EPIDEMIOLOGY OF PREGNANCY INDUCED HYPERTENSION – A MULTIFACTORIAL INFLUENCE. A RETROSPECTIVE STUDY

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Abstract: *Pregnancy-related hypertension is a major cause of maternal and fetal mortality worldwide. About 10% of maternal mortality in Asia and Africa is due to high blood pressure in pregnancy. In Latin America, hypertensive disorders in pregnancy are responsible for 25% of maternal mortality.(1) The paper aims to evaluate the incidence of hypertensive disorders associated with the pregnancy between January 2019 and December 2019 at the Obstetrics and Gynaecology Clinic of the County Emergency Clinical Hospital in Sibiu, Romania. Between January 2019 and December 2019, in the Obstetrics and Gynecology clinic of the Sibiu County Emergency Clinical Hospital, 69 pregnant women with pregnancy-related hypertensive pathology were hospitalized. Of these, 95,65% of pregnant women had a single fetal pregnancy and 4,34% had a twin pregnancy. The patients were between 16 and 44 years old. In the first age category, there was only one pregnant woman who developed hypertensive pathology in pregnancy. The second age category included 50 pregnant women, while the third age category included 18 pregnant women. The average age parameter at the time of admission was 30.79 years old.*

INTRODUCTION

Prevalence

Pregnancy-related hypertension is a major cause of maternal and fetal mortality worldwide. About 10% of maternal mortality in Asia and Africa is due to high blood pressure in pregnancy. In Latin America, hypertensive disorders in pregnancy are responsible for 25% of maternal mortality.(1) Also, fetal growth restriction (FGR) defined as an estimated fetal weight below the 10th percentile often associated with preeclampsia (PE) is an important cause of perinatal morbidity and mortality. Intrauterine growth restriction is frequently associated with acute fetal distress antepartum and intrapartum. Approximately 25% of antepartum stillbirths are associated with intrauterine growth restriction, without fetal hypotrophy being detected antepartum. One of the great challenges of modern obstetrics is to identify as early as possible patients who are at risk of developing preeclampsia. An important step is the evaluation of maternal risk factors, including: nulliparity, preeclampsia at a previous pregnancy, age> 40 years / <18 years, hereditary history of cardiac pathology in pregnancy, chronic hypertension, chronic kidney disease, antiphospholipid syndrome, collagen diseases (systemic lupus erythematosus), type 1 or 2 diabetes, multiple pregnancy, obesity, thrombophilia, previous unexplained intrauterine growth restriction, fetal death in utero, pregnancy obtained by in vitro fertilization.(2) Pregnant women at high risk of preeclampsia can be closely monitored for signs such as intrauterine growth restriction or altered blood flow to the uterine arteries with the appearance of notch. Randomized studies in the literature and meta-analyzes have shown that the administration of aspirin initiated in the first trimester of pregnancy is associated with decreased risk of preeclampsia.(2)

The increased maternal mortality due to hypertensive disorders associated with pregnancy, aroused the interest of the World Health Organization, which launched a study in 2014 in order to assess the incidence of hypertensive disorders associated with pregnancy. Another goal of the World Health Organization was to identify other pathologies associated with hypertension and their impact on maternal mortality. The study included 29 countries from Africa, Asia, Latin America and the Middle East. In Africa, the highest incidence of chronic hypertension, preeclampsia and eclampsia was recorded in Nigeria, respectively 0.56%; 2.33% and 1.35%. In Latin America, the highest number of cases of chronic hypertension associated with pregnancy was registered in Mexico (0.83%), preeclampsia in Peru (3.5%) and eclampsia in Ecuador (0.32%). The Middle East had the highest rates of chronic hypertension in Pakistan 0.53%, preeclampsia in Afghanistan 0.97% and eclampsia also in Pakistan 0.36%. In Southeast Asia, the highest number of cases of chronic hypertension 0,21%, preeclampsia 1,97% and eclampsia 0,43% was recorded in India. In the Western Pacific Region, chronic hypertension associated with pregnancy was most common in China 0.6%, preeclampsia in Mongolia 6.7% and eclampsia in the Philippines 0.28%.(1)

The incidence of eclampsia in Europe is similar to that of developed countries in North America and is estimated at around 5-7 cases per 10,000 births.(3) The incidence of preeclampsia worldwide varies between 2-10% of pregnancies.(4) The prevalence of pregnancy-associated hypertensive pathology decreased in Northern Europe and Australia between 1997 and 2007. This condition has decreased over time in most populations, although risk factors such as obesity and advanced maternal age are generally increasing. However, this may be due to the fact that there has been a

decrease in the number of pregnancies that reach up to 40 weeks of gestation.(5) In Romania, the exact prevalence of hypertension associated with pregnancy is not known.

