearting it.

Placental tissues use various mechanisms to escape from the maternal immune system. If these mechanisms are deficient or maternal immune response against the fetus is strong, the ultimate out come will be poor placentation. Stronger immune response against the placenta produces high inflammatory process all over the body which leads to systemic manifestation of the HDIP. This inflammatory process will stop once the placenta, membranes and the fetus are delivered. Because this process started against the products of conception which acts as an allograft. If the systemic manifestation of the pre-eclampsia (ex-head ache, blurring of vision, right hypochondrial pain, exaggerated tendon reflexes, hemolysis, elevated liver enzymes, low platelet and coagulopathy) is improving without the delivery, it indirectly indicates that the inflammatory process against the placenta is reducing due to the failing placenta. Even though placental failure helps to improve the maternal condition, it adversely affects on the fetal wellbeing. Thus, this should be considered as an alarming sign from the fetus point of view.

Placenta has to ensure a continuous supply of glucose to the fetus when it comes to the GDM. To achieve this, it

secretes various hormones (ex-Human placental lactogen-hPL) which antagonize the maternal insulin actions. Thus, in a typical pregnancy with GDM requires higher doses of anti-diabetic medications (ex- Metformin, Insulin) towards the latter part of the pregnancy as growing placenta towards the term secretes more and more anti-insulin agents to ensure adequate supply of glucose for the growing demand of the rapidly growing fetus. But if anti-diabetic medication requirement starts to drop before the delivery without any major changes in the dietary habits of the mother, indirectly alarming that the secretory functions of the placenta has started to fail. This may have affected to the overall placental functions which put fetal wellbeing in danger.

Discussion

Case 1

40-year-old primi mother who conceived spontaneously after 14 years of primary subfertility presented at the 34th week of pregnancy with pre-eclampsia. She was started on labetalol and dose was gradually increased to achieve the blood pressure control. Then Nifedipine and Methyldopa were added as satisfactory blood pressure control was not achieved. Her platelet count started to drop while liver enzymes started to rise. Estimated fetal weight was on the tenth centile and doppler studies were normal. On the fourth day of the admission, her blood pressure dropped below 140/90mmHg while her platelet count started to rise. Her liver enzyme levels also dropped. Mother was satisfied about the fetal movements and she informed about a better feeling compare to previous days. On the same day evening her baby's fetal heart sound were not detected by the mid wife during his routine fetal heart auscultation. Ultra sound examination confirmed the intra uterine fetal death with out any ultrasonic evidence of placental abruption. Her labour was induced and she delivered a morphologically normal dead fetus. Placenta didn't show any evidence of abruption.

Case 2

34-year-old primi mother in the 29th week of the pregnancy, who conceived spontaneously after 8 years history of primary subfertility, presented with pre-eclampsia. She had generalized body swelling with exaggerated tendon reflexes. She was started on Methyldopa and Nifedipine. Labetalol was not started due to bronchial asthma. On admission her liver enzymes and creatinine level had been elevated. Her platelet count was 120000/ul. Estimated fetal weight was 800g and doppler studies were normal. After two days, she felt better and blood pressure dropped below 140/90mmHg. Her platelet count, liver enzyme level, and creatinine level came to normal. Fetal heart sounds were normal according to hand held doppler. She underwent ultrasound scan on next day morning which confirmed the intra uterine fetal death. There was no any ultrasonically detectable placental abruption. She delivered a morphologically normal fetus.

Case 3

24-year-old primi mother in the 36th week of the pregnancy which complicated with GDM (on soluble insulin) since 24th week, complained of recurrent hypoglycemic episodes with her usual doses. She denied any major changes in diet pattern. She was admitted to the ward for further assessment. Her fetal growth was normal and doppler studies were normal. Cardiotocograph was normal and mother satisfied about the fetal movements. Her insulin doses titrated according to blood sugar series values and doses had to reduced by about 50% compare to her usual doses. On the second day of admission, she complained of reduced fetal movements at night. Ultrasound scan confirmed the intrauterine fetal death.

When considering the first two cases on pre-eclampsia, there were no any specific indication for the delivery according to current accepted international guidelines. Most indications for the pre-term delivery in pre-eclampsia are based on maternal conditions. With the advancement of neonatal care, this has to be revolutionized. Because both these mothers are sub fertile. This may be their last chance. Many developing countries not offer in vitro fertilization free of charge. Thus, at least attempting to deliver the baby and give the maximum possible care for the survival could have been attempted in the first case after multi-disciplinary team involvement. Risk of exposing the mother into a major surgery and its subsequent complications in future pregnancy should be discussed against the benefits of the surgery. The case 2 is little different to the first one as the baby's estimated fetal weight was less than one kilo gram.

When it comes to the third case, my opinion is, this fetal death could have been easily prevented if the decision maker thinks about GDM as above. This baby was a well grown baby just one week behind the term. Reduction in insulin requirement (without any major changes in the dietary pattern) clearly indicates the reduction in placental secretion of anti-insulin agents like hPL. Thus, it clearly indicates the failing in placental function which can immediately and adversely affect on the fetal wellbeing.

These three cases highlight the importance of knowing that "placentally mediated maternal medical disorders will not improve with out the delivery or failing of the placenta". So, improvement in such disorders before the delivery should be considered as an alarming sign from the fetus and delivery plan should be immediately discussed with the participation of neonatologist, anesthetist and the

parents. All these pathophysiological mechanisms behind the placentally mediated maternal medical disorders can be easily understand if fetus and the placenta were taught as an allograft with in the maternal body which acts as the host, specially to the beginners in obstetrics. These facts should be studied further in future research studies for the benefits of the future [1-3].

Conclusion

Placentally mediated maternal medical disorders like HDIP and GDM are usually not improved without the delivery of placenta. If HDIP and GDM is improving with out the delivery, it should be considered as a warning sign from the compromising fetus and delivery should be considered after careful consideration of fetal maturity, neonatal care facilities and parent's wishes. Considering the fetus and the placenta as an allograft will help to better understanding of these disease entities, specially for the beginners in obstetrics.

Declarations

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