Original Research Article

Severe pre-eclampsia in the gynecology and obstetrics department of the CHR of Koudougou: epidemiological, clinical, therapeutic and prognostic aspects

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ABSTRACT

Background: To study the epidemiological, clinical, therapeutic and prognostic aspects of severe pre-eclampsia in the gynecology and obstetrics department of the CHR of Koudougou.
Methods: descriptive cross-sectional study with prospective collection from January 1 to December 31, 2018. The variables studied focused on clinical socio-demographic characteristics, treatment and prognosis. The women admitted to the department and meeting the criteria for severe pre-eclampsia were included, more than 20 weeks of amenorrhea with an increase in blood pressure, presence of albumin in the urine and signs of clinical or biological seriousness.
Results: Severe pre-eclampsia represented 2.3% of admissions and 3% of deliveries. The clinical profile was that of a young housewife (51.2%), married (72.4%), nulliparous (44.1%) with a pregnancy in the 3rd trimester. Symptoms were dominated by headache (53.5%) and diastolic blood pressure ≥110 mmHg (66.9%), with albuminuria greater than two crosses and hyperuricemia. Magnesium sulfate and clonidine were the most commonly prescribed anticonvulsant and antihypertensive drug, respectively. Cesarean section was performed in 53% of cases.
Maternal complications were noted in 57.5% of cases without death. However, the fetus took a heavy toll with 50.7% morbidity and 14% perinatal mortality.
Conclusions: Severe pre-eclampsia is responsible for heavy morbidity - perinatal mortality. Improving maternal and fetal prognosis will require compliance with treatment protocols and greater accessibility of care at all levels of the health pyramid.

Keywords: Severe pre-eclampsia, Prognosis, Treatment, Regional hospital center of Koudougou, Burkina Faso

INTRODUCTION

Along with severe bleeding, infections and illegal induced abortion, high blood pressure is one of the leading causes of maternal mortality. It is ranked third with an incrimination in 14% of maternal deaths.[1] In hypertensive syndromes associated with pregnancy, preeclampsia has an incidence and mortality that make it a major public health issue in developing countries.[2] In Africa, studies conducted on severe pre-eclampsia and eclampsia in Morocco and Benin have shown maternal

mortality of 1.6 to 6.8% and early neonatal mortality varying between 42 and 176 deaths per 1000 live births.[3]

In Burkina, studies report maternal mortality of 1.08 to 2.1% and early neonatal mortality varying between 57 and 270 deaths per 1000 live births.[4,5] Thus, we deemed it necessary to conduct a study in a regional hospital center to determine the epidemiological, clinical, therapeutic and prognostic aspects of severe pre-eclampsia in order to modestly contribute to improving management and prognosis.

METHODS

The study took place at the Gynecology-Obstetrics department of the regional hospital center (CHR) of Koudougou between January 1 and December 31, 2018 in Koudougou, capital of the province of Boulkiemdé with a total regional population of the center west is estimated at 1,598,159 inhabitants for the year 2018 (INSD 2016 projection).[6] This was a descriptive cross-sectional study with prospective data collection and concerned women admitted urgently to the gynecology-obstetrics department of CHR Koudougou for severe pre-eclampsia.

Inclusion criteria

Inclusion criteria for current study were ; all the women admitted to the delivery room and to hospitalization in the gynecology-obstetrics department of the Koudougou CHR during the study period and meeting the criteria for severe pre-eclampsia.

Exclusion criteria

Inclusion criterion for current study was; all women who presented with eclampsia in the service.

Data was collected using an individual sheet. We carried out an interview and a documentary review. The data sources come from medical records, referral and evacuation records, patient monitoring and treatment records, childbirth and hospitalization records, and operative report records. The data collected was entered using a microcomputer and analyzed with Sphinx Plus 2 version 5.1.0.2 and SPSS version 22 software. The anonymity and confidentiality of the data collected was respected. The results of the study were made available to stakeholders in the field of maternal and child health.