Etiopathogenesis of pregnancy-associated hypertension.

Over time, several theories involved in the etiopathogenesis of pregnancy-associated hypertension have been stated. Until now, the occurrence of pregnancy-associated hypertension and the factors that lead to its occurrence have not been fully elucidated. However, studies over the past decade have highlighted the potential mechanisms involved in the pathogenesis of pregnancy-associated hypertension. The state of gestation determines the activation of adaptive mechanisms and the mobilization of the functional reserves of the maternal organism. These adaptive changes affect all body systems, but in different proportions. Pregnancy causes an increased demand on the cardiovascular system to meet progressively increased needs as the pregnancy progresses. In order to meet maternal and fetal metabolic needs during pregnancy, significant changes in maternal cardiovascular and renal function occur.(6)

In pregnancy the heart is moved upwards and suffers a slight hypertrophy with increasing transverse diameter due to increased diastolic volume. Heart rate increases on average by 15% - the increase starts from 8-10 weeks of gestation and reaches a maximum between 32-34 weeks of gestation. Heart rate increases due to increased heart rate and heart rate by up to about 45%. There is also an increase in cardiac labor and blood flow during pregnancy. Blood pressure drops slightly due to decreased peripheral resistance and pregnancy-specific hormonal impregnation. Due to the compression exerted by the pregnant uterus on the inferior vena cava, the venous pressure increases.(7)

Over time, several theories have been proposed in an attempt to explain the etiology of hypertension in pregnancy.

Currently there are 4 important theories that are widely accepted:
1. Placental implantation with abnormal trophoblastic invasion of uterine vessels,
2. Altered immune tolerance between maternal and fetal tissues,
3. Inadequate maternal adaptation to cardiovascular or inflammatory changes in normal pregnancy,
4. Genetic factors including inherited predisposing genes and epigenetic influences.

Over the past two decades, the central piece in the contemporary understanding of the pathogenesis of preeclampsia has been the injury of endothelial cells. Abnormal trophoblastic invasion reduces the lumen of the spiral arterioles with reduced placental flow. Reduced placental blood flow creates a local hypoxic environment. In response to placental factors released due to ischemic changes, a cascade of events occurs. It is considered that both antiangiogenic and metabolic factors as well as a number of mediators of the inflammatory response cause injury to endothelial cells.(8) Decreased concentrations of angiogenic factors such as the vascular endothelial growth factor (VEGF) and placental growth factor (PlGF) and increased concentration of their antagonist, the placental soluble fms-like tyrosine kinase 1 (sFlt-1) are angiogenic imbalances associated with the development of preeclampsia.(9,10)

Nitric oxide synthesis, a crucial factor in vascular remodeling and vasodilation, which may be able to ameliorate placental ischemia, is inhibited by the binding of VEGF and PlGF to their receptors.

Preeclampsia with early onset that occurs before 34 weeks of gestation is thought to be caused by syncytiotrophoblast stress leading to poor placentation. Preeclampsia that occurs after 34 weeks of gestation is more commonly associated with intrauterine growth restriction due to prolonged placental dysfunction.(10,11)

AIM

The aim of the paper is to evaluate the incidence of hypertensive disorders associated with pregnancy between January 2019 and December 2019 at the Obstetrics and Gynecology Clinic of the County Emergency Clinical Hospital in Sibiu, Romania. We also aim to evaluate the presence of other pathologies associated with this condition as well as the identification of associated risk factors and their impact on fetal weight at birth.

MATERIALS AND METHODS

The study included all pregnant women who presented to the OG Clinic of the Sibiu County Emergency Clinical Hospital during January 2019-December 2019 and who suffered from hypertensive disorder associated with pregnancy, intrapartum or postpartum immediately.

The data were extracted from the clinic database as well as from the patient observation sheets. From the observation sheets of the patients there were extracted data related to the mother's age, height, weight, rural or urban background, personal physiological history, toxic consumption (smoking), degree of gestation and parity, gestational age at the time of hospitalization, gestational age at the time of diagnosis of hypertensive pathology associated with pregnancy, gestational age at birth, single or twin pregnancy, other associated diseases, birth pathway, indication for birth by cesarean section where he was born by cesarean section, fetal ultrasound parameters and Doppler values on the umbilical artery, cerebral artery middle and uterine arteries. The collected data were centralized in an Excel table. For the analysis of the obtained data, data sorting and filtering functions were used, as well as various calculation formulas.

