Understanding of current clinical approaches to gestational hypertensive syndromes

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ABSTRACT

Gestational Hypertensive Syndromes (GHS) are a significant complication in obstetrics, affecting approximately 16% of pregnancies, with preeclampsia (PE) being one of the most prevalent, affecting between 3% and 10% of pregnant women. PE is characterized by hypertension and organ damage after 20 weeks of gestation, and can become even more complicated when superimposed on chronic hypertension, especially in women with preexisting kidney diseases. Eclampsia, marked by tonic-clonic seizures or coma, occurs in pregnant women with no history of other neurological conditions, and is one of the most severe manifestations of PE. This study reviews the current clinical approaches to PE, based on the analysis of 160 articles published between 2015 and 2024, with descriptors such as "Approach", "Clinical", and "Gestational Hypertensive Syndrome". Nulliparity appears as an important risk factor for the development of hypertensive disorders in pregnancy. Although antihypertensive treatment is widely used, it remains controversial, with debates about its effectiveness in preventing serious complications such as placental abruption, second-trimester fetal loss, and preterm birth. In the management of PE, the focus is on preventing maternal and perinatal morbidity and mortality, through tight blood pressure control, prevention of eclampsia, and continuous monitoring of fetal well-being. Early identification of laboratory complications, such as HELLP syndrome, is crucial for adequate management, seeking to balance maternal-fetal risks with the challenges of prematurity. An in-depth understanding of GHS and the adoption of a multidisciplinary approach are essential to mitigate negative impacts on the health of the mother and fetus, ensuring timely and effective intervention.

Keywords: Approach, Clinical and Gestational Hypertensive Syndrome.

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INTRODUCTION

In pre-Hippocratic Greece, the observation of headache accompanied by sleepiness during pregnancy, which occasionally triggered seizures, was already considered a worrisome condition. There is historical evidence of this. For example, the Egyptian papyrus of Kahun, dated to approximately 3,000 years ago, also mentioned the occurrence of seizures during pregnancy. According to Chesley (2004), this possibly represents the oldest historical record of a pregnancy-specific hypertensive disease and one of its most feared and severe manifestations, eclampsia.

Currently, the term Gestational Hypertensive Syndromes (GHS) encompasses several conditions related to high blood pressure during pregnancy. This includes gestational hypertension, preeclampsia, and eclampsia (ZUGAIB, 2019). Each of these conditions has specific characteristics, but all are associated with high blood pressure during pregnancy.

In the context of global and national public health, hypertensive complications in pregnancy stand out as the third leading cause of maternal mortality in the world and the main cause in Brazil. In developed countries, the incidence of this syndrome ranges from two to eight out of every 100 pregnant women, while in Brazil it can be observed in 5-10% of all pregnancies (WATANABE et al., 2020).

Due to the severity associated with this disease, it is considered a significant criterion for hospitalization in Maternal Intensive Care Units (ICUs) and is sometimes included as a cause of severe maternal morbidity (NETO, 2007). Although most pregnancies progress naturally and without complications, a portion that has specific characteristics or is affected by other conditions can result in fatalities, putting the health of both mother and fetus at risk.

Gestational Hypertensive Syndromes, among the various maternal conditions that may arise during this period, stand out as the ones that most cause harmful effects on both the maternal and fetal organisms, in addition to being one of the most prevalent causes of maternal and/or fetal death (CHAIM et al., 2008).

Gestational hypertension is characterized by an increase in blood pressure, reaching or exceeding 140 x 90 mmHg, measured under ideal conditions on at least three occasions, and is diagnosed for the first time during pregnancy, from the 20th week of Gestational Age (GA). At the initial assessment, blood pressure should be recorded in both arms, and in cases of discrepancy, the arm with the higher reading should be considered as a reference for subsequent measurements. The recommended position for measurement is the sitting position (CPPAS, 2018).

