RESEARCH ARTICLE

Acute Kidney Failure during Preeclampsia at Parakou University Hospital in Benin in 2019: Diagnostic and Therapeutic Aspects

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Abstract

Background: Acute renal injury during preeclampsia is a relatively common complication in intensive care and grafted with significant morbidity and mortality.

Objective: Describe the diagnostic and therapeutic aspects of acute kidney injury during preeclampsia at Parakou University Hospital center in Benin in 2019.

Patients and Method: Cross-sectional descriptive and analytical study with prospective data collection carried out from March 18th-August 18th, 2019 (5 months) in the intensive care unit and the maternity ward. Women with preeclampsia were included. Acute renal failure, as dependent variable was diagnosed and classified according to the criteria of Kidney Disease Improving Global Outcomes (KDIGO).

Results: A total of 88 patients were included in the study among whom, 39 developed an acute kidney failure (44.32%). The average age was 26.42 ± 6.23 years. The majority of them (44.32%) were at their first pregnancy. The pregnancy had not been followed in 61.54% of cases. The majority of patients with an acute kidney failure were classified as stage 1(46.15%). The patients admitted to the intensive care unit were at stages 2 and 3 for acute kidney failure. The clinical picture was complicated by: eclampsia in 38.46% of case, a HELLP syndrome in10.26% of cases and an acute pulmonary edema in 12.82% of cases. Medical treatment was based on hydro-electrolytic rebalancing, magnesium sulphate, antihypertensive and the transfusion of red blood cells and fresh frozen plasma. Cesarean section was performed for 76.92% of cases. The outcome was positive for 71.79% of patients.

Conclusion: Preeclampsia is a risk factor for acute kidney injury and is a poor maternal prognosis factor.

Keywords: Acute kidney failure; Preeclampsia; Prognosis; Parakou

Introduction

According to the World Health Organization (WHO), Pregnancy is defined as a period of about 9 months during which a woman carries the embryo, and then the fetus which grows in her womb and, for most women, is a time of great happiness and fullness [1]. Unfortunately, during pregnancy, the woman and the fetus face various health risks and many of these conditions expose them to morbid risks during pregnancy, childbirth and in the days after the postpartum period. Among them, we can mention the toxemia of pregnancy called preeclampsia [2]. Preeclampsia is an expression of kidney damage. It involves hypertension blood pressure, edema and proteinuria [3].

This kidney damage could progress to Acute Renal Failure (AKF) if severe preeclampsia [4]. This is always a circumstance that worsens the maternal prognosis [5,6]. The AKF is a real public health problem due to its burden and its severity, especially in pregnant women [7,8].

Since the 1960's, the incidence of pregnancy-induced AKF worldwide has declined, from one case of AKF in 3,000 pregnancies to one in 20,000 pregnancies [9,10]. In the developed countries like Canada, despite an increase from 1.66 to 2.68 AKF cases for 10000 pregnancies between 2003 and 2010, the incidence remains low [11]. In France now-a-days it represents only 2-3% of AKF compared to 20-40% of cases in the 1950's and 1960's [12].

In developing countries, however, the incidence remains high. It's the case from India in 2010 where 20% of AKF cases were pregnancy-related [13]. In Morocco the incidence was 66 cases per 10,000 pregnancies in 2013 [14]. This bearing is still highest in sub-Saharan Africa where in 2006 in Senegal, 50% of AKF cases among adults were due to pregnancy [7]. In the literature, preeclampsia appears to be the first cause of these AKF during pregnancy. In Benin, it is a frequent complication evaluated at 4.8% in Porto-Novo in 2017 by Tshabu-aguemon C, et al. but the AKF only represented 0.61% of complications [15]. In Parakou, approximately 11.73% of pregnant women developed an AKF in 2016 according to Ahoui S, et al. and proteinuria was significantly associated with occurrence of this AKF [7]. Faced with this high risk of occurrence of an AKF during the preeclampsia, we initiated this work which objective was to describe the diagnostic and therapeutic aspects of AKF in preeclampsia in Parakou University Hospital center of Benin.

Patients and Method

Study framework

The study took place in the intensive care unit and the Maternity Department of Parakou University Hospital center. It is a multipurpose resuscitation unit working 24 hours a day with 11 beds. Maternity ward is a multi-purpose care unit (gynecological and prenatal consultations, childbirth, various surgeries, vaccination unit, family planning and various advices units).