The values 0 and 1 were assigned to certain studied parameters. The value 0 was assigned to vaginal birth, while the birth by cesarean section was marked with the value 1. The urban environment was marked with the value 0, and the rural one with 1. The smoking pregnant women were assigned the value 1, while the non-smoking pregnant women were marked with 0. Pregnancy-induced hypertension was assigned a value of 0, and pregnancy-associated chronic hypertension was assigned a value of 1. The mild clinical form of hypertension was marked with 0, and the severe with 1.

For the evaluated parameters we calculated the average of the parameter, as well as the standard deviation. To obtain these values we used the standard calculation formulas. The data related to the age of the pregnant women at the hospitalization were processed by dividing them into 3 categories. The first category included pregnant women aged between 16 and 18 years. The second category included pregnant women aged between 19 and 35 years, and the third category included pregnant women aged between 36 and 44 years.

The data corresponding to the gestational age parameter were processed by dividing them into 3 categories. In the first category, there were included pregnant women with gestational age between 24 and 33 weeks of gestation, in the second category, pregnant women with gestational ages between 34 and 36 weeks of gestation, and the third category included pregnant women with gestational ages between 37 and 42 weeks of gestation.

Gestational age at admission, at the time of diagnosis of hypertension pathology and at birth was established and noted in the completed weeks of pregnancy.

CLINICAL ASPECTS

Between January 2019 and December 2019, in the Obstetrics and Gynecology clinic of the Sibiu County Emergency Clinical Hospital, a number of 69 pregnant women with pregnancy-related hypertensive pathology were hospitalized. Of these, 95,65% pregnant women had a single fetal pregnancy and 4,34% had a twin pregnancy. The average number of single-fetal or twin pregnancies was 1.04, and the standard deviation 0.203.

4.34% of the pregnancies in the studied group were obtained by in vitro fertilization.

The patients were between 16 and 44 years old. In the first age category there was only one pregnant woman who developed hypertensive pathology in pregnancy. The second age category included 50 pregnant women, while the third age category included 18 pregnant women. The average age parameter at the time of admission was 30.79 years old, and the standard deviation 6.58. 18.84% of pregnant women with hypertension were multiparous and only 1.44% of patients were juvenile primiparous.

Table no. 1. Results for average of the parameter and standard deviation for each parameter

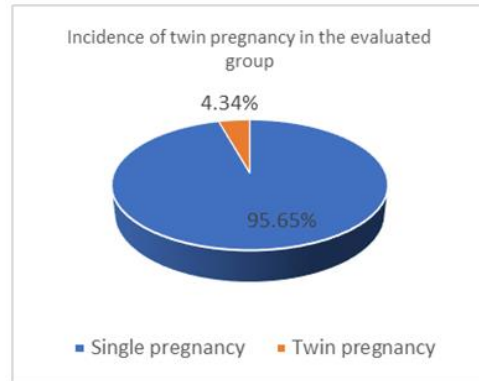| Parameter	Average of the parameter	Standard deviation
Patients age	30,79	6,58
Gestational age at admission	37,184 weeks of gestation	2,393
Gestational age at diagnosis	34 weeks of gestation	0
Gestational age at birth	37 weeks of gestation	2
Single fetal-1/ twin pregnancy-2	1,043	0,20
Vaginal birth-0/ Caesarian section-1 birth	0,666	0,4714
Rural-1 / urban -0 environment	0,3623	0,480
Non-smoker-0 / smoker- 1	0,144	0,352
Maternal weight	95,375kg	8,23
Maternal height	154,62 cm	5,998
Mild preeclampsia -0 / severe-1	0,2898	0,45
Pre-existing hypertension -1 / pregnancy-induced 0	0,101	0,301
Fetal weight at birth	2443,3 g	625,15

Figure no. 1. Age distribution of the patients
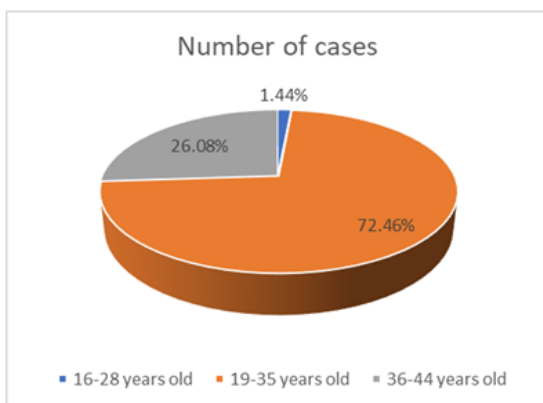
Table no. 2. Age distribution of the patients