Statistical analysis

The several epidemiological and clinical variables were studied: age, socio-professional status, spouse's occupation, provenance, marital status, mode of admission, reasons for referral, medical history, gynecological and obstetrical history, gestational age, the number of fetuses, variables related to the clinical profile of the parturient, variables related to the circumstances of childbirth, variables related to the maternal and fetal prognosis

RESULTS

Total 5484 women were admitted and 4233 deliveries were performed with 127 cases of severe pre-eclampsia, or 2.3% of emergency admissions and 3% of deliveries in the gynecology-obstetrics department. The distribution of patients by month of admission is shown in (Figure 1). The average age is 26.75±6.6 years with extremes of 15 years and 42 years.
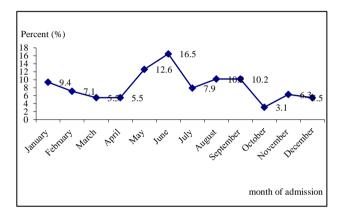

Figure 1: Distribution of patients by month of admission (n=127).

Antecedents

Some patients had an associated pathological history. Chronic hypertension was the antecedent found in 10.2% (13 cases), preeclampsia and diabetes 0.8% (1 case), the scarred uterus 4.7% (6 cases), appendectomy 1.6% (2 cases) and no history 79.5% (101 cases).

Admission data

We have 80.3% from other structures, of which 63 or 61.7% came from CSPS, 38.3% from medical centers. Hypertension was the cause in 80.3%. The diagnosis is suggested in the ante-partum department in 45.7%, in intrapartum in 50.4% and in immediate postpartum less than 3 hours in 3.9%. The functional signs were headache 53.5%, vertigo 21.3%, visual blurring 6.3% (8 cases) and abdominal pain in a bar in 4.7%. They were not found in 43.3%. The mean admission blood pressure was 164.4 ± 16.2 mmHg for SBP with extremes of 130 and 230 mmHg and 108.9±9.5 mmHg for DBP with extremes of 90 and 150 mmHg. Among our patients, 88 or 69.3% had SBP ≥160 mmHg and 85 or 66.9% had DBP ≥110 mmHg.

Ultrasound data

Fetal ultrasound was normal in 72.1% of cases and the main abnormalities encountered were MFIU, IUGR and acute fetal distress.

Table 1: Sociodemographic characteristics.

Parameters	N (%)
Maternal age (years)	
15-19	23 (18.1)
20-24	28 (22)
25-29	31 (24.4)
30-34	23 (18.1)
35-40	19 (15)
>40	3 (2.4)
Profession	
Student	15 (11.8)
College Student	12 (09.4)
Civil servant	22 (17.3)
Housewives	5 (51.2)
Informal sector	13 (10.3)
Marital status	
Married	92 (72.4)
Single	17 (13.4)
Cohabitation	18 (14.2)
Residence (%)	
Other cities in the health region	66.9
Urban	11.8
rural area	21.3
Number of prenatal consultations	
1-3	50 (41)
4-6	72 (59)

Table 2: Circumstances of admission to the service.

Admission circumstances (n=127)	N	%
Reason for admission		
HTA	102	80.3
Edemas	11	08.7
Headache	04	03.1
Dizziness	02	01.6
SFA	05	03.9
HRP	03	02.4
Anemia	03	02.4
DAP/CU	09	07.1
Dyspnea	01	00.8
Abdominal pain	01	00.8
Palpitations	01	00.8
RPM	05	03.9
Vicious presentation	04	03.1
Fetal macrosomia	03	02.4
MAP	02	01.6
Loss of consciousness	03	02.4
Oligoanuria	04	03.1

Job characteristics

On admission, they were in labor in 68.9% of cases and this labor was spontaneous in 75% of cases. The patients admitted in the immediate postpartum had given birth vaginally. As for pregnant and parturient women (122), a

conservative treatment of pregnancy was administered in 07 cases, i.e. 5.7%. In 115 cases the delivery was performed vaginally in 54 cases and by cesarean section in 61 cases.

Table 3: Distribution of patients based on data from the general examination on admission.

General admission exam (n=127)	N	%
Condition		
Well	117	92.2
Good enough	10	7.8
Bad	00	0.0
State of consciousness		
Claire	125	98.4
Obsessed	02	1.6
Conjunctiva		
Colorful	95	74.8
Little colored	25	19.7
Pale	07	5.5
Edemas		
No	56	44.1
IMO	70	55.1
Generalized	01	0.8

Table 4: Distribution of patients according to obstetric data on admission.