In view of the above, it is important that, when diagnosed with hypertensive syndrome during pregnancy, the woman receives special attention, including differentiated prenatal care with specific laboratory tests. In addition, a fetal evaluation should be carried out with greater care, considering the harmful effects that it can cause to the fetus and the pregnant woman (ALMEIDA, 2017).

Protecting the mother and fetus against serious complications from high blood pressure during pregnancy is essential because, if left unchecked, this condition can progress to preeclampsia, eclampsia, or HELLP syndrome (characterized by H = hemolysis, EL = elevated liver enzyme levels, and LP = low platelet count), which are prevalent complications of maternal-fetal mortality (LIMA et al., 2018).

Therefore, this condition represents a significant challenge for maternal and fetal health, and understanding the clinical-epidemiological profile of pregnant women with gestational hypertensive syndrome is essential for its adequate prevention and treatment.

THEORETICAL FRAMEWORK

CONCEPT OF SHG

Hypertension is characterized by the persistence of systolic blood pressure (SBP) equal to or greater than 140 mmHg and/or diastolic blood pressure (DBP) equal to or greater than 90 mmHg, when measured on different occasions and moments in offices. In addition to these values, measurements performed in outpatient clinics or self-measurements should also be considered (MARTINS, 2014).

Its classification can be made based on etiological, pathophysiological, or severity criteria. Etiologically, hypertension can be primary (or essential), when the cause is unknown, or secondary, when it results from other medical conditions. Pathophysiologically, it can be categorized as isolated systolic hypertension (SBP > 140 mmHg and DBP < 90 mmHg), isolated diastolic (as in conditions of bradycardia, fever, anemia, aortic insufficiency, etc.), or a combination of systolic and diastolic hypertension associated with increased cardiac output, peripheral vascular resistance, or both (WU et al., 2009).

In pregnancy, the definition of hypertension is not uniform, but there is consensus on the need for close monitoring. Currently, gestational hypertension is considered when SBP is ≥ 140 mmHg or DBP is ≥ 90 mmHg, measured on several occasions. Close surveillance is crucial due to the additional risks to maternal and fetal health (KAHHALE, 2018).

IMPACTS ON THE HEALTH OF THE MOTHER AND FETUS

Eclampsia is a serious condition that occurs when seizures or coma manifest during a preeclampsia condition. These seizures can be generalized, with muscle contractions throughout the body, or focal, and should not have identifiable causes, such as epilepsy, stroke, intracranial hemorrhage, or be related to the use of drug substances (MURALI; MILLER; MCDERMOTT, 2020).

Failure to terminate pregnancy can lead to progression from preeclampsia to placental insufficiency and maternal organ dysfunction. Eclampsia is one of the main causes of maternal mortality in Brazil, especially when it presents in a severe form, such as in HELLP syndrome (Hemolysis, Elevated Liver Enzymes and Low Platelet Count), which affects 10% to 20% of women with severe preeclampsia (VEGA et al., 2007).

This hypertensive condition is the leading cause of perinatal death, and affected neonates often face problems related to lack of oxygen during delivery, even if they survive (DERHAM et al., 1989).

In addition to the immediate impacts during pregnancy, preeclampsia also poses significant long-term risks to the health of women and their children. Women who have suffered from preeclampsia have an increased risk of developing metabolic syndromes, cardiovascular disease, and hypertension earlier in life (WU et al., 2009).

Several risk factors are associated with preeclampsia, including nulliparity, history of preeclampsia, eclampsia, or HELLP syndrome, family history of the condition, chronic diseases such as hypertension, diabetes, kidney disease, and thrombophilia, obesity, multiple pregnancy, and gestational trophoblastic diseases (KAHHALE; ZUGAIB, 1995).

