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Research Article

Severe Preeclampsia: Epidemiological, Diagnostic, Therapeutic and Prognostic Aspects at the Maternity Unit of the Institute of Social Hygiene of Dakar (Senegal)

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ABSTRACT

Objectives: Determine the frequency of severe preeclampsia, specify the epidemiological and clinical profile of patients, assess the management and the maternal and perinatal prognosis and specify the factors associated with the risk of complications in patients treated for severe preeclampsia at the maternity ward of the hospital Institute of Social Hygiene of Dakar.

Material and methods: This was a retrospective, descriptive and analytical study conducted over a period of two years (January 1st, 2019 to December 31st, 2020) and focusing on severe preeclampsia. We studied the socio-demographic characteristics of the patients, the clinical and paaclinical data, the maternal and perinatal prognosis and the factors associated with the risk of complications.

Results: During the study period, we recorded 110 cases of Severe Preeclampsia (SPE) among the 4290 parturients, i.e. a frequency of 2.6% of deliveries. The epidemiological profile of the patients was that of a woman with an average age of 29, nulliparous (50%), nulliparous (45.4%), and married (96%), at the average socio-economic level (55.4%), with history of pregnancy-induced hypertension (8.3%). The average gestational age at admission was 33 weeks of amenorrhea with extremes between 27 SA and 42 SA + 4 days. Most of the pregnant women were carriers of a pregnancy whose term was greater than or equal to 37 WA (60%). Prenatal follow-up Chronic Progressive Nephropathy (CPN) was carried out in all our patients and was most often of good quality (60%). On general examination, severe diastolic and severe systolic hypertension was each observed in 27% of our study population. The biological examinations carried out had objectified 14 cases of anemia (12.7%), thrombocytopenia in 11 patients (10.1%), massive proteinuria in 1.8% of cases, hepatic cytolysis in 4 pregnant women (3, 7%), renal failure with elevated serum creatinine in 5 cases (4.5%) and hyperuricemia in 22 patients (20%). Obstetric ultrasound found 16 cases of oligohydramnios (15%) and a high resistance index of the umbilical artery in 2 patients (2%). In our study, 10 patients (9%) had benefited from intensive care unit resuscitation. Magnesium sulphate was used in 38 patients (34.5%) intravenously according to the Zuspan protocol. Lung maturation was performed in 38 patients (34.5%) with betamethasone. Antihypertensive treatment was instituted in 77 patients (71%) orally (43.6%) or parenterally (56.4%). The molecules used were dominated by alpha methyl-dopa (36.4%) and nicardipine (63.6%). The obstetrical treatment consisted of a uterine evacuation which was most often done by caesarean section (90%). Maternal complications were dominated by retroplacental hematoma (9.1%), HELLP syndrom (9.1%) and eclampsia (2.1%). We have not recorded any maternal deaths. Prematurity (45.8%) and Intrauterine Growth Restriction (IUGR) (26.8%) were the most common perinatal complications. The Apgar score at the 5th minute was normal in 105 newborns (96.3%). Neonatal asphyxia only affected 4 newborns (3.7%). Birth weight averaged 3177 grams with extremes of 800 grams and 4000 grams. Low birth weight concerned 70 newborns (63%). We recorded 97 live birth (87.4%) and 14 perinatal deaths, i.e. a stillbirth of 144.3‰ live birth. During the postnatal follow-up, we noted a normalization of the blood pressure figures in 85.5% of the patients. Contraception was instituted in 107 patients (97.2%). These were most often progestogen implants (76.4%) or Intrauterine Device (IUD) (14.5%). We did not find any factors significantly associated with the risk of maternal and perinatal complications.

Conclusion: Despite the severity of the c linical cases and the difficulties encountered in the management, severe preeclampsia is associated with a relatively favorable maternal and perinatal prognosis in our practice.

Keywords: Preeclampsia; Retroplacental hematoma; Caesarean section; Prematurity.