Study method

It was a Cross-sectional descriptive and analytical study with prospective data collection, which took place over a period of five months from March 18th-August 18th, 2019.

The study population consisted of all admitted pregnant women or delivered women for preeclampsia in the maternity ward and for all delivered women admitted for preeclampsia in the maternity ward and transferred to intensive care unit.

Inclusion criteria: It was included in the study any patient admitted for preeclampsia (pregnant ≥ 20 WA or postpartum < 42 days) with PAS (systolic blood pressure) ≥ 140 mmHg and / or PAD (diastolic blood pressure) ≥ 90 mmHg; with a proteinuria ≥ 2 crosses; with or without edema of the lower limbs and having given their free and informed consent or that of the family to participate in the study.

Non-inclusion criteria: It were not included the patients who came with added preeclampsia and other vasculo-renal syndromes.

Exclusion criteria: It was excluded patients with a history of kidney diseases, diabetes and patients who did not have a kidney exam during their hospitalization.

Sampling

We carried out an exhaustive recruitment of patients admitted for preeclampsia and meeting our inclusion criteria. The variables studied were classified in two groups.

Dependent variable: Represented by acute renal failure which has been diagnosed and classified according to the Kidney Disease Improving Global Outcomes (KDIGO) criteria of 2012 revised in 2017 [16,17]. A single criterion is sufficient to establish the stage of severity. The Classification of acute renal injury according to KDIGO is presented in table 1. Renal injury in preeclampsia is defined by level of serum creatinine exceeding 10 mg.L^1 [18].

Independent variables: Grouped together in socio-demographic, clinical, paraclinical, therapeutic, progressive and prognostic.

Table 1: Classification of acute kidney failure according to KDIGO.

Stage	Serum creatinine	Diuresis
1.	Increase 1.5-1.9 times baseline OR Increase ≥ 3 mg/L^{-1}	< 0.5 ml/kg/h >6-12 h
2.	Increase 2.0-2.9 times baseline	< 0.5 ml/kg/h >12-24 h
3.	Increase 3 times baseline, OR Increase ≥ 40 mg/ L^{-1}, OR Initiation of renal replacement therapy, OR For patients <18: Glomerular filtration rate <35 ml/min/1,73 m²	0.3 ml/kg/h >24 h, OR Anuria >12 h

Socio demographic data

Age, level of education, profession, married or not, place of residence, way of life (supplementation of salt at the table, fruits and vegetables consumption (at least 5 fruits and vegetables per day)).

Clinical data

Mode of admission (referred or direct admission) and reason for reference, the previous treatment; obstetrician gynecologist history (preeclampsia/eclampsia, pregnancy, parity, period between two pregnancies called inter reproductive space (<2 years or ≥ 2 years), number of prenatal consultations (ANC), place childbirth, term of pregnancy; general signs (general condition (good or bad), arterial hypertension, edema of the lower limbs, proteinuria, jaundice, hemoglobinuria; physical signs: Glasgow Coma Score (GCS), diuresis (oliguria, anuria or normal), haemorrhages, convulsive fits, crackling rales, hydrops.

Paraclinical data

Hemoglobin level (anemia if <10 g.dL^1); platelets (if low and <150 µL called Thrombocytopenia); transaminases (elevated if >twice normal); blood ionogram, kidney blood test (serum creatinine), stage of AKF (stage 1, 2 or 3).

Therapeutic data

Medical treatment (oxygen therapy, magnesium sulphate protocol, antihypertensive drugs, diuretics, anticonvulsants, analgesics, transfusion.

Obstetric treatment

Caesarean section or vaginal birth.

Collection of Data

Data collection method and tool

It was done through an individual interview with each patient during which an individual file was completed with in addition the referral sheets, patient diaries, medical records and operative reports. An informed consent form has been completed and signed by patients or by a representative of the family. The study was conducted after obtaining authorization from local ethics and biomedical research committee of the University of Parakou.

Collection process

Each patient received at entry (D1) a blood sample for determination of: kidney blood test (creatininemia, azotemia), blood count (CBC), blood ionogram (sodium, potassium, and chloride), aspartate aminotransaminase (ASAT) and alanine aminotransferase (ALAT).