EPIDEMIOLOGY

Preeclampsia has registered a global increase in its incidence due to factors such as the postponement of motherhood, the growth of obesity, the use of assisted reproduction techniques and the presence of pre-existing medical conditions, such as diabetes, hypertension and kidney diseases (TOWNSEND, 2016). A relevant study conducted in Norway found a significant increase in the risk of preeclampsia in women with multiple pregnancies, but did not find a corresponding increase in the incidence of gestational hypertension compared to singleton pregnancies (LAINE et al., 2019).

According to Kintiraki et al. (2015), preeclampsia can lead to several serious complications, such as Hemorrhagic Strokes (CVA), acute pulmonary edema, central nervous system dysfunctions, liver damage, and disseminated intravascular coagulation (DIC), which can result in maternal death. For fetuses and neonates, risks include Intrauterine Growth Restricted (IUGR), Small for Gestational Age (SGA) fetuses, prematurity, and perinatal death.

In addition, the World Health Organization (WHO), in 2011, highlighted that the early occurrence of preeclampsia (before 32 to 34 weeks of gestation) and complications associated with fetal health are important criteria for classifying preeclampsia as severe in several regions. Globally, preeclampsia affects between 3% and 10% of pregnancies and is one of the main causes of perinatal mortality (MURALI; MILLER; MCDERMOTT, 2020).

According to recent data from the World Health Organization (WHO), in 2010, approximately 287,000 maternal deaths were recorded, with most occurring in low-income countries, especially in sub-Saharan Africa and South Asia, which account for between 83% and 88% of these deaths. To address this alarming situation, goals have been established that prioritize global health, and while there has been some significant progress in the last decade, there is still a need for further improvement (SILVA, 2015).

Hypertension is the second leading cause of direct death among pregnant women, accounting for 14% of deaths. Its global prevalence is highest in Latin America and the Caribbean, while in developed regions, such as Europe, the rate is 12.9% (MARTINS, 2014).

During pregnancy and the puerperium, hypertension is one of the main clinical complications, affecting between 6% and 30% of pregnancies. Of these, 2% to 3% have a high risk of morbidity, and between 15% and 20% are associated with a significant risk of maternal and perinatal mortality (SILVA, 2015; MARTINS, 2014).

With regard to socioeconomic aspects, it is crucial to observe the impact of factors such as geographic location, level of education, occupation, and marital status on the occurrence of hypertensive disorders during pregnancy. Municipalities far from urban centers often face challenges that can compromise the quality of prenatal care. A study conducted in the Netherlands by Silva et al. (2008) revealed a significant association between low educational levels and less skilled occupations with an increased risk of hypertensive disorders in pregnancy. These factors were often correlated with risk behaviors, such as alcohol consumption, smoking, and illicit substance use. These findings highlight the need for an integrated and comprehensive approach in the prenatal monitoring of pregnant women who are at risk of developing gestational hypertensive syndromes.

PATHOPHYSIOLOGY

The etiology of preeclampsia is not yet completely understood. In 1916, Zweifel described the condition as "the disease of theories" due to the multiple hypotheses proposed to explain its cause, many of which have not been confirmed. More than six decades ago, Page suggested that decreased placental perfusion was a relevant factor. It is now widely believed that preeclampsia involves immunological and genetic aspects and failures in placental invasion. The most recent theories indicate that endothelial injury, exacerbated inflammatory response, and stress play significant roles in the occurrence of preeclampsia. The condition is marked by increased vascular reactivity and permeability, coagulation activation, and damage to the vascular endothelium, kidneys, central nervous system, liver, and placenta. This can lead to multiple organ involvement with varying degrees of severity (KAHHALE, 2018).

Although the understanding of the pathophysiology is partial, studies indicate that factors such as abnormalities in placental implantation, genetic predisposition, and immune intolerance between maternal and fetus-placental tissues may play a significant role (KINTIRAKI et al, 2015). In addition, recent research, according to Phoswa (2019), emphasizes endothelial dysfunction as a result of oxidative stress, influenced by the action of endogenous neurotransmitters such as dopamine, and highlights the crucial role of enzymes that convert it into inactive metabolites, such as monoamine oxidase (MAO) and catechol-O-methyltransferase (COMT), in the origin of this set of pathologies.