Age years old	Number of cases %
16-28	1.44%
19-35	72,46%
36-44	26,08%

The gestational age at the time of hospitalization was between 28 weeks of gestation and 42 weeks of gestation. The average gestational age at the time of hospitalization was 37.18 weeks of gestation, and the standard deviation was 2.39.

**Figure no. 2. Incidence of twin pregnancy in the evaluated group**

89,85% of the 69 patients developed high blood pressure during pregnancy, while 10,14% of the patients were known to have cardiac pathology prior to pregnancy.

The average of the pre-existing or pregnancy-induced hypertension parameter is 0.10 and the standard deviation is 0.30.

71.01% of patients had a mild form of hypertension, and 28.98% had severe preeclampsia.

Figure no. 3. Comparative representation of cases with high blood pressure values acquired in pregnancy and those present before pregnancy
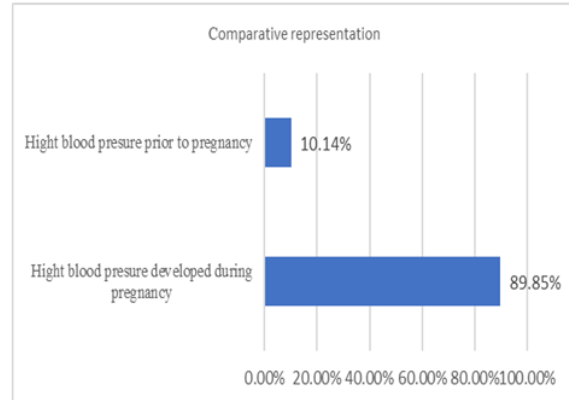
**Figure no. 4. Graphical representation of cases with severe preeclampsia**
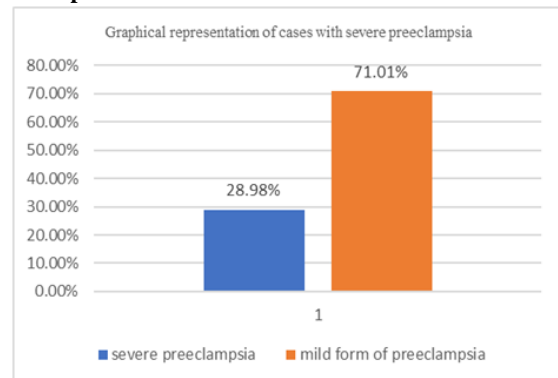
Between 24 and 33 weeks of gestation, 5,79% of the patients presented with pregnancy-associated hypertensive

pathology, 20,28% developed hypertension between 34 and 36 weeks of gestation, and 73,91% were diagnosed with hypertension between 37 and 42 weeks of gestation.
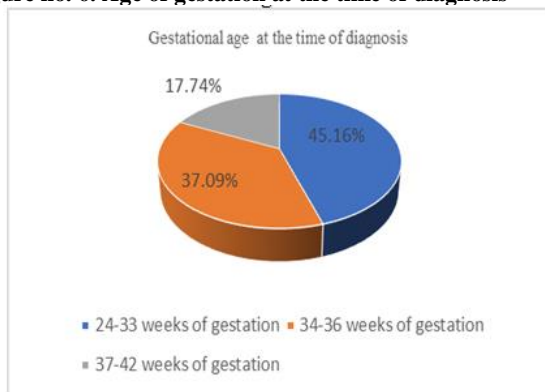
Figure no. 5. Gestational age distribution at admission
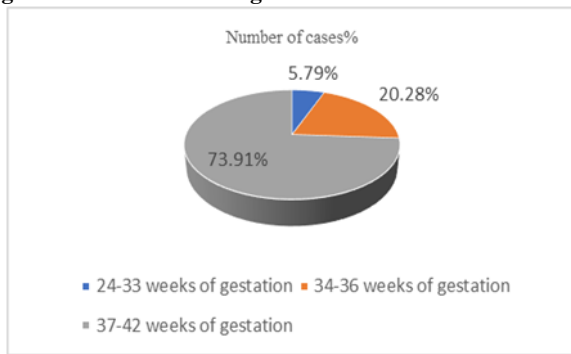
Table no. 3. Gestational age distribution at admission

Gestational age at admission (weeks of gestation)	Number of cases %
24-33 weeks of gestation	5.79%
34-36 weeks of gestation	20.28%
37-42 weeks of gestation	73.91%

**Figure no. 6. Age of gestation at the time of diagnosis**

The average gestational age at the time of diagnosis was 34 weeks, and the standard deviation was 0.

