

The impact of preeclampsia in pregnancy

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Summary

Objective. To observe the influence of preeclampsia during pregnancy.

Materials and methods. 5711 patient's records of the year 2008 and 6188 patient's records of the year 2009 of Obstetric/Gynecologic hospital 'Queen Geraldina' have been consulted. The age of women that we studied in 2008 was between 23-35 and in 2009 was between 25-34 years old. We have made a careful diagnose of induced hypertension of pregnancy and preeclampsia.

Results. The incidence of preeclampsia in the population was 4.1% (n=238) in 2008 and 3.1% (n=192) in 2009. The incidence of the cases that developed from preeclampsia to eclampsia were respectively 1.6% (n=4) and 1.5% (n=3) on 2009. Babies which have preeclamptic mothers were preterm in 13% (n=31) of cases, and 14.5% (n=28) of which have severe hypotrophy vs. 10% (n=24) and 11% (n=21) severe hypotrophy in 2009. Babies mortality on the preeclamptic population were respectively 8% (n=19) and 7.8% (n=15).

Conclusions. From the survey resulted that patients diagnosed with preeclampsia manifested on a high rate hypertension and proteinuria. Prematurity, severe hypotrophy and baby's mortality were the major complications of preeclampsia. Women with preeclampsia were especially the youngest.

Key Words: preeclampsia, hypotrophy, babies mortality, uterin artery Doppler.

Introduction

Preeclampsia still remains one of the main causes of mor-

bidity and mortality for both mother and child. Our objective is to observe the influence of preeclampsia in pregnancy.

Preeclampsia is primarily a disorder of placental dysfunction leading to a syndrome of endothelial dysfunction with associated vasospasm (1). In most cases, pathology demonstrates evidence of placental insufficiency with associated abnormalities such as diffuse placental thrombosis, an inflammatory placental decidual vasculopathy, and/or abnormal trophoblastic invasion of the endometrium. This supports abnormal placental development or placental damage from diffuse microthrombosis as being central to the development of this disorder (2). In this women persists the early diastolic Notch on the uterine artery (Fig.1).

Endothelial damage leads to pathologic capillary leak that can present in the mother as rapid weight gain, nondependent edema (face or hands), pulmonary edema, hemoconcentration, or a combination thereof. The diseased placenta can also affect the fetus via decreased utero-placental blood flow. This decrease in perfusion can manifest clinically as nonreassuring fetal heart rate testing, low scores on a biophysical profile, oligohydramnios, or as fetal growth restriction. The hypertension occurring in preeclampsia is due primarily to vasospasm, with arterial constriction and relatively reduced intravascular volume compared to normal pregnancy also this is accompanied with proteinuria (3). Both of these may be severe and risk mother's health and the pregnancy progress. Gestational hypertension refers to hypertension with onset in the latter part of pregnancy (>20 weeks' gestation) without any other features of pree-

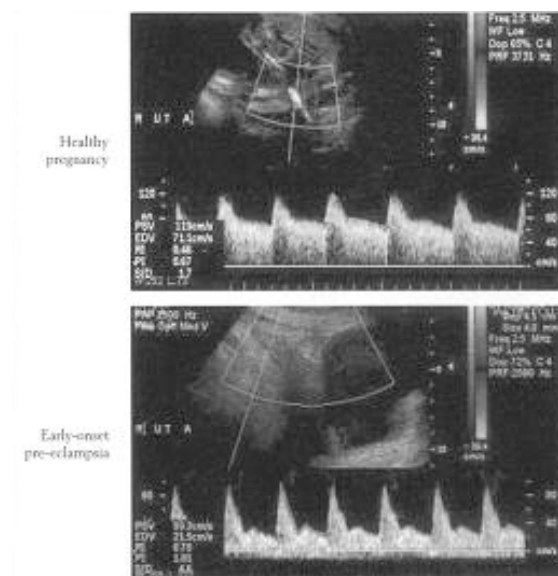


Figure 1 - In this women persists the early diastolic Notch on the uterine artery.

clampsia, and followed by normalization of the blood pressure postpartum. Of women who initially present apparent gestational hypertension, about one third develops the syndrome of preeclampsia and eclampsia. As such, these patients should be observed carefully for this progression.