Table 2: Distribution of patients admitted for preeclampsia according to the clinical data (N=88).

Variables	Number	%
General condition		
Good	58	65.91
Bad	30	34.09
Systolic blood pressure <160	18	20.45
Systolic blood pressure ≥ 160	70	79.55
Diastolic blood pressure < 110	37	42.04
Diastolic blood pressure ≥ 110	51	57.96
Feet edema		
Yes	72	81.82
No	16	18.18
Jaundice		
Yes	9	10.23
No	79	89.77
Proteinuria		
++	14	15.91
+++	25	28.41
++++	49	55.68
Hemoglobinuria		
Negative	78	88.64
Non significative	6	6.82
Significative	4	4.54
Physical signs		
Convulsive fit	24	27.27
Hemorrhage	6	6.82
Crackling groams	6	6.82
Hydrops	1	1.14
motor deficit	1	1.14
Coma with GSC ≥13	5	16.67
Coma with GSC [9-12]	15	50.00
Coma with GSC ≤ 8	10	33.33

1. Those with serum creatinine < 10 mg/dL were considered to have no AKF and classified in Non-Cases.

2. Those with a serum creatinine ≥ 10 mg/dL benefited from a second renal assessment on D2 of the first assessment with the results found:

- An increase in serum creatinine meeting the definition of KDIGO and were included as Case;

- An increase in creatinemia but which did not meet the definition of KDIGO or a decrease in the latter and were considered to have no AKF and classified in Non-Cases.

The AKF was monitored by measuring the serum creatinine on the 7th day, 14th day and at one (1) month and the criterion of good recovery was based on a return of lower serum creatinine to the patient's baseline. Transaminases and CBC were repeated according to initial disruption.

Data processing and analysis

The data were coded and analyzed using EPI INFO software. The data have been captured and analyzed using the Epi Info's software versions 3.5.1 and 7.1.1.14 from Center of Disease Control (CDC) respectively. The data analysis was carried out in two parts:

1) A descriptive section which consisted of calculating the percentages for the qualitative variables and means and standard deviation for quantitative variables.

2) An analytical component which consisted in measuring the association between the dependent variable and the independent variables. The measure of association used was the Odd ratio (OR). The tests Chi-square, Fischer, or Yates-corrected Chi-square statistics were used as appropriate to determine the degree of significance of the association (p-value). The materiality threshold was set at 0.05.

Results

Sociodemographic data of patients admitted for preeclampsia

During the study period, 1204 patients were admitted to the Gyneco-obstetrics department of Parakou University Hospital center. Among them, 104 (8.64%) developed preeclampsia and according to our inclusion criteria we collected 88 cases (84.62%). The average age was 26.42 ± 6.23 years with extremes of 16 and 45 years. The slice of age most represented is that of 20 to 30 years or 51.14% (n=45). Fifty-seven female patients were out of school (64.77%) compared to 31 female patients enrolled (35.23%). The self-employed women were 42 (47.73%), housewives 32 (36.36%), pupils/students 8 (9.09%) and 6 patients (6.82%) were civil servants. The women married represented 81.82% (n=72) of our population and unmarried 18.18% (n =16). Sixty-eight patients (77.27%) lived in urban areas compared to 22.73% (n=20) in rural area. Eighty-one patients (92.05%) were taking salt supplementation at the table and 69 patients (78.41%) regularly consumed fruits and vegetables.

Clinical and paraclinical data of patients admitted for preeclampsia

Clinical data: Fifty-eight patients (65.91%) had been referred from another health center against 30 (34.09%) admitted directly. Hypertension in pregnancy was the main reason in 53.33% of cases, followed by eclampsia (20%), altered state of consciousness (20%), oliguria and preeclampsia represented respectively 10% of the reasons for admission and anuria 6.67%. Seventy-eight patients (88.64%) were still pregnant compared to 10 (11.36%) postpartum arrivals. Among the 78 patients: 10 had a term <32 WA, 26 patients had a term between 32 and 36 WA and 42 patients a term >37 WA. The diuresis was normal for 69.32% of patients (n=61), there was oliguria for 21.59% of them (n=19) and anuria for 9.09% of cases (n=8). Several gyneco-obstetrical histories were noted: preeclampsia 7 cases (7.95%), eclampsia 2 cases (2.27%). Concerning the gesture we have identified 39 "primigestes (women at first pregnancy)" (44.32%), 17 "paucigestes (women at 2nd or 3rd pregnancy)" (19.32%), 32 "multigestes (women at 4th or more pregnancy)" (36.36%). As for parity we have collected 37 no parity (42.05%), 14 first-time (15;91%), 19 pauciparous (2nd or 3rd time parity) (21.59%) and 18 multiparous (4th or more time parity) (20.45%). The intergenesic space (period between two pregnancies) was appreciated and we have noted that it was <2 years in 9 cases (21.95%) and ≥ 2 years 32 (78.05%). As for the number of antenatal consultations (ANC) performed within the series, it was <4 times in 64 cases (72.73%) and ≥ 4 times in 24 patients (27.27%). Table 2 shows the distribution of admitted patients for preeclampsia based on clinical data (n=88).