Obstetric data on admission (n=127)	N	%
Gesture		
Primigest	58	45.7
Paucigeste	44	34.6
Multigest	23	18.1
Large multigest	02	01.6
Parity		
Nulliparous	56	44.1
Primiparous	19	15.0
Pauciparous	30	23.6
Multiparous	21	16.5
Large multipare	01	00.8
Gestational age (AS)		
20-22	00	00.00
22-28	04	03.3
28-37	33	27.0
37-42	85	69.7
Pregnancy type		
Monofetal	108	88.5
Twin	14	11.5

Characteristics of the fetus at birth

The distribution of newborns according to their characteristics at birth is shown in (Table 8).

Table 5: Distribution of patients according to biological data on admission.

Biological data on admission (n=127)	Frequency	%
Platelets (/mm^3)		
<150 000	11	08.7
150 000-350 000	105	82.7
>350 000	11	08.7
Creatinine (µmol/l)		
<100	101	80.8
≥100	24	19.2
Uricemia (µmol/l) (N=45)		
<350	21	46.6
350-450	13	28.8
450-600	09	00.2
>600	02	04.4
Albuminuria		
2 croix	59	43.3
3 croix	62	48.8
4 croix	06	04.7
ASAT (UI/l) (N=76)		
0-35	55	72.4
35-70	16	21.1
>70	05	06.6
ALAT (UI/l) (N=76)		
0-40	68	89.5
40-80	03	03.9
>80	05	06.6
TP (%) (N=08)		
<70	03	37.5
70-100	05	62.5
>100	00	00.0

Table 6: Work characteristics.

Job characteristics	Frequency	%
Work in progress (N=122)		
No	38	31.1
Yes	84	68.9
Fashion (N=84)		
Spontaneous	63	75.0
Artificial triggering	21	25.0
Directed work	72	85.7

Treatment

All our patients benefited from antihypertensive and anticonvulsant treatment and general resuscitation measures with mainly volume expansion in 97.6% of cases. Anti-hemorrhagic treatment with etamsylate or tranxenamic acid was administered to 3 patients.

Maternal prognosis

Response to treatment; normalization of blood pressure was obtained in 66.9% of cases and 4.7% of our patients progressed to eclampsia despite preventive treatment of seizures.

Table 7: Characteristics of newborns and stillborns.

Characteristics (n=129)	N	%
Term		
Born at term	96	74.4
Pre-term	33	25.6
Weight (g)		
500-1500	07	05.4
1500-2500	45	34.8
2500-3500	70	54.3
3500-4000	06	04.8
≥4000 and more	01	00.7
Vitality at birth		
Yes	120	93.0
No	09	07.0

Maternal complications and deaths

In current study 57.5% of women presented with complications. Acute renal failure was found in 18.9% of them. We have not recorded any maternal deaths

Perinatal prognosis

The patients admitted after a recent childbirth (5 in number), the newborns were taken care of in the delivery room. A satisfactory assessment of their clinical condition on arrival allowed referral to pediatrics for advice, but all returned to the mother. Conservative treatment was offered in 7 cases due to prematurity and the absence of any biological sign requiring urgent extraction

Perinatal morbidity

No morbidity was noted in patients, i.e. 49.3%. Perinatal morbidity was low birth weight type in 45.2%, prematurity 24.3%, fetal distress 18.4% and neonatal jaundice 0.7%.

Fetal and neonatal mortality

Study involved 129 births, the 7 pregnancies being progressive at the end of the study period. We recorded 09 stillbirths out of 129 births, i.e. a stillbirth rate of 70 deaths per 1000 births.

The number of deaths in the early neonatal period was 09 out of 120 live births, resulting in an early neonatal mortality of 75 deaths per 1000 live births. Perinatal mortality was 140 deaths per 1000 births, or 18 fetuses and newborns died out of 129 births.

Table 8: Summary of support.

Data (n=127)	N	%
Intensive care		
Left lateral decubitus	127	100.0
Peripheral venous route	127	100.0
Volume expansion	124	97.6
Urinary catheterization	127	100.0
Oxygen	06	04.7
Guedel cannula	06	04.7
Red blood cell base	09	07.1
Fresh frozen plasma	03	02.4
Antihypertensives		
Nicardipine	06	04.7
Clonidine	121	95.3
α Methyl-dopa	127	100.0
Nifedipine	14	11.0
Enalapril	01	00.8
Amlodipine	10	07.9
Indapamide	01	00.8
Anticonvulsants		
Diazepam+magnesium sulfate	06	04.7
Magnesium sulfate	121	95.3
Anxiolytic		
No	118	92.9
Bromazepam	07	05.5
Hydroxyzine	02	01.6
Obstetrical treatment		
Conservative treatment	07	05.7
Non-conservative treatment	115	94.3
Delivery route		
High	61	53.0
Low	54	47.0
Pediatric transfer		
Yes	42	35.0
No	78	65.0

Table 9: Maternal complications (n=127).