In the normal process of placentation, the cytotrophoblast migrates to the spiral arteries, causing changes that result in a decrease in vascular resistance, thus providing adequate nutrition for the fetus. However, in cases of placentas destined to develop preeclampsia, cytotrophoblasts fail to effectively perform vascular remodeling, resulting in narrowed vessels and a condition of relative placental ischemia. The ischemic placenta releases inflammatory and prothrombotic factors into the maternal circulation, which contribute to the development of hypertension and changes in the coagulation system, thus supporting the clinical presentation of hypertensive syndrome (RANA et al, 2019).

It is well established that preeclampsia develops in the presence of placental tissue and is a multifactorial pathological condition influenced by environmental, immunological, and genetic factors of pregnant women. Placental hypoxia results in oxidative stress and release of trophoblastic products, as well as an excess of antiangiogenic factors, such as soluble endoglobin and the soluble receptor Flt-1 (sFlt-1), known as "fms-like tyrosine kinase-1". These factors are detected early in pregnancy. Inadequate trophoblastic invasion leads to the production of toxic substances that damage the endothelium, resulting in the clinical syndrome of preeclampsia. The success of physiological placentation depends on the regulation of angiogenic factors, such as PLGF, and antiangiogenic factors, such as sFlt-1. Recent studies associate the decrease in PLGF and the increase in sFlt-1, as well as the high sFlt-1/PLGF ratio, with the prediction, diagnosis, and prognosis of pregnant women with preeclampsia (KAHHALE, 2018).

CLINICAL SUSPICION AND DIAGNOSIS OF PREECLAMPSIA

To detect preeclampsia early during prenatal visits, especially from the 20th week of gestation, it is crucial that the doctor is aware of the symptoms reported by the pregnant woman, such as general malaise, headaches, body aches, nausea, vomiting, itching and visual changes, among others. It is also important to monitor weight gain, particularly if it exceeds 1 kg per week, and to watch for the appearance of edema, often on the hands and face. If signs or symptoms suggestive of preeclampsia are identified, such as high blood pressure, additional tests should be performed to confirm the diagnosis (Peraçoli et al., 2023).

The diagnostic criteria for preeclampsia have been revised over the years. The 2013 American College of Obstetricians and Gynecologists (ACOG) and the 2014 International Society for the Study of Hypertension in Pregnancy (ISSHP) guidelines no longer require the presence of proteinuria as a mandatory criterion for diagnosis. In 2018, the ISSHP again revised these criteria, which remain in place today (Brown et al., 2018; Magee et al., 2022).

Figure 1 - Dysgnostic criteria for preeclampsia

CRITÉRIOS DIAGNÓSTICOS PARA PRÉ-ECLÂMPSIA - 2023	
HIPERTENSÃO + PROTEINÚRIA	PAS > 140 e/ou PAD > 90 mmHg, Medido em duas ocasiões, com intervalo > 4 hours, after 20 weeks of pregnancy.
	Relação Proteinúria/Creatinúria > 0,3 mg/dL ou > 300 mg/24 horas ou > 1+ no Reagente Tiras
Na ausência de proteinúria	**Hipertensão Associada a pelo menos um dos seguintes:**
trombocitopenia	Contagem de plaquetas < 150.000 mm3
Insuficiência hepática	Elevação de Transaminases (ASL) > 40 U/L
Insuficiência renal	Elevação da creatinina sérica > 1,0 mg/dL
Edema pulmonar	Dispneia, sibilos, palidez, sudorese fria, cianose das extremidades, ansiedade, confusão mental, secreções pulmonares rosadas...
Sinal e/ou sintoma de lesão de órgão-alvo	Dor de cabeça e escotomas e epigastralgia (eclâmpsia iminente)
affected fetal compartment	Placental Insufficiency / Fetal Growth Restriction