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INTRODUCTION

Maternal and perinatal mortality constitute a real public health problem in the world, particularly in developing countries where the highest ratios are recorded [1]. These deaths are due to several etiologies most often related to pregnancy, also called direct obstetric causes of maternal death. Among these, vascular-renal syndromes and their complications rank second [2]. It is essentially preeclampsia, which is the most pejorative clinical form in the association of high blood pressure Hepatic Artery Thrombosis (HTA) and pregnancy. A systematic review by the World Health Organization (WHO) indicates that hypertensive disorders account for 16% of maternal deaths in developed countries, 9% of maternal deaths in Africa and Asia and up to 26% of maternal deaths in Latin America and the Caribbean [3]. In developing countries, due to the lack of equipment, health infrastructure and qualified personnel, the management of preeclampsia remains difficult despite the significant progress that has been made over the past twenty years. We wanted, through this study, to evaluate the management of severe preeclampsia at the Institute of Social Hygiene Hospital in Dakar between January 1st, 2019 and December 31st, 2020. The specific objectives of this study were to determine the frequency of severe preeclampsia, to specify the epidemiological profile of the patients, to determine the methods of management, to evaluate the maternal and perinatal prognosis and to specify the factors associated with the risk of maternal and perinatal complications.

Patients and methods

Type, scope and period of study

This was a descriptive and analytical retrospective study concerning cases of severe preeclampsia treated at the maternity ward of the IHS hospital in Dakar between January 1st, 2019 and December 31st, 2020. Our study population was composed of pregnant women and parturients admitted to the service during the study period.

Patient selection criteria

The study involved all patients treated for Severe Preeclampsia (SPE) and who had given birth at the IHS hospital during the study period. Severe preeclampsia was defined by the association in pregnant women of Systolic Blood Pressure (SBP) ≥ 140 mmHg and/or Diastolic Blood Pressure (DBP) ≥ 90 mmHg with pathological proteinuria (greater than or equal to 300 mg on 24-hour urine or 1 gram on random urine or two dipstick crosses on two urine samples 4 hours apart) and the existence of one or more of the following factors:

Clinical criteria: Severe (SBP ≥ 160 mmHg and/or TAD ≥ 110 mmHg) or uncontrolled hypertension, epigastric pain and/or persistent or intense "bar" pain in the right hypochondrium, chest pain, dyspnoea, acute edema lung disease, neurological signs (intense headaches resistant to usual treatment, persistent visual or auditory disturbances, lively and polykinetic osteotendinous reflexes), oliguria with a diuresis ≤ 500 ml/day or 25 ml/h.

Biological criteria: Proteinuria > 5g/24h, serum creatinine ≥ 90 µmol/L, hepatic cytolysis with transaminases (ASAT/ALAT) greater than twice normal, thrombocytopenia less than 100,000/mm^3;

Ultrasound criteria: Intrauterine Growth Retardation (IUGR), severe oligohydramnios, umbilical Doppler abnormalities (high resistance index, protodiastolic notch, negative diastolic or reverse flow, zero diastolic.

Data collection and analysis

Data were collected from patient and newborn records and birth and hospitalization registers in pathological pregnancy, post-surgery unit and neonatology. They were recorded on a computerized file containing the following items: the socio-demographic characteristics of the patients, clinical and paraclinical data, therapeutic data, maternal and perinatal prognosis and postnatal follow-up data. Data analysis was performed using Stata 13.0 software. The qualitative variables were described in number and frequency and the quantitative variables in average with the standard deviation and the extremes. Regarding the analytical part of our study, the chi-square test was used to compare the proportions with a statistically significant difference when the p-value was less than 0.05.

RESULT

Descriptive results

Frequency: During the study period, we recorded 326 cases of high blood pressure associated with pregnancy among 4290 pregnant and parturient women, i.e. a frequency of 7.6% of pregnancies treated. They were distributed as follows: 96 pregnant hypertension (2.2%) and 230 preeclampsias (5.4%) including 110 Severe Preeclampsias (PES) (2.6%). This last entity also represents 33.7% of cases of high blood pressure in pregnant women.

Socio-demographic characteristics of patients: The patients were between 16 years and 43 years old with an average of 29 years. The age group of 21 years to 34 years was the most represented. The majority of patients were married (96%) and 54.5% of them had a socio-economic level considered average. Nulliparous were the most represented (45.4%) followed by primiparous (19.1%) and pauciparous (27.3%). Personal obstetric history was dominated by abortion (17.3%), retained dead egg Range of motion (ROM) (8.2%), prematurity (3.6%), Retroplacental Hematoma (HRP) (0.9%) and pregnancy-induced hypertension (8.2%) (Table 1). Twelve patients (10.9%) had chronic hypertension. A notion of primipaternity was found in 34 spouses (30.9%) and couple infertility in one case (0.9%).