The average gestational age at birth was 37 weeks of gestation the standard deviation is 2.

36,23% patients came from rural areas and 63,76% from urban areas.

Figure no. 7. Graphic representation of patients according to the environment of origin
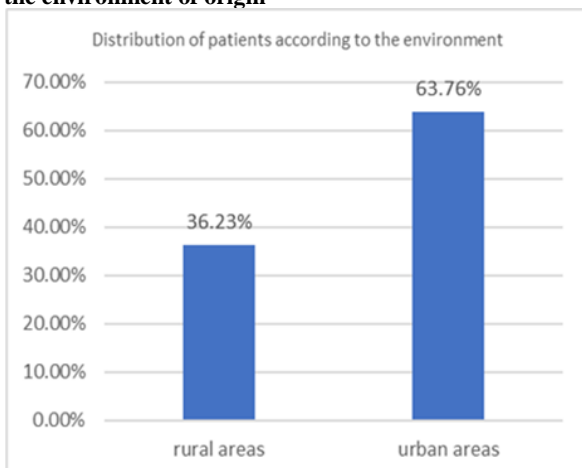

14.49% of patients are smokers and 85.5% non-smokers. The average value of smoking and non-smoking patients is 0.144, and the standard deviation 0.35. The mean weight of the patients was 95.37 kg and the standard deviation 8.23.

The average height of the pregnant women was 154.62 cm, and the standard deviation was 5.99.

66,66% of the patients gave birth by cesarean section, and 33,33% gave birth vaginally. The average of the parameter is 0.66, and the standard deviation is 0.47. 62.5% of births by Caesarean section was a surgical emergency. The average weight of girls at birth was 2443.3 grams, and the standard deviation was 625.15

At the time of hospitalization, Doppler ultrasound was performed on the umbilical artery in 44 patients. Of these, only one pregnant woman showed reverse flow on the umbilical artery. The resistance index on the umbilical artery had values between 0.43 and 0.82.
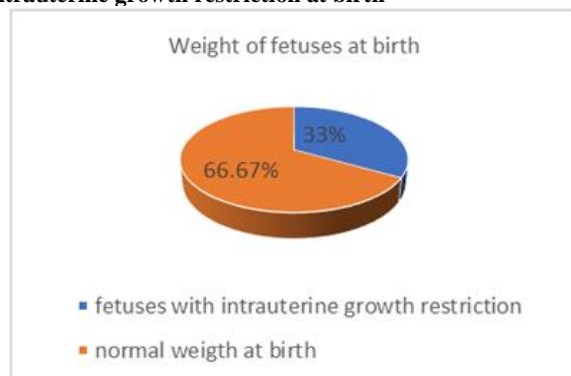
Figure no. 8 Incidence of birth by caesarean section in the studied group.
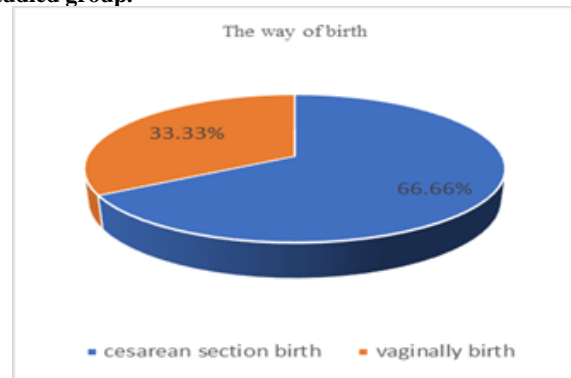
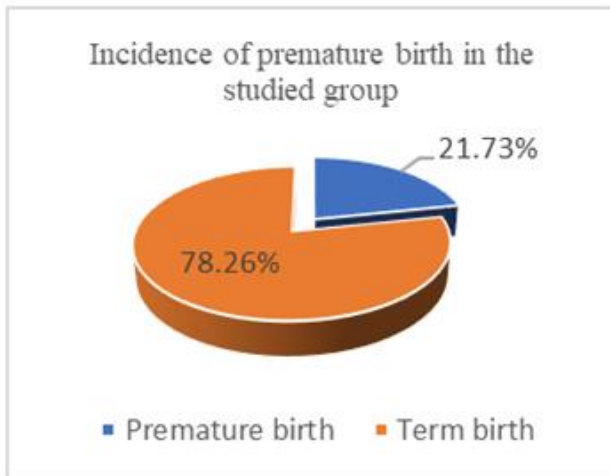**Figure no. 9. Incidence of toxic consumption (smoking) in the studied group**
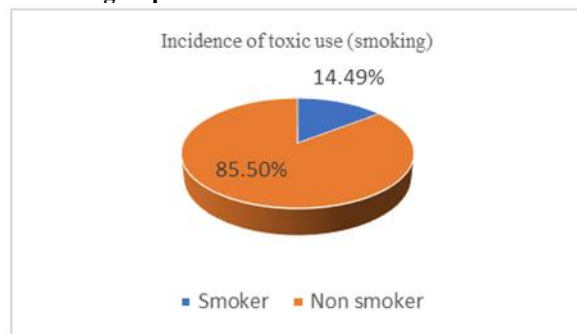
Figure no. 10. Graphic representation of cases with intrauterine growth restriction at birth
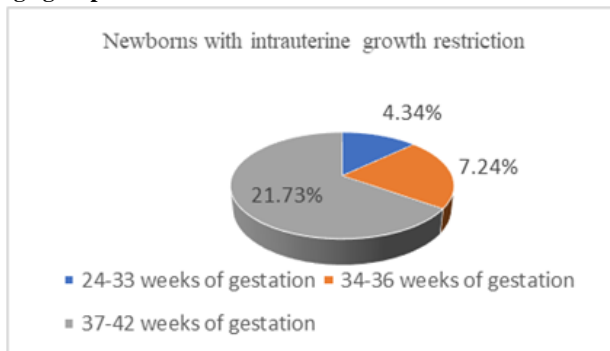
Figure no. 11 Graphical representation of the incidence of premature birth in the studied group