Source: Peraçoli JC, Costa ML, Cavalli RC, de Oliveira LG, Korkes HA, Ramos JG, et al. Preeclampsia – Protocol 03. Brazilian Network of Studies on Hypertension in Pregnancy; 2023. Chart 1, Recommended clinical risk factors for the identification of pregnant women in need of prevention; p. 20. Available at: https://rbehg.com.br/wp-content/uploads/2023/04/PROTOCOLO-2023.pdf.

After the diagnosis of preeclampsia, hospitalization of the pregnant woman is recommended to ensure a detailed follow-up of the health of the mother and baby (Peraçoli et al., 2023).

For maternal health monitoring, it is crucial to perform regular examinations to detect possible systemic complications. The PIERS calculator can be useful to assess the risk of maternal adverse events in the following 48 hours. Laboratory tests, such as transaminase dosage, platelet count, and creatinine, are essential to determine the severity of the condition (Von Dadelszen et al., 2011). It is equally important to control blood pressure closely by initiating the administration of antihypertensive medications to keep pressure below 140 x 90 mmHg and to consider the use of magnesium sulfate, especially if there is clinical or laboratory deterioration (Peraçoli et al., 2023).

Regarding fetal care, vitality tests such as cardiotocography, fetal biophysical profile, and Doppler velocimetry should be performed. For pregnancies less than 34 weeks, fetal lung maturation should be assessed and magnesium sulfate should be considered for brain protection in fetuses at risk of preterm birth, especially before 32 weeks.

Expectant management for patients with preeclampsia is recommended, especially in cases of fetal prematurity or when there are limited resources at the point of care. This approach allows for the promotion of fetal lung maturation with the use of corticosteroids and the transfer of the pregnant

woman to a better equipped center. However, the time required for management and transport can delay critical interventions and potentially aggravate the patient's condition, since decisions often involve degrees of subjectivity (Peraçoli, 2020).

To reduce uncertainty in these decisions, a mathematical model with predictive value called PIERS (Preeclampsia Integrated and Estimated Risks) was developed. This tool, available online, assesses the likelihood of adverse outcomes within 48 hours of patient admission. PIERS considers serious adverse events such as eclampsia, coma, central blindness, retinal detachment, stroke, placental abruption, coagulopathy, severe hepatic dysfunction, hepatic hematoma, pulmonary edema, myocardial infarction, acute renal failure, and ascites. Given the severity of these events, utilizing an objective tool like PIERS can help protect both mother and fetus. The final decision should be based on the specific clinical context and the interpretation of clinical and laboratory data. If clinical or laboratory signs of concern, such as platelets < 100,000/mm³ or creatinine ≥ 1.2 mg/dL, indicate acute renal failure, there is no justification for delaying decisions due to instability and the risk of rapid deterioration. It is recommended that the clinical team use the risk calculation to become familiar with the tool and better understand the meaning of percentage risks in daily clinical practice (Peraçoli, 2020).

PREVENTION

First, it is important to clarify that some interventions have not shown efficacy in reducing the risk of preeclampsia and, therefore, should not be recommended in clinical practice. Among these interventions are absolute rest, salt restriction in the diet, the use of antioxidants such as vitamins C and E, vitamin D, omega-3 and enoxaparin. In contrast, interventions that have been shown to be effective in reducing the risk of preeclampsia include the use of acetylsalicylic acid (ASA) and calcium supplementation (Peraçoli, 2020).