Table 1: Distribution according to personal obstetric history.

Pathological obstetric history	Number	Frequency (%)
None	68	61.8
Abortion	19	17.3
Retention of dead egg	9	8.2
Early birth	4	3.6
Placenta abruptio	1	0.9
Pregnancy induced high blood pressure	9	8.2
Total	110	100

Clinical and paraclinical data on admission : In our study, the average gestational age was 33 weeks of amenorrhea SA and 2 days with extremes of 27 SA and 42 SA and 4 days. The majority of patients (60%) were carriers of a pregnancy whose term was greater than or equal to 37 weeks. Mean systolic blood pressure on admission was 170 mmHg with extremes of 150 mmHg and 240 mmHg. Regarding the mean diastolic blood pressure, it was 110 mmHg with extremes of 70 mmHg and 190 mmHg (Table 2).

Table 2: Distribution according to blood pressure values (N=110).

Arterial pressure (mmHg)	Number	Frequency (%)
Systolic Blood Pressure (SBP)		
<160	6	5.4
160 to 180	74	67.3
>180	30	27.3
Diastolic Blood Pressure (DBP)		
<110	46	41.8
110 to 120	34	30.9
>120	29	26.4
Total	110	100

The results of the biological examinations are recorded in Table 3.

Table 3: Distribution according to the results of the biological examinations (N = 110).

Results of the biological examinations	Number	Frequency (%)
24 hours proteinuria		
<2 g	105	95.4
2 g to 4.9 g	3	2.7
≥ 5 g	2	1.8
Hémoglobin level		
<8 g/dl	2	1.8
8-10.9 g/dl	12	10.9
≥ 11 g/dl	96	87.3
Platelets level (/mm^3)		
<50000	1	0.9
50000 to 150000	10	9.1
>150000	99	90
Transaminase assay		
Normal	106	96.3
high level	4	3.6
Creatinine		
Normal	105	95.4
High level	5	4.5
Uricemia		
Normal	88	80
High level	22	20
Total	110	100

Obstetrical ultrasound found that most pregnancies were single-fetal (99.1%). In addition, we recorded 16 cases of oligohydramnios (14.5%) and a high resistance index of the umbilical artery in 2 patients (1.8%).

Therapeutic data: In our series, 10 patients (9.1%) were hospitalized in an Intensive Care Unit (ICU). Magnesium sulphate was used in 38 patients (34.5%) intravenously according to the Zuspan protocol. Lung maturation was performed in 38 patients (34.5%) with two intramuscular injections of 12 mg of betamethasone 12 hours apart. Seventy-seven patients (70%) had received antihypertensive treatment either orally (43.6%) or parenterally (56.4%). It was most often monotherapy (92.7%). The molecules used were α-methyldopa (36.4%) or nicardipine (63.6%).

The majority of patients (60%) had delivered at term. Premature delivery represented 40% of the sample. The most common mode of delivery was caesarean section (90%). Eleven patients (10%) had given birth vaginally, including 7 (6.4%) after an artificial induction of labour. The birth weight was between 800 grams and 4000 grams with an average of 3177 grams. One hundred and five newborns (94.6%) had a normal Apgar score at the fifth minute. Neonatal asphyxia only affected 4 newborns (3.6%).

Prognosis: In our study, 33 patients (30%) presented with complications. These were often cases of HRP (9.1% of patients or 30.3% of complications) or HELLP syndrome (9.1% of patients or 30.3% of complications). We did not record any maternal deaths (Table 4).

Table 4: Distribution according to the complications found in the patients (N=110).