Figure no. 12 Graphical representation of the incidence of intrauterine growth restriction on established gestational age groups.

Table no. 5 Birth weight of newborns with intrauterine growth restriction depending on gestational age at birth

Gestational age at birth (weeks of gestation)	Weight at birth (grams)
24-33 weeks of gestation	710 g - 1310 g
34-36 weeks of gestation	1130 g - 2370 g
37-42 weeks of gestation	1410 g - 2920 g

33.33% of patients did not present other pathologies associated with pregnancy except for hypertensive pathology.

66.66% of patients had other pregnancy-related conditions. Of these, 50% had fetuses with intrauterine growth restriction associated with severe oligoamnios in 4.34% of cases. Also, 21.73% of them had scarred uterus after cesarean section and 2.17% double scarred uterus after cesarean section.

7.39% of patients with pregnancy-associated pathology had minor or major thrombophilia. Of the 46 pregnant women with other pathologies associated with pregnancy, 4 had gestational diabetes. There were 4 cases of patients with hypothyroidism. Other pathologies associated with pregnancy were lumbar discopathy (3 cases), single congenital maternal kidney, asthma, myopia of both eyes and genital herpes. 33.33% of pregnant women with hypertension also had associated obesity. 13.4% of pregnant women were over 35 years old at the first pregnancy. The main indications for which it was decided to end the birth by cesarean section were: acute chronic fetal distress in labor in 47.91% of cases, severe preeclampsia in 20.83% of cases. Other indications for birth by cesarean section were scar or double scar, uterine primiparous, acute genital herpes, major thrombophilia in treatment with anticoagulant and lack of progression of labor by pelvic cephalopod disproportion.

Of course, there have been many cases in which indications for cesarean delivery have overlapped.

Table no. 6. Incidence of pregnancy-related pathologies in the studied group

Pregnancy-related pathologies except cardiac pathology	Number of cases %
Intrauterine growth restriction	33%
Urinary tract infection	1.45%
Scar uterus	14.49%
Double scarred uterus	1.45%
Thrombophilia	11.59%
Gestational diabetes	5.80%
Oligoamnios	2.90%
Hypothyroidism	5.79%
Lumbar discopathy	4.35%
Unique congenital maternal kidneys	1.45%
Pulmonary asthma	1.45%
Acute genital herpes	1.45%
Strong myopia	1.45%

DISCUSSIONS

Preeclampsia and intrauterine growth restriction are thought to be the result of abnormal changes in the placenta. Clinical manifestations are dependent on gestational age at the onset of cardiac pathology and are dependent on the phenotypic characteristics of each individual.(22) The etiopathogenesis of preeclampsia is complex and frequently associated with other pathologies.