Although the protocol establishes risk stratification based on clinical factors and recommends the use of aspirin, recent research indicates that the benefits of low-dose aspirin go beyond the prevention of preeclampsia. Studies show that the use of aspirin in nulliparous women, without comorbidities, is associated with a reduction in prematurity before 34 weeks of gestation. In addition, the administration of aspirin between 6 and 13 weeks and 6 days of gestation in nulliparous women has shown a reduction in both prematurity and perinatal mortality. There is also evidence to support universal prophylaxis for preeclampsia as a beneficial and cost-effective practice. The recommendation is to use ASA at a dose of 100 mg per day for patients identified as at risk, according to the guidelines on the prediction of preeclampsia. In Brazil, the 100 mg formulation is the one available through the public health system and is suitable for this purpose (Peraçoli, 2020).

ASA should be started as early as possible, ideally around 12 weeks of gestation, and given at night. Although it can be maintained until the end of pregnancy, suspension after the 36th week is recommended to allow platelet renewal, ensuring adequate functional capacity for delivery (Peraçoli, 2020).

In addition to prevention measures during prenatal care, it is crucial to also consider the prevention of severe forms of preeclampsia. Magnesium sulfate (MgSO4) plays a key role in the prevention and treatment of eclampsia and should be available in all maternal-fetal care facilities, including primary care. MgSO4 is recommended in cases of imminent eclampsia and should be used freely in patients with severe preeclampsia, or with blood pressure that is difficult to control, even without signs or symptoms of imminent eclampsia, in addition to being indicated for cases of HELLP syndrome. Its administration should be considered whenever clinical perception suggests a high risk of progression to more severe forms or eclampsia (Peraçoli, 2020).

As preventive measures, the importance of early identification and follow-up of pregnant women with hypertension through prenatal care is highlighted. The use of low doses of aspirin is recognized to reduce the risk of preeclampsia by 10 to 20% and decrease the chances of prematurity and intrauterine growth restriction (IUGR). It is recommended to start administration as early as possible, ideally between 12 and 16 weeks of gestation, in women with risk factors. In populations with low serum calcium concentration, intake of 1500 mg to 2000 mg has been shown to reduce the risk of severe preeclampsia, although its effect on overall risk is limited. As for folic acid, its role in the prevention of preeclampsia remains uncertain, but it is recognized as important in the prevention of neural tube defects (SHAH; GUPTA, 2019).

Several agents can be used to lower blood pressure, including hydralazine, calcium channel blockers, methyldopa, diazoxide, prostacyclin, and magnesium sulfate. Among the most common, intravenous hydralazine, intravenous labetalol, and calcium channel blockers stand out. Hydralazine may lose preference due to its adverse effects compared to calcium channel blockers. For cases of non-severe hypertension, the agents of choice are methyldopa, labetalol, and nifedipine. Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers have been contraindicated due to association with oligohydramnios, intrauterine growth restriction (IUGR), and renal anomalies, as well as other congenital malformations when women are exposed during the second or third trimester of pregnancy (BRAUNTHAL; BRATEANU, 2019).

There are disagreements regarding the appropriate time to start therapy. Most guidelines indicate that treatment should be initiated only when blood pressure reaches values greater than 150x100 mmHg, while others recommend intervention only when blood pressure levels exceed 160x110 mmHg (BRAUNTHAL; BRATEANU, 2019).

TREATMENT

It is crucial to make an early diagnosis of preeclampsia during antenatal care. Weight gain should be monitored for the pregnant woman, especially if it occurs quickly and accompanied by edema in the hands and face. Blood pressure should be carefully assessed, as should signs and symptoms related to end-organ involvement, such as epigastric or right hypochondrium pain. It is important to note that diastolic blood pressure usually decreases during pregnancy, and persistent values greater than 80 mmHg should be cause for concern.

After diagnosis of preeclampsia, the goal of clinical management is to prevent maternal and perinatal complications. This includes providing guidance on the signs of worsening disease, referring the pregnant woman to tertiary centers with specialized neonatal support, strictly controlling blood pressure, preventing eclampsia or its recurrence, and early identification of laboratory abnormalities, particularly those associated with HELLP syndrome. In addition, the assessment of fetal well-being is essential. The combination of these strategies aims to manage cases in order to deliver the delivery with the best possible balance between maternal and fetal risks and the impacts of prematurity (Peraçoli, 2020).