Paraclinical data: Table 3 shows the distribution of patients admitted for preeclampsia according to paraclinical data.

Table 3: Distribution of patients admitted for preeclampsia according to the paraclinical data.

Variables	Averages	Extremes	Values	Numbers / %
Creatinine blood level mg/L	108,85 ± 8,6	6,1 et 102,7	≥ 10 mg/L	77/87,5
Urea blood level g/L	0,26 ± 0,03	0,1 et 1,7	<10 mg/L	11/12,5
Haemoglobin g/dL	10,28 ± 1,05	4 et 13,3	Anemia	31/56,36
Platelets G/L	164,5 ± 20,86	35 et 428	Good	24/43,64
			Lack of platelet	25/89,29
			Normal	3/10,71
Transaminases				
ASAT : Ui/L	136,81 ± 15,1	8 et 700	High	22/48,89
ALAT : Ui/L	99,58 ±14,24	13 et 634	Normal	23/51,11

Table 4: Distribution of patients with AKI according to clinical data.

Variables	Effective	%
General condition		
Good	19	48,72
Bad	20	51,28
Systolic blood pressure		
< 160	8	20,51
≥ 160	31	79,49
Diastolic blood pressure		
< 110	14	35,90
≥ 110	25	64,10
Feet edema		
Yes	31	79,49
No	8	20,51
Proteinuria		
++	5	12,82
+++	11	28,21
++++	23	58,97
Haemoglobinuria		
Negative	29	74,36
Non significative	6	15,38
Significative	4	10,26
Convulsive fit	15	38,46
GCS		
≤ 8	8	40,00
9-12	7	35,00
≥ 13	5	25,00
Crackling groams	5	12,82
Hemorrhage	2	5,13

According to the KDIGO guidelines of 2012 and revised in 2017, among the 77 patients who had plasma creatinine ≥10 mg/L, we have, after achievement of plasma creatinine at 48 hours of hospitalization, found about 39 patients with an acute kidney failure (AKF).

Sociodemographic, clinical and paraclinical data of patients admitted for affected preeclampsia (AKI)

Sociodemographic data: In our sample, 30 patients (76.92%) were referred from another health *versus* 9 (23.08%) who were admitted directly to the maternity ward. Among them, 19 (48.71%) had received a previous treatment (antihypertensive and/or anticonvulsant) and 19 others were on herbal medicine. Twenty-four patients (61.54%) had done less than 4 prenatal consultations (ANC), and 15 (38.46%) had performed more than 4 ANC. The average of ANC performed was 2.53 ± 2 with extremes of 0 and 8. Regarding pregnancy, the primigestes were 19 (48.72%), paucigestes 5 (12.82%) and multigestes 15 (38.46%). Regarding parity, in our sample, 18 patients (46.15%) were nulliparous, 7 (17.95%) primiparous, 3 (7.69%) pauciparous and 11 (28.21%) multiparous. Thirty-three patients (84.62%) had their pregnancy in progress against 6 patients (15.38%) come in postpartum. Among the 33 patients with pregnancy in progress, the average gestational age was 37.10 ± 6.68 WA with extremes of 22 and 45 weeks of amenorrhea. So seven patients (21.21%) had a gestational age <32 WA, 6 patients (18.18%) had a gestational between 32-36 and 20 patients (60.61%) were beyond 37 WA.