Material and Methods

In 2009 of Obstetric/Gynaecologic hospital 'Queen Geraldina' have been consulted. The age of women that we studied in 2008 was between 23-35 and in 2009 was between 25-34 years old. We have made a careful 5711 patient's records of the year 2008 and 6188 patient's records for the diagnose of induced hypertension of pregnancy and preeclampsia.

We emphasised the best methods of fetal prognosis assessment through maternal clinical and biological data from the observation of preeclampsia. The combination of clinical data: mean arterial pressure, oedema of the face and hands, fundus oculi examination, deep tendinous reflexes, as well as the laboratory test results: proteinuria, plasma urea, creatinine, platelet count, total protein, plasma fibrinogen have been used to assess the condition. Uterine, umbilical, and cerebri media arteries blood flow was very helpful in prognosis prediction and fetal assessment. The predictive rate of various elements is associated with maternal quantitative changes (arterial pressure, plasma uric acid, proteinuria) as well as with fetal quantitative changes (weight, height, head perimeter). None of these factors alone is sufficient to predict the fetal birth condition.

Routine tests when evaluating a patient for preeclampsia include: CBC count, electrolytes, BUN, creatinine, liver enzymes and bilirubin, and urine dip for protein. In cases in which an incidental platelet count is less than 150,000/ μ L, 75% are secondary to dilutional thrombocytopenia of pregnancy, 24% are due to preeclampsia, and about 1% of cases are due to other platelet disorders not related to pregnancy. Counts less than 100,000/ μ L suggest preeclampsia or ITP. Hemoglobin levels greater than 13 g/dL suggest the presence of hemoconcentration (4). Low levels may be due to microangiopathic haemolysis or iron deficiency. Urinalysis may be used as a screen for proteinuria. Trace levels to +1 proteinuria are acceptable, but levels of +2 or greater are abnormal and should be quantified with a 24-hour urine collection or spot urine protein (5). Serum creatinine usually is less than 0.8 mg/dL during pregnancy; higher levels suggest intravascular volume contraction or renal involvement in preeclampsia.

Hyperuricemia is associated with pre-eclampsia and it has been tested in early pregnancy for its ability to predict the later onset of the disease. A serum uric acid level greater than 5 mg/dL is abnormal and is a sensitive, but nonspecific, marker of tubular dysfunction in preeclampsia.

Elevated levels of hepatic transaminases may reflect hepatic involvement in preeclampsia and may occur in the absence of epigastric/right upper quadrant pain. Prothrombin time (PT) and/or international normalized ratio (INR) and/or activated partial prothrombin time (aPTT) results may be abnormal in consumptive coagulopathy and disseminated intravascular coagulopathy complicating severe preeclampsia. Checking the PT/INR/aPTT is not necessary in the absence of abnormal liver transaminases or thrombocytopenia. Abnormal values of lactate dehydro-

genase (LDH), bilirubin, haptoglobin, fibrinogen, and D-dimers may confirm the presence of hemolysis and disseminated intravascular coagulopathy, along with coagulation testing (6). Checking LDH, bilirubin.

The goal of the conservative management was to prolong pregnancy until 36 completed weeks or until the onset of either maternal or fetal complications (fetal death, fetal distress, or static growth). Patients were monitored by staff specially trained in eclampsia management. Monitoring included inquiry about any complaints, blood pressure measurement 4 times daily, fetal heart sound auscultation 2 times daily, fetal growth monitoring by ultrasonography every 2 weeks, and repetition of other tests whenever necessary. Patients were instructed to report the development of features such as persistent headaches, insomnia, visual disturbances, epigastric pain, and such other features as uterine contractions, cramps, vaginal bleeding, ruptured membrane, or decreased fetal movement. Blood pressure was controlled by administering methyldopa and oral nifedipine. The initial dose of methyldopa was 250 mg every 8 hours up to a maximum dose of 500 mg every 6 hours. Nifedipine, 10 mg, was administered every 8 hours up to a maximum dose of 10 mg every 6 hours. The aim of therapy was to keep systolic blood pressure at a level between 140 and 150 mm Hg and diastolic blood pressure at a level between 90 and 100 mm Hg. If diastolic blood pressure rose to 110 mm Hg or above, hydralazine was administered in 1 of 2 ways: 20 mg diluted in 10 cc distilled water, administered by IV directly in 5-mg boluses or 20 mg in 200 cc normal saline, administered by IV drip at the rate of 10 drops per minute and increased as necessary. Dexamethasone therapy was administered before 34 weeks of gestation (7-10).