In the case of eclampsia, basic management principles include avoiding fall trauma, maintaining airway patency, providing oxygen support, and preventing aspiration in case of vomiting. It is recommended to position the pregnant woman in the left lateral decubitus position or semi-seated, use a Guedel cannula, administer nasal oxygen at 5 L/min, and quickly establish a venous access (Peraçoli, 2020).

It is recommended that the diet be normal, without salt restriction, as there is insufficient evidence to support the effectiveness of this approach to control blood pressure or prevent adverse outcomes. Additionally, maintaining a balanced diet is crucial, especially for patients who may require lengthy hospital stays, as the nutritional quality of the diet contributes to overall well-being. Sodium restriction can, in some cases, reduce intravascular volume, but it is not considered an effective measure for blood pressure control in patients with preeclampsia (Peraçoli, 2020).

Reducing physical activity for women with preeclampsia can help improve uteroplacental blood flow and prevent exacerbation of hypertension, particularly if blood pressure is not well controlled. However, there is insufficient evidence to state that reduced physical activity or absolute rest significantly improves key maternal and perinatal outcomes. Therefore, absolute rest is not recommended as a standard practice for patients with preeclampsia (Peraçoli, 2020).

Antihypertensive treatment in pregnant women with hypertension or preeclampsia is controversial in the literature. In non-pregnant patients, antihypertensive treatment is well established and proven to reduce cardiovascular and renal morbidity and mortality. However, when it comes to pregnant women, the effectiveness and benefits of antihypertensive treatment are less clear.

Some authors advocate the use of antihypertensive drugs during pregnancy to reduce the incidence of severe hypertension and improve fetal prognosis and maternal renal function, although there is no robust evidence demonstrating a significant reduction in severe complications such as placental abruption, fetal loss in the second trimester, or preterm birth. In addition, the treatment can have side effects that affect both the mother and the fetus (Souza, 2010).

During the clinical and laboratory investigation of severe hypertension, associated conditions that increase maternal and perinatal risks, such as chronic diseases and risk factors, are often identified. In these cases, antihypertensive therapy may be necessary to control blood pressure levels and prevent complications. Ideally, patients with severe chronic hypertension should be followed up before pregnancy for adequate control. Antihypertensive therapy should be maintained during pregnancy, except when the drug has contraindications for the fetus (Souza, 2010).

In general, antihypertensive treatment is initiated when systolic blood pressure exceeds 160 mmHg and/or diastolic blood pressure exceeds 110 mmHg. The goal is to maintain systolic pressure between 130 and 149 mmHg and diastolic pressure between 80 and 90 mmHg. In cases of severe preeclampsia, antihypertensive therapy may help control hypertensive peaks and reduce neonatal morbidity, although its ability to alter the course of the disease or significantly improve maternal and fetal prognosis has not been confirmed. Conservative management, which may include antihypertensive therapy for hypertensive peaks, is generally preferred to prevent neonatal complications associated with prematurity (Souza, 2010).

Guidelines such as those of the American College of Obstetricians and Gynecologists (ACOG) and the National High Blood Pressure Education Program recommend antihypertensive treatment only for hypertensive peaks, while the Canadian Hypertension Society suggests starting treatment for all hypertensive syndromes of pregnancy, regardless of blood pressure levels (Souza, 2010).

The treatment of hypertension during pregnancy must balance efficacy and safety for both the mother and the fetus. The main concern is the teratogenic potential of the drugs, as they all cross the placental barrier. Severe hypertension, known as hypertensive emergency, must be treated promptly to prevent serious complications such as maternal stroke and placental abruption. However, the benefit of antihypertensive treatment for lower blood pressure levels during pregnancy is still controversial, especially due to the potential risk of intrauterine growth restriction (IUGR) caused by reduced uteroplacental perfusion.