Clinical data

1) Functional, general and physical signs

Dyspnea was present in 5 patients (12.82%) and absent in 87.18% of cases (n=34). Thirteen patients (33.33%) had oliguria, 8 (20.51%) had anuria and 18 (46.16%) had normal urine output. The average systolic blood pressure was 183.95 ± 26.1 mmHg with extremes of 130 and 263 mmHg and diastolic blood pressure average was 113.46 ± 23.03 with extremes of 58 and 150 mmHg. The table 4 shows the distribution of patients with AKI according to the data clinics.

2) Laboratory data of patients with AKI

Table 5 shows the averages and extremes of the laboratory tests of the patients with acute kidney injury

The distribution of patients according to the stage of ARI (KDIGO 2012) is recorded in table 6 (n=39).

Therapeutic data for patients with acute renal failure: Among the patients with an AKF, 25 (64.10%) were treated in the maternity ward against 14 (35.90) transferred to intensive care unit. The medical treatment consisted on a hydro-electrolytic rebalancing or even a vascular filling based on crystalloids (Salted serum 0.9%, Serum glucose 5%, and Ringer lactate) associated with bicarbonate serum in the case of metabolic acidosis and hyperkalemia. All patients received oxygen therapy using glasses. Magnesium sulfate was administered to 24 patients (74.36%). The antihypertensive drugs were used in 79.49% of cases (n=31). The drugs used were: Nicardipine; 29 patients (93.54%), Clonidine; one patient (3.23%) and combination Clonidine + Nicardipine; one patient (3.23%). Furosemide has been used in 6 cases (15.38%). The other therapies consisted of transfusions (Red blood cell; 7 cases and Fresh frozen plasma 2 cases).

In our study, 30 patients (76.92%) gave birth by caesarean compared to 9 (23.08%) by vaginal birth. The indication for dialysis was given in the 8 patients with anuria and in one patient with an acute pulmonary edema refractory to diuretics but it was not performed in any case for financial reasons.

Table 5: Representation of the means and extremes of biological blood tests of patients with AKI.

Variables	Medium	Extreme
Creatinine Level (mg/L)		
H 0	164 ± 10,27	10.1 et 102.7
H 48	22.93 ± 11.83	13.68 et 99.50
Urea level (g/L)	0.38 ± 0.34	0.1 et 1.7
Haemoglobin (g/dL)	10.28 ± 1.05	4 et 13.3
Platelets (G/L)	164,5 ± 20.86	35 et 494
Na⁺(mEq/L)	136 ± 2.08	135 et 140
K⁺ (mEq/L)	3.9 ± 0.52	3.42 et 6.96
Cl⁻ (mEq/L)	107 ± 2.65	104 et 109
ASAT (Ui/L)	136.81 ± 15.1	8 et 700
ALAT (Ui/L)	99.58 ± 14.24	13 et 634

Table 6: Distribution of patients with ARI according to stage of AKI.

Stage	Number	%
1	18	46.15
2	12	30.77
3	9	23.08

Progressive and prognosis of patients with AKI: In our study, out of 88 patients with preeclampsia we recorded 11 deaths or a percentage of 12.5%. The 11 deceased patients were all affected of AKF. The average length of hospitalization was 7.26 ± 6.30 days with extremes of 1 and 28 days. The outcome was favorable in 28 of the patients with AKF (71.79%) with total recovery of renal function in varying times. The clinical picture is complicated by eclampsia in 38.46% of cases, HELLP syndrome in 10.26% of patients and acute pulmonary edema (APO) in 12.82% of patients.

Discussion

Clinical and paraclinical data

The study allowed us to note that most patients were referred from centers peripheral health (76.92%). This finding is identical to that made by Tondi ZMM, et al. who reported that 71.9% of the patients in their series had been referred [19]. This high rate references found both in our study and in the international literature shows the inadequacy of the implementation of a decision tree in our maternity hospitals which explains the references of pregnant women at the stage of complications, a situation that could be avoided.

High blood pressure in pregnancy was the main reason for referral (53.33%) in our series followed by eclampsia (20%), altered state of consciousness (20%), oliguria (10.00%) and anuria (6.67%). On the other hand, in the study by Missamou A, et al. the alteration of consciousness was the main reason for admission (62%) [20]. Nulliparous (46.15%) were the most affected in our study unlike the studies by Arora N, et al. in India, Ansari MR, et al. in Pakistan and Ngomas J, et al. where the multiparous were the most reached with 54.4%, 52% and 57% respectively [21-23]. Tondi ZMM, et al. reported in their study that 53.1% of patients were first-time mothers [19]. This percentage diversity could be explained by the fact that our study concerned only cases of preeclampsia and according to data from the literature, nulliparity is a risk factor [24] while other studies all involved obstetric AKF cases.