Recent data from the literature suggest that the risk of preeclampsia may be reduced by prophylactic administration of aspirin. Thus, identifying patients who are at risk for developing preeclampsia is essential to establish prophylactic treatment. Individual assessment of risk factors is essential to determine patients at high risk of developing preeclampsia.

Risk factors for preeclampsia include nulliparity, multiple pregnancy, preeclampsia in a previous pregnancy, a hereditary history of chronic hypertension or pregnancy-induced hypertension, age over 40 years or under 18 years. Among the conditions that are involved in the occurrence of pregnancy-induced hypertension are: diabetes of 1 or 2, thrombophilia, chronic kidney disease, antiphospholipid syndrome and some collagen diseases such as systemic lupus erythematosus.

Also, other risk factors for preeclampsia that are recommended to be evaluated are obesity (BMI> 35 Kg / m2), fetal death in utero, unexplained intrauterine growth restriction in a previous pregnancy and pregnancies obtained by in vitro fertilization and embryo transfer.

The results of our study show that 53.62% of pregnant women who had pregnancy-associated high blood pressure are nulliparous. Null parity is assessed as a risk factor in numerous studies in the literature. Several studies published in the literature have included exclusively nulliparous pregnant women. The aim was to assess the risk factors associated with nulliparity.

It is noteworthy that 60.86% of pregnant women enrolled in our study with fetuses with intrauterine growth restriction are nulliparous.

Another important factor in assessing the risk of preeclampsia is preeclampsia in a previous pregnancy. Data from the literature show that the incidence of developing preeclampsia in a future pregnancy after a first pregnancy with preeclampsia is between 7-20%. The risk of developing preeclampsia increases in direct proportion to the number of previous pregnancies with preeclampsia. Following data from patients enrolled in our study, no patient had preeclampsia in a previous pregnancy.

Regarding maternal age in assessing the risk of developing preeclampsia, the results obtained from our study show that one pregnant woman was 16 years old and 8 were over 40 years old. This shows that only 13.04% of pregnant

women who developed preeclampsia were of extreme age.

Extreme maternal age is thought to be associated with adverse pregnancy outcomes. Obtaining a pregnancy in adolescence is often associated with premature birth and low birth weight. On the other hand, obtaining a pregnancy at an advanced maternal age has an increased risk of complications and is associated with premature birth, low birth weight etc.

It is well known that preeclampsia is frequently associated with intrauterine growth restriction. However, there are other diseases associated with preeclampsia in pregnancy that may contribute to the onset and progression of intrauterine growth restriction.

Evaluation of the data obtained from the study group showed that 33.33% of patients had fetuses with intrauterine growth restriction. However, in addition to preeclampsia and intrauterine growth restriction, patients also had other associated diseases. The most common conditions associated with pregnancies with preeclampsia and intrauterine growth restriction were hereditary thrombophilia, gestational diabetes, diabetes type 2, pregnancy obtained by in vitro fertilization, twin pregnancy and obesity.

However, 5.80% of pregnant women with preeclampsia also had associated gestational diabetes.

Data from the literature highlight several similarities between preeclampsia and gestational diabetes. Both preeclampsia and gestational diabetes are diseases that begin during pregnancy and are characterized by placental insufficiency and maternal pancreatic dysfunction.(23)

The American College of Obstetrics and Gynecology claims that preeclampsia is associated with the development of cardiovascular disease later in life.(24)

Gestational diabetes is also a risk factor for the development of type 2 diabetes later in life.(25)

The data in the literature are, however, contradictory. There are studies that argue that gestational diabetes is a risk factor for preeclampsia, and others that claim that preeclampsia is a risk factor for the development of gestational diabetes. This draws attention to the possibility of common pathophysiological mechanisms for the two diseases.