Among the oral medications used, α-methyldopa is considered one of the safest and most effective options for the treatment of hypertension in pregnancy. The starting dose is 750 mg/day, with a maximum of 3 g/day. Although it is effective in reducing hypertensive peaks, it does not demonstrate a significant reduction in the incidence of IUGR, prematurity, cesarean sections, or

perinatal death. Its main side effects include drowsiness, lethargy, depression, and postural hypotension.

β-blockers, such as propranolol and labetolol, are also used. They reduce the risk of hypertensive peaks and the need for other antihypertensive drugs, but may be associated with increased small-for-gestational-age neonates (PIGs) and neonatal bradycardia. Atenolol, in particular, has shown better results compared to other β-blockers, although it is associated with low birth weight when started in the first trimester.

Calcium channel blockers, such as nifedipine and nicardipine, are considered second-line drugs. Nifedipine is more common, but it may be associated with prematurity and low birth weight. However, no significant perinatal adverse effects were observed in pregnant women who used it.

For hypertensive emergencies, intravenous medications such as hydralazine, labetolol, nitroglycerin, and sodium nitroprusside are used, which are effective for acute treatment.

ACE inhibitors, angiotensin II receptor blockers (ARBs), and direct renin inhibitors (aliskiren) are contraindicated during pregnancy because of the risk of abnormalities in fetal renal development when used from the second trimester onwards. These medications should be replaced with safer alternatives before or in early pregnancy.

In summary, the choice of antihypertensive treatment during pregnancy should be made with caution, taking into account the potential risks and benefits. Careful monitoring and consideration of additional research are essential to determine the need for maintenance therapy in severe preeclampsia and to assess the efficacy and safety of different therapeutic options (Souza, 2010).

CONCLUSION

This review on preeclampsia provided a comprehensive analysis of the factors that may influence the onset of this condition, prevention strategies, existing public policies to combat it, and the challenges associated with this complex condition.

Chronic hypertension is defined by a blood pressure of 140 mmHg × 90 mmHg or more and is associated with hypertension existing before pregnancy or diagnosed by the 20th week of gestation. On the other hand, gestational hypertension refers to hypertension that develops after the 20th week of gestation. Preeclampsia is characterized by hypertension and organ damage after 20 weeks of gestation, while eclampsia is identified by tonic-clonic seizures or coma in a pregnant woman who has no other conditions that explain the seizures. These conditions pose a significant risk to maternal and newborn health, affecting more than 8% of pregnancies globally and causing approximately 40,000 maternal deaths annually.

In the management of preeclampsia, the main goal is to prevent serious complications for both the mother and the baby. This includes guidance on signs of worsening disease, referral to

tertiary centers with specialized neonatal support, tight blood pressure control, prevention of eclampsia or its recurrence, and early monitoring of laboratory abnormalities, especially related to HELLP syndrome. Ongoing assessment of fetal well-being is also crucial. The combination of these strategies aims at the appropriate management of cases, with the objective of delivering at a time that balances maternal and fetal risks with prematurity.

Although antihypertensive therapy was initially proposed to delay delivery and improve maternal and fetal prognosis, this efficacy has not been confirmed. However, the conservative approach can help prevent neonatal complications associated primarily with prematurity. Therefore, the benefits observed in perinatal prognosis seem to be more related to conservative management than to antihypertensive treatment itself. For patients with superimposed preeclampsia or gestational hypertension, antihypertensive treatment should be reserved for those who have significant hypertensive peaks.

The study therefore reiterates the importance of comprehensive, evidence-based strategies to address the challenge of preeclampsia, aiming not only at reducing maternal mortality, but also at promoting equity in access to health care. These measures are essential to achieve the goal of reducing maternal mortality associated with preeclampsia and improving maternal and neonatal outcomes globally.

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