Results

All patients had marked elevation of blood pressure and of serum uric acid levels.

The incidence of preeclampsia in the population was 4.1% on 2008 and 3.1% on 2009. The incidence of the cases that developed from preeclampsia to eclampsia were respectively 1.6% (n=4) and 1.5% (n=3). The interruption of pregnancy is the preferred solution of preeclampsia. This is the main factor of the high incidence of preterm birth on preeclampsia. During 2008-2009 there was 920 preterm birth on our clinic, or 7.7% of total births. 6.4% (59 cases) of preterm births were from preeclamptic mothers, so the index of prematurity on preeclamptic mothers is 13% by our experience. On the references the index of prematurity is 11.3%. The incidence of preterm birth due to preeclampsia in correlation with the total number of births is 0.49% (Tab.1).

According to our cases analyze, the gestational age 30-35 weeks is not favorable and it requires a special attention to achieve the best result of labor. One of the factors that influence prematurity is the intensive care during pregnancy. Severe preeclampsia, requires intensive care, often it ends with the birth of a premature child, not more than 34 weeks of pregnancy. We had these results on most of our premature births (54.6%).

From the results is clear that preeclampsia is associated with the high level of prematurity, which depends on the severity of the clinical signs (Tab. 2).

The incidence of hypotrophia is correlated with the gra-

Table 1 - Preterm birth caused by preeclampsia, in correlation with total number of births, the number of preterm births and those with preeclampsia.

No. of births during 2008-2009	No. of preterm births caused by preclampsia	%
Total no. of births	59	0.49%
No. of preterm births	59	6.40%
No. of births by preeclamptic mothers	59	13%

Table 2 - Weight (gr) on neonates at birth from preeclamptic mothers between 2008-2009.

Gestational age (on weeks)	Isolated Hypertension	Hipertension and Proteinuria
32-34	2344.1	2067
35-37	3172.9	2741.6
38-40	3141.3	3146.9
-41	3300	3250
Average	3007.69 ± 761.7	2777.7 ± 649.51

Data are mean ± S.D.

Hipertension/hipertension and proteinuria $T= 3.4$; $P < 0.01$.

de of severity of preeclampsia. Mothers that have hypertension without proteinuria had hypotrophic children on 11 cases, so 24% of babies were hypotrophic. On the other hand mothers that had proteinuria beside hypertension had hypotrophic children on 76% of cases.

With the aggravation of preeclampsia, we assume that the number of hypotrophic children augment $P>0.05$; also we calculated that the average weight on severe preeclampsia is lower than in moderate one $P < 0.001$ (Tab.3).

Perinatal mortality on preeclamptic births, is 3 times higher than in those with normal arterial blood pressure. When the diastolic blood pressure exceeds 95 mmHg, or with diastolic blood pressure 90mmHg, and with the unexpected augmentation of proteinuria there is a significant raise of perinatal mortality. On the analyse of perinatal mortality, we had to underline that there were a connection between proteinuria and perinatal mortality.

Our study shows that perinatal mortality increases with the increase of the severity of the clinical signs; perinatal mortality is higher in severe preeclampsia cases: $P < 0.05$ (Tab. 4). Given the influence of preeclampsia on perinatal morbidity and mortality, it is of importance to evaluate clinical and biological data for the prediction of fetal prognosis. The combination of clinical data: mean arterial pressure, oedema as well as the laboratory test results: proteinuria, plasma urea, creatinine, platelet count, total protein, plasma fibrinogen have been used to assess the condition. Uterine, umbilical, and cerebri media arteries blood flow was very helpful in prognosis prediction and fetal assessment.

Table 3 - Mean neonates weight in correlation with preeclampsia aggravation.