Maternal complications	N	%
Any	54	42.5
HELLP syndrome	05	04.0
Acute renal failure	24	18.9
Coagulation disorder	03	2.4
Acute Lung Edema	01	00.8
Retention of placental debris	11	08.6
Retro Placental Hematoma	03	02.4
Anemia	20	15.7
Eclampsia	06	04.7

Table 10: Discharge method and length of hospitalization.

Discharge and duration of hospitalization (n=127)	N	%
Output mode		
Output without MV	85	66.9
Output with HTA	42	33.1
Cardiology consultation	127	100
Nephrology consultation	03	02.4
Duration of hospitalization (days)		
0-1	3	02.4
2-3	38	29.9
4-5	31	24.4
>5	55	43.3

DISCUSSION

Current study experienced limitations and constraints in relation to stockouts of certain reagents during hospitalization. Despite these limitations and constraints, we achieved these results which we compared to the data in the literature.

The frequency of severe preeclampsia was 3% of deliveries. Our rates are close to those obtained by Tchaou et al. in 2012 in Benin which in its series noted 4.7%.[3]

The mean age was 26.7 ± 6.9 years with extremes of 15 years and 42 years. The most represented age group was 25 to 29 years old and 40.1% of our patients were under 25 years old. Our results are similar to those of Tchaou et al in Benin in 2012 who respectively regained an average age of 26.4 years with 46.8% of patients under 25 years old.[3] This young age of our patients corroborates the data in the literature. Indeed, authors such as Richet and Beaufils, as well as Lamazou and Salama stipulate that severe pre-eclampsia has a maximum incidence before 25 years.[7,8] Housewives were the most represented with a rate of 51.2%.

Tchaou et al in Benin in 2012 found in its series a frequency markedly lower than ours with 31% of housewives.[3] Cultural and economic differences could explain this lack of similarity of results, coastal women seeking more autonomy and also having more possibilities of self-employment compared to women in landlocked countries like Burkina Faso. The young age of our study population and the extent of unemployment in our countries could be related to this high proportion of housewives in our series. Most of our population, 72.4%, was married. Our results are superior to those of Nirina et al who reported 38.7% of married women in their studies.[9] Despite the young age of our study population, the majority of them find themselves in the status of married women, probably due to early marriage encouraged by African tradition. 78.7% had an urban residence with 66.9% residing in the city of Koudougou.

This high proportion of city dwellers could be explained by the fact that our study setting is a regional referral hospital receiving patients from other health structures in the city. We found a predominance of severe preeclampsia during the month of June with 16.5% of cases. Nirina et al also obtained in their series an oscillating curve with a plateau, shifted in time compared to our peak, going from September to October.[9] Our results could be explained by the high number of deliveries in June. Humidity could also be implicated, thus corroborating the data in the literature which places humidity as a risk factor for preeclampsia.[10]

Pregnancy was monitored irregularly (01 to 03 ANC) in 41% and regularly in 59% of patients with a number of ANC consistent with WHO recommendations, which sets the minimum number at 04.[11] Indeed, the reproductive health awareness campaigns carried out by associative structures and the ministry of health could explain the improvement in the figures on pregnancy monitoring compared to previous years. We found a history of chronic arterial hypertension (10.2%) and a history of preeclampsia (0.8%). Hypertension was detected in 21.3% of cases during pregnancy follow-up. Our results are different from those of Tchaou et al. who noted in the history 3.9% of chronic arterial hypertension, 4.8% of preeclampsia.[3] Our results could be explained by the improvement of the equipment of health centers involved in reproductive health and the increase in the number of these centers allowing better monitoring of pregnancies and screening with early management of pathologies.

In current study, 85% of our patients were admitted for signs directly related to arterial hypertension (high blood pressure, headache, dizziness). Headache 53.5% and dizziness 21.3% of cases were the major functional signs. Our results could be explained by the fact that these signs testify to the aggravation of the hypertensive pathology consequently appearing at the stage of severe preeclampsia. We identified 55.1% of patients admitted with edema of the lower limbs (IMO) and 0.8% of cases with generalized edema, resulting in a total of 55.9% of edema cases.