One of the hypotheses stated in the literature is that insulin resistance may contribute to the pathophysiology of preeclampsia. It is considered that women who develop preeclampsia have increased insulin resistance before pregnancy, in pregnancy and late in life after birth compared to women who have normal blood pressure in pregnancy. This can be explained by the fact that some of the risk factors for preeclampsia are associated with insulin resistance. However, after eliminating the common risk factors for preeclampsia and gestational diabetes (obesity, advanced maternal age, black race, etc.), increased insulin resistance remains a significant predictor of preeclampsia.(26,27,28,29,30,31,32)

To assess whether gestational diabetes and preeclampsia have a common etiology, studies have been conducted to see if early treatment for diabetes reduces the risk of preeclampsia. The data from the studies were contradictory. Some studies show that early treatment for gestational diabetes reduces the risk of preeclampsia, while other studies show that there is no significant decrease in the risk of preeclampsia.(33,34,35,36)

In the group we studied preeclampsia and gestational diabetes were associated, gestational diabetes was diagnosed before preeclampsia. It is difficult to say whether these data support the fact that gestational diabetes is a risk factor for preeclampsia, especially given that most cases did not have gestational diabetes associated with preeclampsia.

However, it is noteworthy that pregnant women with gestational diabetes and preeclampsia had fetuses with intrauterine growth restriction.

Another pathology associated with preeclampsia and progresses with intrauterine growth restriction is hereditary thrombophilia. Most likely this is due to altered placental perfusion followed by insufficient maternal-fetal intake, resulting in intrauterine growth restriction.(37,38)

Several studies show that protein S deficiency, MTHFR gene mutation, prothrombin gene mutation, and Leiden factor V mutation are more commonly associated with intrauterine growth restriction.(39,40,41)

In our study, 17.39% (8 patients) of pregnant women had thrombophilia. Of these, only one patient had major thrombophilia. 6 of the pregnant women diagnosed with thrombophilia had pregnancies with fetuses with intrauterine growth restriction. Given the fact that both preeclampsia and hereditary thrombophilia are characterized by intrauterine growth restriction, it is difficult to attribute the low weight of the fetus to one of them. Most likely both pathologies through a combination of factors determined this evolution of pregnancy.

However, in the study group, fetuses from mothers with thrombophilia and preeclampsia associated with intrauterine growth restriction had higher birth weights than girls from mothers with preeclampsia associated with intrauterine growth restriction. The average weight of fetuses from mothers with thrombophilia was approximately 2,267 g, and of fetuses from mothers with preeclampsia with intrauterine growth restriction was 1,910 g. This can be justified by the fact that all pregnant women who have been known to have thrombophilia have received anticoagulant treatment, which reduces placental pathology such as thrombosis and placental infarction.

There are numerous studies in the literature that highlight the evolution of hypothyroidism in pregnancy with intrauterine growth restriction.(42,43)

Hypothyroidism is thought to cause intrauterine growth restriction by inducing pathological changes in the placenta.(44)

It is well known that twin / multiple pregnancy is associated with intrauterine growth restriction. The mechanism of fetal hypotrophy in twin pregnancy is complex and involves the distribution of placental territory and the insertion of the umbilical cord. Most of the risk factors for intrauterine growth restriction in twin pregnancies are common to those of preeclampsia and gestational diabetes and overlap with other pregnancy-related pathologies in the study group.(45)

Obesity is a global health problem. Data published by the National Institute of Public Health in 2014 show that Romania has a high percentage of overweight people, but obesity is a lower percentage compared to other European countries. Globally, obesity is the fifth leading cause of death. Romania presents the epidemiological profile of all developed countries characterized by increasing the incidence of cardiovascular diseases and lifestyle diseases. In Romania, the incidence of obesity has had an upward trend since 1995 when this condition began to be reported until today. In the states of the European Union in 2011 between 8% and 23.9% of women were obese.

In addition to gestational diabetes, infertility, thrombotic complications, premature birth, miscarriage, obesity is associated with an increased risk of preeclampsia. The risk of developing preeclampsia increases in direct proportion to the body mass index. The higher the body mass index, the higher the risk of developing preeclampsia. Of the 69 pregnant women enrolled in the study, 23 were obese both during pregnancy and at birth. Of the 69 pregnant women enrolled in the study, 23 were obese both during pregnancy and at birth. Given that obesity is characterized by increased insulin resistance, only 4

patients developed gestational diabetes out of 23 with obesity. All newborns from mothers with gestational diabetes were normal weight at birth.

CONCLUSIONS

In conclusion, the epidemiology of preeclampsia is multifactorial and in our study we did not find all the epidemic factors usually mentioned in the literature. Intrauterine growth restriction found in the foetuses delivered from mothers with preeclampsia is a usually complex, multifactorial mechanism, dependent on a number of pregnancy-associated pathologies that are based on common risk factors.

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