	No. of cases	Birth Weight (gr)	p value
P.I.H.	103	3079.5 $\bar{\sigma} = 563.33$	$P > 0.05$
Mild Preeclampsia	204	3016.9 $\bar{\sigma} = 638,4$	$P < 0.05$ (significant)
Severe Preeclampsia	123	2315 $\bar{\sigma} = 676,24$	$P < 0.05$ (significant)

Uterine artery Doppler is not considered to be a valid tool for the detection of pre-eclampsia and/ or IUGR in low-risk unselected pregnancies. However, if screening is aimed at detecting the subset with the most perinatal morbidity and mortality, i.e. severe early-onset pre-eclampsia and IUGR (presenting before 32-34 weeks), and the screening test is applied to clinically high-risk groups, the test characteristics are substantially better (11, 12).

This is one of the cases we used uterine artery Doppler to predict fetal prognosis (Fig. 2).

Uterine artery Doppler, for the moment, is the most common test in "Queen Geraldine" Maternity in Tirana for the prediction of fetal prognosis and preeclampsia.

Nausea and vomiting and epigastric pain are independent risk factors for complicated severe preeclampsia (13). Results of a panel of tests with values including lactate dehydrogenase level >1400 IU/L, aspartate aminotransferase level >150 IU/L, alanine aminotransferase level >100 IU/L, uric acid level >7.8 mg/dL, serum creatinine level >1.0 mg/dL, and 4+ urinary protein by dipstick can be used to discriminate the patient at high risk for significant maternal morbidity. Concentrations of lactate dehydrogenase, aspartate aminotransferase, and uric acid above these cut points have the strongest predictive value and are risk additive with worsening thrombocytopenia. In a 24-hour urine collection, the reference range for protein excretion in pregnancy is up to 300 mg/d. Creatinine clearance increases approximately 50% during pregnancy, and levels less than 100 mL/min suggest renal dysfunction that is either chronic or due to preeclampsia (14, 15).

Table 4 - Perinatal mortality on preeclamptic births in correlation with the pathology severity.

Preeclampsia severity	No. of cases with Preeclampsia	Mortality	P value
Inducted hypertension on pregnancy	103	1.9 (2)	$P < 0.01$
Moderate form	204	5.9 (12)	$P < 0.05$
Severe form	123	16.2 (20)	$P < 0.05$

Data are number %

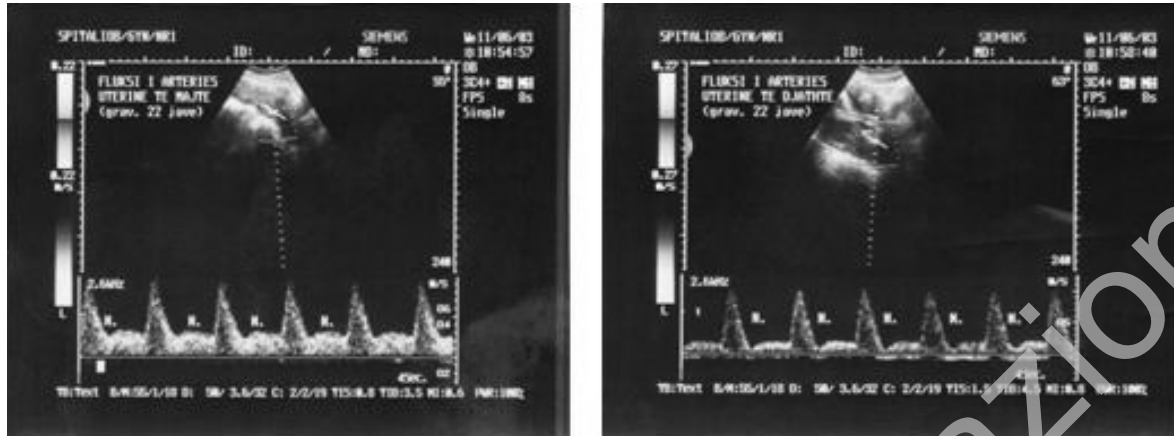


Figure 2 - Presence of diastolic notch on 22-23 week of pregnancy.

Conclusions

From the survey resulted that patients diagnosed with preeclampsia manifested on a high rate hypertension and preeclampsia. Prematurity, severe hypotrophia and baby's mortality were the major complications of preeclampsia. Women with preeclampsia were especially the youngest. Magnesium sulfate remains the drug of choice for the prevention and treatment of preeclampsia. Alternative antihypertensive agents may provide additional benefit in the management of hypertension for preeclamptic patients (16, 17).

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