Our results are lower than those of Tchaou et al which reported 62.1% of OMI versus 9.7% of generalized edema.[3] Indeed, edema is a classic but optional clinical sign of preeclampsia. Often physiological during pregnancy, edema, when associated with severe preeclampsia, is characterized by its sudden onset or rapid and significant increase, accompanied by rapid weight gain.[12]

High blood pressure is the first warning sign and appears to be a predictor of poor maternal and fetal prognosis if diastolic blood pressure is greater than or equal to 110 mmHg.[13] Tchaou et al on the other hand, they found higher frequencies, namely 90.3% for patients with SBP ≥160 mmHg and 98.1% for those with DBP ≥110 mmHg.[3]

Convulsions

In our series, 4.7% of patients presented their inaugural seizure on admission or during hospitalization. The difference in our results with those of the above authors could be explained by the predominance of the non-convulsive form of toxemia of pregnancy. Part of the explanation could also come from the fact that almost all of our patients benefited from treatment with magnesium sulfate during hospitalization.

Primigest and nulliparas are the most common in our series with 45.7% and 44.1% respectively. Our results are similar to those of Tchaou et al who found mostly nulliparas in their studies with 40.8%.[3] This difference is also noted in comparison with the results of Nirina et al who found multiparas to be the most exposed group, representing 53.7% of their patients.[9] Poor recognition of paternal antigens by the maternal organism in nulliparas, thus promoting poor tolerance of pregnancy, could explain the high proportion of these in our study. Our results corroborate the data in the literature which cites nulliparity as a factor favoring pre-eclampsia.[13]

The most represented gestational age group was that of 37 WA (completed) to 42 WA (not completed) with 69.7% of patients. Our results are close to those of Chaoui et al who identified 80.83% of patients with a gestational age exceeding 36 weeks.[14] Our results support the inflammatory hypothesis which states that the inflammatory process, responsible for pre-eclampsia when exaggerated, peaks in the third trimester of pregnancy.[15,16]

Biological data

Albuminuria; in our series, albuminuria was massive (greater than or equal to 3 crosses) in 48.8% of cases. Our results support the importance of albuminuria in women with severe preeclampsia. It constitutes an element of gravity when it is greater than or equal to three crosses. The existence of massive proteinuria correlates with the severity of renal impairment.[17-19]

Creatinine and azotemia ; a mean creatinine level of 81.7±36.9 µmol/l with extremes of 16.50 and 315 µmol/l. We found 19.2% of cases of hyper-creatinine and hyper-azotemia in 37% of cases. Hyperazotemia and hyper creatinine levels indicate kidney damage. They are most often a reflection of functional renal failure in severe pre-eclampsia. This could be explained by a decrease in filtration and plasma flow following true or relative hypovolaemia.[17,20,21]

Uricemia; impaired tubular function results in decreased clearance of uric acid responsible for hyper uricemia. An assay of the blood level of uric acid in our patients revealed a mean uricemia of 341.9±145.4 µmol/l with extremes of 104.50 and 710 µmol/l. This hyper-uricemia, found in our patients with a level ≥ 350 µmol/l (34.4%),

indicates renal tubular damage and is correlated with placental ischemia as well as hypovolemiaand requires fetal extraction of 'emergency.[20]

Liver function: In our series we identified 27.7% of high ASAT rate (AST >35 IU/l) and 6.6% of ASAT >105 IU/l (AST >03 times normal). Elevation of hepatic transaminases is one of the biological signs of severe preeclampsia and is part of Hellp syndrome when there is also severe hemolysis and thrombocytopenia.[22,23]

Circumstances of childbirth

Mode of admission; In our study 66.9% of the women were evacuated. Tchaou et al reported rates similar to ours, namely 66.9% evacuations.[3] Evacuations help to reduce maternal-fetal morbidity and mortality linked to this pathology.

Job characteristics; Labor was spontaneous for 75% of them. The presence of labor could have an impact on the prognosis, especially fetal.