According to WHO recommendations, at least 4 antenatal consultations are recommended for the proper follow-up of a normal pregnancy or at best one per month [25]. In our study, the pregnancy was not monitored (absence of prenatal consultations) or had been poorly monitored (less than 4 antenatal consultations) in more than half of the patients (61.54%). This observation has also been made by others including Hachim K, et al. (96%) in 2001 in Casablanca [26]. Ngomas J, et al. (64.5%), Arora N, et al. (61.4%) [21,23]. This finding could be explained by the fact that not only the majority of patients were not educated (no culture of pregnancy monitoring) but also they were self-employed with low income monthly (47.73%). Yet the antenatal/prenatal consultation (ANC) offers the opportunity for patients to do check-ups to detect preeclampsia early as well as the AKF. However it did not exist in our study a statistically significant association between the number of ANC and the occurrence of an AKF.

Almost 3/4 of the patients in our series (79.49%) had edema. This result is higher than those reported by Keita M, et al. in 2018 in Mali (53.3%) and Tondi ZMM, et al. (37.5%) [27,19]. These different findings confirm the inconsistency of edemas during preeclampsia.

On admission, the average SBP was 183.95 ± 26.1 mmHg and the average DBP 113.46 ± 23.03 mmHg. High blood pressure was severe in 79.49% of patients, which is corroborated by the data in the literature according to which it is the patients with severe preeclampsia which have more AKF [11,28].

Oliguria was objectified in 33.33% of patients. Similar rates had been reported by other authors including Tondi ZMM, et al. (40.5%) and Ahoui S, et al. (44.71%) [19,7]. For Kabbali N, et al. more than half of the patients were in oliguria (57%) [29]. In the series by Hachim K, et al., 71% of patients were in oliguria [26]. That in pregnant and postpartum women, our results are similar to those data in the literature that oliguria is the main functional sign of AKI.

The average serum creatinine in our study was 164 ± 10.27 mg/L. It is higher than those of Kabbali N, et al. (48.41 ± 37.32 mg/L) and Hachim K (95.85 ± 57.36 mg/L) but lower than that reported by Tondi ZMM, et al. (352 ± 100 mg/L) [29,26,19]. Creatinine, substance nitrogen comes from the breakdown of creatine, especially present in the muscles. It's an indicator of kidney condition. The higher its value, the more it reflects the degree of impairment of kidney function. Thus in our study, the high value of the average creatinemia reflects the significant degree of renal impairment in our patients.

In our series we have classified the patients according to the practical recommendations of KDIGO 2012 unlike the other authors who mostly used Risk Injury Failure Loss End-stage (RIFLE). Nevertheless there is a correspondence which can be made. KDIGO stages 1, 2 and 3 will correspond respectively to R, I and F of RIFLE. In our series, the patients presented more AKF at stage 1 (46.15%) and this finding is similar to that reported by Ngomas J, et al. (49.2%: R) [23]. Missamou A, et al. brought in a percentage 85.19% of patients classified as stage 3 according to the AKF classification [20]. The classification of KDIGO was set up because it synthesizes the previous classification which is part of the RIFLE. She avoids considering the most severe form of an Acute Kidney Failure (AKF) which is fundamental since it is now accepted that minor modifications on renal function have a significant impact on the outcome of patients with short and long term.

Therapeutic data

According to data in the literature, the mechanism underlying hypertension is dominated by vasoconstriction. In our series, 79.49% of our patients received antihypertensive treatment including a