Maternal complications	Number	Frequency (%)
None	77	70
Placenta abruptio	10	9.1
HELLP syndrom	10	9.1
Eclampsia	3	2.7
Acute pulmonarty edema	2	1.8
Malignant high blood pressure	1	0.9
Others (indirectly related to preeclampsia)	7	6.4
Total	110	100

We registered 97 live birth (87.4%). There were 14 perinatal deaths, i.e. a perinatal mortality of 144.3‰ live birth. There were 4 cases of Retention of A dead egg ROM (28.6%) and 10 fresh stillbirth (71.4%) including 5 in a context of retroplacental hematoma and 5 secondary to growth retardation intrauterine. In our study, 73 newborns (66.4%) were transferred to the Neonatology Unit. The reasons for transfer were dominated by prematurity (50.7%), IUGR and low weight for gestational age (41.1%). A favorable evolution was noted in all cases.

Analytical results

We carried out a multivariate analysis which allowed us to find that maternal and perinatal complications were more frequent in women under 20 (62.5%, p=0.429), nulliparous (50%, p=0.344), having had poor prenatal follow-up (55.6%, p=0.67) and carrying chronic hypertension (66.7%, p=0.18) without there being a statistically significant relationship between these various risk factors and the occurrence of complications in the event of severe preeclampsia.

DISCUSSION

Epidémiology

In our series, the frequency of preeclampsia was 2.6% of pregnancies treated. This varies according to the authors and data from the literature show that the prevalence of severe preeclampsia is between 2% and 5% in industrialized countries. It is increased in emerging countries, ranging from 4% to 18% [4]. This difference noted in the prevalence of severe preeclampsia from one country to another could be explained by the reference center status of certain maternities which receive the majority of cases of high-risk pregnancies from satellite maternities, the difference in the patient recruitment criteria, the specificities of the population studied (environmental factors and socio-economic level) and the quality of prenatal follow-up. The epidemiological profile of our patients was comparable to those found in the literature. In Casablanca, Benjelloun reported in 2020 the predominance of the age group from 30 years to 39 years in patients who suffered from preeclampsia and he believes that young age would be questioned as being a determining risk factor [5]. And would simply correspond to the usual age at the time of the first pregnancy in our developing countries. Preeclampsia is more common in primigravida and nulliparous women as we noted in our series. The predominance of nulliparous was also noted by Mboudou, Boubacar and Doumbia who found rates of 41.34%, 47.5% and 38.1% of nulliparous in their respective series [6-8]. According to Cissé, the role attributed to a certain maternal immune intolerance in the genesis of preeclampsia suggests that it is rather the development of the first pregnancy that should be more incriminated and considered as one of the most important risk factors [9].

Clinical and paraclinical data

We recorded 40% premature delivery. The same observation was made by Cissé in Dakar who found 41.8% of premature live birth [9]. Mean Systolic Arterial Pressure (MSAP) on admission was 170 mmHg and mean diastolic PADM was 110 mmHg. These results are comparable to those recorded by some African authors [9-11]. These high blood pressure figures that we noted on admission of patients reflect the poor quality of prehospital care that can be detrimental to patients. Indeed, this severe hypertension exposes women to the risk of complications, in particular stroke, which can be life-threatening. The 24-hour proteinuria was greater than 2 grams in 5 patients (4.5%) and massive in 1.8% of cases. In Morocco, Benjelloun found similar results with 24-hour proteinuria greater than 3 grams in 6% of cases (99). Massive proteinuria results in severe hypovolemia with renal hypoperfusion and a risk of renal failure. In the fetus, the risk would be placental hypoperfusion and intrauterine growth retardation that can lead to fetal death in utero. This justifies the recommendation of the French Society of Anesthesiology and Resuscitation (SFAR) to carry out systematic vascular replacement of women with severe preeclampsia to reduce maternal and/or neonatal morbidity [12]. However, this is generally moderate and is usually limited to 300 ml–500 ml of non-glucose crystalloid solution in order to avoid the occurrence of acute pulmonary oedema. The dosage of uricemia was carried out in all patients with 22 cases of hyperuricemia (20%). Hyperuricaemia greater than 58 mg/l predicts a poor fetal prognosis.

