

Case Report

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Intrauterine Growth Retardation (IUGR): A Case Report

Obrowski Michael^{1*} and Obrowski Stephanie²

¹Doctor of Medicine (M.D. – 2000); Assistant Professor of Anatomy; CEO, Chief Physician and Surgeon of Wilderness Physicians, European Union

²Doctor of Medicine (M.D. – 2019); Medical University of Łódź; President of Wilderness Physicians, European Union

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***Corresponding author:** Michael Obrowski M.D., 43C Żeligowskiego Street, #45, Łódź, Poland 90-644, Email: DrObrowski@gmail.com; www.wildernessphysicians.org

Abstract

This case report is about a 36 year old primigravida patient in Southern California. She worked a sedentary job, was severely overweight prior to becoming pregnant and was unable to carry the baby to term. This paper reports on all the problems of the patient and the pregnancy, Caesarean Section Delivery of the infant at 24 weeks and the subsequent death of the child at the age of 6 days. Written permission and all of the information was freely given to the authors by the father, the mother refused to talk about the mistakes she had made, her guilty feelings and the fact that she was ultimately the cause of the death of the child due to her obesity precipitated this refusal. The father wanted it published to avoid anyone else losing a child, an unimaginable nightmare.

Keywords: Preeclampsia; Eclampsia; Pregnancy Induced Hypertension (PIH); Hyperemesis Gravidarum; Caesarean Section; Intrauterine Growth Restriction (IUGR); Gestational Diabetes; Ductus Arteriosus; Ligamentum Arteriosum

Abbreviations: BMI: Body Mass Index; WHO: World Health Organization; PIH: Pregnancy Induced Hypertension; IUGR: Intrauterine Growth Restriction; PDA: Patent Ductus Arteriosus; LBW: Low Birth Weight; SGA: Small for Gestational Age; COPD: Chronic Obstructive Pulmonary Disease;

Introduction

This case report is about a 36 year old primigravida patient in Southern California. She worked as an extremely sedentary Family Practice Physician and had only been Board Certified for two years. So she was an inexperienced physician with minimal training in Obstetrics. The patient was 5'2" (1.57 meters) tall and according to the husband weighed approximately 180 lbs. (81 kg.) at the time she discovered she was pregnant. Prior to the pregnancy, the patient did absolutely no exercising in a gym or even minimal exercise such as walking. Her idea of exercising was the minimal walking she did in her office. She was not under the care of any physician for any health issues, especially her obesity. After discovering she was pregnant, she still refused to get any exercise or professional dietician counseling for losing weight. The husband related that she always refused to get professional help for weight loss. This patient's weight and short stature would have given her a Body Mass Index (BMI) of 32.9, which is classified by the World Health Organization (WHO) as Obese Class 1 [1]. This Obese Classification during pregnancy also put her at an extremely high risk for heart disease including

Pregnancy Induced Hypertension (PIH), stroke, Gestational Diabetes, Intrauterine Growth Restriction (IUGR) of the baby, Pre-Eclampsia and Eclampsia. It is unknown whether she had any pre-pregnancy diabetes issues or heart problems, but the husband did not think so.

Case History

The patient suffered from severe *hyperemesis gravidarum* [2] from the beginning of the pregnancy. Due to the severe *hyperemesis gravidarum* and her massive obesity, she was seeing a High-Risk Obstetrician almost immediately after it was confirmed that she was in fact pregnant. She saw this high risk doctor weekly and at about 18 weeks her blood pressure started increasing. From the 19th week to the 20th week of pregnancy, her blood pressure had risen drastically. The patient was admitted into the high-risk pregnancy ward of the hospital for Pre-Eclampsia, proteinuria, possible Intrauterine Growth Restriction (IUGR) of the baby and *hyperemesis gravidarum* as the blood pressure had risen so sharply over the span of one week. The husband could not relate how high the blood pressure was but

he did state that she was also gaining weight quite rapidly.

Preeclampsia is defined as a potentially dangerous pregnancy complication characterized by high blood pressure. If uncontrolled, this condition can lead to *Eclampsia* [3], a life-threatening condition in which one or more convulsions occur in a pregnant woman suffering from high blood pressure, this can often be followed by a coma and posing a serious threat to the health and life of mother and baby.

The patient was informed that she was going to have to stay in the hospital on total bed rest until delivery of the baby due to the Preeclampsia. It was also seen on the first in-patient ultrasound that the child was not developing at the proper rate, so a definitive additional diagnosis of IUGR was made. This is where the problems became more complex. The mother's weight continued to balloon and when the mother's weight passed 200 lbs. (91 kgs.) she began having difficulty breathing. A small framed, short statured woman is not designed to carry such a massive weight, especially when pregnant. The fat was accumulating everywhere, especially around her neck, obviously producing the difficulty in breathing. All the calories taken in by the patient first had to go to feed the massive weight of the patient and whatever minimal calories were left over, went to nourish the baby, hence the IUGR [4].

At 24 weeks gestation, this patient was having so much trouble breathing and was becoming mentally confused, her high-risk Obstetrician decided that she was progressing into Eclampsia and that the risks to the patient dying outweighed the risks to delivering a 24 week pre-term, IUGR baby. The Cesarean Section was performed without any difficulties, a female infant weighing 1 lb. 4 ozs. (567 grams) was delivered and named Krystyna. She was given surfactant [5] and did not need any ventilator support and was not intubated – she was just very small. The father relates that on the 4th day of the child's life, the doctor's discovered a "large" Patent Ductus Arteriosus (PDA) and recommended that it be clipped and closed. The surgeon's also stated they did "many of these procedures without problems". The father was against the surgery because he suggested that she was breathing fine on her own and that the doctors should wait until she was larger and stronger. The father was a Biologist by training at that time and was applying for medical school, but he was not a physician yet. The surgeons stated to him and the mother that such a large PDA could decrease the flow of blood to the brain and possibly cause cerebral palsy. Since the father was not a doctor yet, he mistakenly deferred to the mother's knowledge and she agreed to the surgery and signed the permission, a big mistake. It is unknown exactly what happened, but the father suspected that the infant was over-anesthetized during the surgery due to her small size and she never regained consciousness and was intubated from the surgery onward. On the 6th day of her life, the child, died. No definitive explanation was ever given to the parents. No autopsy was performed.