Therapeutic data

Resuscitation; All our patients benefited from general resuscitation measures with volume expansion (97.6%), revival of diuresis with furosemide (0.8%) of cases, oxygen therapy (4.7%), an intake of blood derivatives, in particular red blood cells (7.1%) and fresh frozen plasma (3.9%). Tchaou et al. noted higher rates than ours with 21.1% of cases having received a blood derivative.[3]

Antihypertensive treatment; The use of antihypertensive drugs is justified in view of the major risk of stroke, especially when the blood pressure levels are very high. However, care must be taken to achieve a gradual reduction in blood pressure levels which are harmful to both the fetus and the mother.[7,8,24] In our series, 100% of the patients benefited from an antihypertensive treatment and is superior to that found by Tchaou et al with 93.20%.[3]

The antihypertensive treatment included injectable clonidine (95.3%), α methyl-dopa tablet (100%) and injectable nicardipine (4.7%), which are secondarily combined with each other and/or with other antihypertensive drugs. namely nifedipine tablet, amlodipine tablet and enalapril tablet. Our results are different from those of other authors. Indeed, Tchaou et al. found clonidine in 67.9%, nicardipine in 25.2% of cases.[3] Our rates could be explained by the fact that treatment protocols are different depending on the country and the availability of antihypertensive drugs. The treatment protocol at the CHR in Koudougou includes a therapeutic regimen consisting of injectable clonidine one ampoule every 4 hours and injectable nicardipine 2 ml every 30 minutes.

Anticonvulsants; in our series, 100% of patients benefited from magnesium sulfate. Getaneh and Kumbi in Ethiopia also administered in 100% of cases.[25] Despite the preventive treatment instituted, 4.7% of patients presented seizures while Getaneh and Kumbi in Ethiopia reported no cases of seizures.[25] Some authors are unanimous on the efficacy of magnesium sulfate in the prevention and onset of seizures.[20,26] Our cases of eclampsia despite preventive treatment could be explained by non-compliance with treatment or by rupture of the product at the time of administration.

Obstetrical treatment; The delivery was by the upper route in 53% of cases. Since the fetal and maternal prognosis is threatened in the majority of our patients and uterine evacuation being the only curative treatment for severe pre-eclampsia, cesarean section has been most often used for maternal and/or fetal rescue.[13] The vaginal route option is performed if maternal, fetal, and local conditions permit.

Maternal prognosis

Response to treatment; the response to treatment showed normalization of blood pressure at the outlet (66.9%) and arrest of seizures in 100% of eclampsic patients. The goal of treatment was to normalize blood pressure before discharge and all of our births benefited from a follow-up appointment with the cardiologist.

Maternal morbidity; we identified 57.5% of women with complications. The main complications were renal failure (18.9%), anemia (14.9%) Hellp syndrome (13.4%) and retro-placental hematoma (10.3%). Our results are superior to that of Tchaou et al. which identified 7.5% of complicated cases with mainly eclampsia (30%) and similar for renal failure (20%).[3] The delay in consultation in health centers could explain this high rate because most of our patients were complicated cases on admission.

Maternal mortality; during the study, we did not record any maternal deaths. The method of recruiting cases on admission justifies our results. Also, our cases of eclampsia during hospitalization benefited from early management with a team of specialists.

Perinatal prognosis

Perinatal morbidity; we identified 49.3% of cases of perinatal morbidity. Complications were dominated by low birth weight (38.2%), prematurity (24.3%), acute fetal distress (11.8%) and neonatal distress (6.6%). This high morbidity rate is linked to the fact that in severe preeclampsia follows prematurity.[3,13]

Fetal and neonatal mortality; Stillbirth was 70 deaths per 1000 births, early neonatal mortality 75 deaths per 1000 live births (7.5%) and perinatal mortality 140 deaths per 1000 births (14%). Our rates are lower than those of

some authors. Tchaou et al reported 25.4% in utero fetal death and 17.6% early neonatal death.[3] Also, Kumari et al reported higher rates than ours at 13% intrauterine death, 10% early neonatal mortality and 23% perinatal mortality.[27] The fetal and neonatal mortalities, relatively low compared to those of the other studies, could be explained by the fact that our patients benefited from a delivery in a hospital environment with neonatal resuscitation and multidisciplinary care available.

CONCLUSION

Severe preeclampsia is responsible for heavy perinatal morbidity and mortality at the Koudougou CHR. The response to protocol treatment showed normalization of blood pressure at discharge. The mean age was 26.7±6.9 years, 10.2% history of chronic hypertension, 0.8% history of preeclampsia, and hypertension was discovered during pregnancy in 21.3%. Improving maternal and fetal prognosis will require compliance with treatment protocols at all levels of the health pyramid.

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