Therapeutic data

According to Cissé, preeclampsia is a disease for which many ephemeral and sometimes contradictory "truths" have followed one another [9]. The most controversial aspects certainly concern the appropriateness and modalities of antihypertensive treatment [13-15]. The antihypertensive molecules used in our patients were nicardipine (63.6%) and alpha-methyldopa (36.4%). Our therapeutic choices are similar to those usually recommended in the literature. Indeed, in Morocco, Benjelloun found in his series the use of alpha-methyldopa in 49% of patients [5]. In Brazzaville, as in most African countries, Elombila reports that nicardipine was the only intravenous antihypertensive used in 84.5% of cases [16]. In France, learned societies such as SFAR and the National College of French Gynecologists and Obstetricians (CNGOF) recommend the use of intravenous labetalol as first-line therapy for the treatment of arterial hypertension in pre-eclampsia [12, 17]. Severe because of these minimal maternal and fetal effects. The unavailability of this molecule in our countries justifies the choice of central antihypertensives and calcium inhibitor. Magnesium sulfate was used in 38 of our patients (34.5%) intravenously according to the Zuspan protocol. In the study by Elombila in Brazzaville, magnesium sulphate was the only anticonvulsant administered and more frequently than in our practice (76.1% of cases) [16]. The prophylactic use of magnesium significantly reduces the rate of seizures in women with severe pre-eclampsia (0.6% *vs* 2%) but increases the rate of respiratory depression (RR=2.06%, 95% CI: 1, 33-3, 18) [18]. Women with severe pre-eclampsia are certainly the best candidates for receiving magnesium sulfate prophylaxis. Administration of magnesium sulfate also improves fetal prognosis by reducing the risk of cerebral palsy and neonatal death [19]. In our series, the obstetrical treatment consisted of uterine evacuation which was most often done by caesarean section (90%). This rate is comparable to those recorded in the series of Sarr, Mbombo and Diakité which were respectively 81.9%, 85.1% and 71.4% of cases [20-22]. On the other hand, in Lèye's series, the majority of patients (64%) had given birth vaginally [23]. The high caesarean section rate and the relatively short time between admission and delivery were mainly related to the high rates of maternal complications (30%), IUGR and low weight for gestational age (41.1%) that we have registered. Caesarean section would be associated with lower perinatal mortality. Indeed, Merveil has demonstrated that the rapid evacuation of the uterus is a factor of better prognosis in preeclampsia. Furthermore, it has been established that the real treatment for severe preeclampsia is uterine evacuation [24].

Maternal and perinatal prognosis

The maternal complications found in our study are comparable to those generally described in the literature [14, 15, 25, 26]. Their high frequency noted in our series (30%) was found by Cissé in Dakar in 2005 and Elombila in Brazzaville who had recorded respective frequencies of 27% and 25.4% of complications [9, 16]. In our series, these are often cases of HRP (9.1% or 30.3% of complications) or HELLP syndrom (9.1% or 30.3% of complications). In Cissé's study, complications were dominated by eclampsia (16.4%) and RPH (7.5%) whereas Elombila had reported a predominance of renal failure and HELLP syndrom which represented respectively 38.9% and 22.2% complications [16]. In developed countries, these complications are rarer [15, 27]. In our study, perinatal mortality was 144.3% live birth, far lower than those reported by Cissé in Senegal in 2002 and Benjelloun in Morocco in 2012, which were respectively 470% and 166.5‰ live birth [5]. This development reflects the efforts made for several years in the management of hypertension associated with pregnancy in terms of availability and accessibility of emergency obstetric and neonatal care SONU structures and recovery from the plateau technical. However, this perinatal mortality remains high and is probably linked to the frequency of complications that are often detrimental to the fetus, in particular HRP, HELLP syndrome, eclampsia, IUGR and the often induced prematurity. Maternal and perinatal complications were more frequent in women under 20 (62.5%, p=0.429), nulliparous (50%, p=0.344), with poor prenatal care (55.6%, p=0.67) and carrier of chronic hypertension (66.7%,

p=0.18). Cissé and Benjelloun had found primigestity, severity of arterial hypertension and early onset of preeclampsia as risk factors for maternal complications [9, 5]. These risk factors are also found in the literature. On the other hand, the level of diastolic blood pressure at admission is not significantly correlated with perinatal mortality, in accordance with the observation made by other authors [14, 25, 26, 28, 29].

CONCLUSION

Severe preeclampsia is relatively common in our practice. It is the most frequent clinical form in the association of arterial hypertension and pregnancy. Due to the delay often observed in diagnosis and the difficulties encountered in taking, maternal and perinatal morbidity and mortality are still high.

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