The father and his wife eventually had two more children. After the mother lost over 75 lbs. (34 kg.), the second daughter was born weighing 6 lbs. 12 ozs. (3,062 gms.) a good weight although on the low side of normal delivery weight; and the third child, a boy, was also born with slight IUGR, weighing just over 3 lbs. 2 ozs. (1,417 gms.) so there was an indication that in this mother she was prone to having children with IUGR while carrying excessive weight. When she had the second daughter, she had lost about 75 lbs. (34 kg.) and weighed approximately 135 lbs. (61 kg.) but when she had her third child, the son, she again weighed over 175 lbs. (80 kg.). So in this woman, it is obvious that her obesity had a direct correlation to having two children with IUGR [4,6], although the third child had a less severe case of IUGR and actually survived, however it has been reported he has some learning and cognitive disabilities which are being ignored by the mother. All this birthing trauma led to the parent's eventual divorce. The second child is now a 3rd year medical student so she is obviously cognitively fine, the third child, the boy, has failed out of high school and is a high school dropout. Is this a sequelae of the IUGR? Probably.

Intrauterine Growth Restriction (IUGR)

Intrauterine Growth Restriction (IUGR) [4] refers to the delayed intrauterine growth of a fetus during pregnancy. There are many causes, but most often involve poor maternal nutrition with the mother usually being severely overweight and/or lack of adequate oxygen supply to the fetus. Women that are severely underweight or anorexic usually find it impossible to get pregnant but being underweight can also be a cause of IUGR due to an insufficient intake of nutrients and calories. At least 60% of the 4 million neonatal deaths [6] that occur worldwide every year are associated with low birth weight (LBW), caused by intrauterine growth restriction (IUGR), preterm delivery, and genetic/chromosomal abnormalities [3], demonstrating that under-nutrition is already a leading health problem at birth. Intrauterine growth restriction can result in baby being *Small for Gestational Age* (SGA), which is most commonly defined as a weight below the 10th percentile for the gestational age [7]. At the end of pregnancy, it can result in a low birth weight.

Causes of IUGR

Maternal

- Pre-pregnancy Maternal Obesity (#1 Cause)
- Poor Nutritional Status
- Excessive Weight gain during Pregnancy
 - Obesity prior to becoming Pregnant
- Utilize WHO Parameters
- ◆ Regarding BMI – good indicator of obesity classification
 - Rapid Weight Gain During Pregnancy
- Anemia

- Alcohol
 - Drug Use
 - Alcohol with Concomitant Drug Use
- Maternal Smoking
- Recent Pregnancy
- Pre-Gestational Diabetes
 - Gestational Diabetes
- Pulmonary Disease
 - Chronic Obstructive Pulmonary Disease (COPD)
 - Smoking is major cause of COPD
- Cardiovascular Disease
 - Hypertension
 - Previously Diagnosed
 - ◆ Untreated or Poorly Treated
 - Pregnancy Induced Hypertension (PIH)
- Renal Disease
 - Chronic Kidney Disease
 - Previously Diagnosed or Undiagnosed
 - Nephrotic Syndrome (Nephrosis)
 - Proteinuria, Hypoalbuminemia and Generalized Edema
 - ◆ Nephrotic Range Proteinuria is 3 grams of Protein per day or more
 - Proteinuria
 - Perform 24-hour urine collection
 - ◆ Total Protein Excretion is Abnormal
 - When it exceeds 3 gms. in 24 hours

Uteroplacental

- Preeclampsia
 - Prior Pregnancy with Preeclampsia
- Multiple Gestation
- Uterine Malformations [8]
 - Septate Uterus
 - Uterine Fibroids
- Placental Insufficiency
 - Characteristically present in Preeclampsia.
 - Often caused by obesity

Fetal

- i. Chromosomal Abnormalities
- ii. Vertically Transmitted Infections

Pathophysiology of IUGR

If the cause of IUGR is extrinsic to the fetus (maternal or uteroplacental), transfer of oxygen and nutrients to the fetus

is decreased. This causes a reduction in the fetus' stores of glycogen and lipids. This often leads to hypoglycemia at birth. Polycythemia can occur secondary to increased erythropoietin production caused by the chronic hypoxemia. Hypothermia, thrombocytopenia, leucopenia, hypocalcemia and pulmonary hemorrhage are often results of IUGR. In addition, as seen in this case, if the child has a low birth-weight, the chances of a PDA remaining are increased. In a normal weight childbirth, the PDA closes with the first breath of the child, the fetal cardiac circulation then changes to a normal cardiac circulation and the *Ductus arteriosus* changes into the *Ligamentum arteriosum*. If the cause of IUGR is intrinsic to the fetus, growth is restricted [4,7] due to genetic factors or as a sequelae of infection.

Conclusion

IUGR is a multifactorial disorder as demonstrated by this single case report. Although this case report had a tragic ending with the death of this child, it demonstrates, in this case, quite clearly that maternal obesity was the major factor of IUGR in this case. Numerous other research papers [1,3,4,6,7,9] have confirmed that maternal obesity is a major factor in cases of IUGR.

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