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5

vasodilator. A similar finding has been reported by Tondi ZMM, et al. (84.37%) [19]. In response to the physiopathological mechanism which explains this HTA, in our study, Nicardipine was the most used molecule (93.54%) (Recommended as a first-line treatment over others, especially antihypertensive central drugs. This explains its majority use in our series despite its high cost). If hypertension persists despite treatment, we combine other antihypertensive drugs such as centrally acting antihypertensives (3.23%) and sedatives. In our series almost all of our patients benefited from hydration with crystalloids (87.18%) which is similar to Tondi ZMM, et al. result (90.63%) and superior to Kabbali N, et al. (52%) [19,29]. This treatment is justified by the fact that although the woman is edematous during PE, it is vascular empty which is responsible for the occurrence of functional AKF notified above. Thus the management of an AKF during pregnancy is going well and well by vascular filling in order to perfuse the kidney, as in the population in general. In our series, diuretics (Furosemide) were used in only 6 patients (15.38%). Among these 6 patients, 5 had presented acute pulmonary edema, hence the need to use diuretics to ensure water depletion in the lung parenchyma. The only remaining one who received secondary diuretic treatment is a case of AKF with anuria that benefited from an initial vascular filling during 48 hours without success and given the installation of a hypervolemia table, we have resorted to Furosemide to force diuresis.

Almost 3/4 of the patients (74.36%) benefited from treatment with magnesium sulphate. Tondi ZMM, et al. had found roughly the same percentage (68.75%) [19]. The use of magnesium sulphate for the most part in our study is based on data from the literature. In effect during the preeclampsia, there is cerebral vasoconstriction in the brain posterior which causes (depending on the degree) oxygen weaning resulting in the onset of seizures. Magnesium sulfate by its mode of action (blocking of voltage-dependent calcium channels and sodium channels at the level of excitable cells) causes a vasodilator effect on small blood vessels allowing intracerebral reperfusion. Therefore, it is the drug of choice in the treatment and prevention of eclampsia. But during the AKF its use is limited or even prohibited by some authors. Before the time required for making the diagnosis of an AKF according to KDIGO, it was used in the vast majority of patients in our sample without knowledge of their kidney condition.

In our series, 17.95% of patients received a blood transfusion. This rate is very low compared to that reported by Keita M, et al. (37.7%), Tondi ZMM, et al. (50%) and Kabbali N, et al. (59%) [27,19,29]. During pregnancy the hemoglobin level drops due to physiological hemodilution. Cases of severe anemia which required a blood transfusion in our study could be attributed to the management of a HELLP syndrome.

Almost three quarters of our patients (76.92%) gave birth by Caesarean section. Kabbali N, et al. reported a lower rate (68%) and Tondi ZMM, et al. a higher rate (90.63%) [29,19]. In contrast, in Ansari MR, et al. the majority of patients gave birth vaginally (71%) [22]. The relatively high rate of caesarean section in our study could be explained by several settings. First, the patients were referred (76.92%) and in an emergency table that required immediate intake in the operating theatre for a cesarean. The free of charge has contributed to faster and more effective action on the part of the nursing staff; secondly in case of AKF, the expulsion of the fetus must be done quickly to limit progression of kidney injury [9].

The indication for dialysis was made in 23.08% of cases (n=9). For some financial reasons and lack of a universal health insurance program, none of them was able to benefit from this dialysis. This observation was made by Tondi ZMM, et al. who for the same reasons

only one patient was able to be dialysed out of the 8 in her series [19]. With a percentage higher but still low, in their series, Missamou A, et al. and Ngomas J, et al. could dialyze respectively 4% and 4.9% of patients who were in need [20,23]. This low rate of dialysis is the reflection of a health system in our countries where social security is absent and health care costs are largely covered by the households themselves. The high cost of dialysis therefore becomes an obstacle to its implementation. On the other hand, for Zelmat S, et al. 25% of patients could be dialyzed [30]. In Benin, a health insurance project could be set up and its application would help to reduce the mortality of these patients and give better results.

Conclusion

At the end of this work, which aimed to describe the diagnostic aspects and treatments for acute renal failure during preeclampsia in Hospital University center of Parakou in 2019, we can remember that the AKF is very present with a frequency of 44.32%. Those most affected are young, first-time pregnant and none parity women. The typical profile of a patient at risk of developing an AKF is a patient with a history of preeclampsia, primiparous, between 32-36 WA and with a short intergenesic space. The anomaly of the most common urine output was oliguria. Treatment is essentially based on hydro-electrolytic rebalancing or even vascular filling, the use of antihypertensive drugs, of magnesium sulfate, the transfusion (red blood cell and fresh plasma frozen). The death rate from AKF in the present study is quite significant and could have been low if patients had been on dialysis.

Conflict of Interest

None

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6

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