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Research Article

Outcome of Pregnancy in Pre-Eclampsia and Eclampsia at the Regional Hospital Maroua-Cameroon -

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ABSTRACT

Background: We conducted this study to identify outcomes of pregnancies complicated by pre-eclampsia and eclampsia in Cameroon.

Methods: This was a cohort study at the Regional Hospital, Maroua-Cameroon between June 2005 and May 2007. The outcome of pre-eclamptic and ecliptic patients were compared. The level of significance was 0.05.

Results: Among the 152 patients, 6 maternal deaths were recorded leading to the overall case fatality rate of 3.9%; with 5 out of 56(8.9%) and 1 out of 96 (1%) maternal deaths in the eclamptic and pre-eclamptic groups respectively. Eclampsia was associated with an increased risk of delivery by caesarean section (Odds Ratio [OR]: 3.3, 95% CI: 1.3-8.2, *P* = 0.0173) and maternal death (OR: 9.3, 95% CI: 1.05-81.8, *P* = 0.0160).

Foetal death was 18% among the eclamptic patients, compared to 32% among the pre-eclamptic patients leading to the overall 26.6% foetal death.

Among patients with Eclampsia, induction of labour was associated with an increased risk of foetal death (Odds Ratio [OR]: 6.3, 95% CI: 1.02-38.2, *P* = 0.0296).

Conclusion: In Maroua, outcome of hypertensive disorders in pregnancy still dramatic. The national priority guidelines, education, training and supply of the drug in the management of eclampsia and severe pre-eclampsia are required.

Keywords: Pre-Eclampsia; Eclampsia; Maternal; Foetal Prognosis

INTRODUCTION

Hypertensive disorder in pregnancy complicates up to 4-10% of pregnancies, [1-8]. Several classifications have being proposed for hypertensive disorders in pregnancy based on the moment of occurrence of the hypertension, proteinuria, and the seizure. The elevation of blood pressure before the pregnancy or during the first 20 weeks of pregnancy is classified as chronic hypertension while the elevation of blood pressure after 20th week of pregnancy and in postpartum period is classified as pregnancy induced hypertension. Pregnancy induced hypertension can be associated with proteinuria and is therefore classified as pre-eclampsia; if the pregnancy induced hypertension is not associated with proteinuria, it is classified as gestational hypertension. Some authors evoke that; gestational hypertension may be the early stage of pre-eclampsia. Chronic hypertension associated with proteinuria from the 20th week of pregnancy is classified as superimposed pre-eclampsia [9,10]. Pre-eclampsia complicates up to 7% of deliveries with a high incidence in developing countries [4,5,11,].

Pre-eclampsia can progress in several complicated conditions that could finally lead to maternal and foetal death [3,9,12-16]. In clinical trials, eclampsia was reported among 0.8% and 2.3 % of pre-eclamptic patients respectively in developed and in developing countries, and was described as the commonest complication of pre-eclampsia [3,9]. However in routine practice higher seizure rate of up to 20.8% was reported in West Africa [17].

Preeclampsia and eclampsia are serious obstetric complications, particularly in developing countries. Finally, the prevalence of eclampsia varies from 0.15 to 3.23 per 100 deliveries with high frequency in developing countries [8,9,12,13,18].

Eclampsia has its own complications, as abruption placenta (11.6%), pneumonia, in the same proportion, intravascular coagulated dissemination (4.4%), cerebro-vascular accident (2.94%), and acute tubular necrosis (2.94%), [13]. Many of these complications will lead to death, and , hypertensive disorders in pregnancy is among the three leading causes of maternal mortality and contribute for 15-20% in worldwide maternal mortality ratio [16,18,19].

Obstetric audit is vital for any nation that hopes to provide adequate care for women and their offspring. However, little is known about pregnancy outcome in pre-eclamptic and eclamptic patients in Cameroon.

We found it necessary to analyze the outcome of pregnancy in eclamptic patients in comparison to those with pre-eclampsia. The information from this study could help in improving strategies for prevention of morbidity and mortality due to hypertensive disorders in pregnancy.

OBJECTIVE

We conducted this study to identify outcome of pregnancies complicated by pre-eclampsia and eclampsia in semi urban area of Maroua Cameroon.

METHODS

This was a cohort study at the Regional Hospital of Maroua-Cameroon.

Design and Site of the Study

The Maroua Regional Hospital is the second level referral hospital located in the Far North Region. However, its obstetric care unit is suffering from the low number of health workers. When the study was conducted, there was one gynaecologist, one midwife and six trained nurses assisted by four temporary assistant nurses. About four deliveries occurred per day.

Study population

During the study period, we identified 176 cases of hypertension in pregnancy. Before the detailed analysis, among the 176 women with hypertension, we excluded 16 (9.1%) with twin pregnancy and 8(4.5%) women with chronic hypertension. 152 cases of pregnancies complicated by hypertension were eligible for the study. Eclamptic (n = 56) and pre-eclamptic patients (n = 96) were compared.

Terms definition and Variables

Preeclampsia is defined as pregnancy induced hypertension from the 20th week of gestation or within 42 days postpartum. Eclampsia is Pre-eclampsia associated with convulsions not attributed to another cause. For the purpose of this study, proteinuric and non-proteinuric

patients were grouped and included in the so-called Eclampsia group for those with seizure and Pre-eclampsia group for those without seizure. Then, the so called gestational hypertension was assimilated to Pre-eclampsia. Low birth weight is defined as foetal birth weight of less than 2500 grams. Severe neonatal asphyxia is defined as Apgar score of less than 7 at first minute after birth.

Data were collected on the socio-economic status (age, marital status, educational level, occupation residence) and reproductive health characteristics.

Data management

Data were collected using a pretested coded data sheet. The information was entered in Excel software by an assistant nurse with a good computer skill. Data were stored in the database at the Department of Obstetrics and Gynaecology of the Maroua Regional Hospital.

Statistical analysis

Data analysis was performed using EPI Info 3.4. The chi^2 of heterogeneity was used in comparing the distribution of different variables in the two study populations. Odds ratio with 95% confidence interval was used to measure the effect of pre-eclampsia/ eclampsia on the major outcomes. The difference was considered significant if the p value was less than 0.05.

RESULTS

Pregnancy induced hypertension was quite frequent below the age of 30 years; (96.4%) eclamptic patients and (79.7%) in those with preeclampsia (table 1). The gestational age at which the diagnosis of hypertensive was made was significantly lower in the Pre-eclamptic compared to the Eclamptic group ($p = 0.008$). However, 68.4% of the study population had Pre-eclampsia or Eclampsia after 36 weeks of gestation (table1).

Pregnancy induced hypertension occurred before labour (47.4%), intrapartum (40.8%), only 11.8% occurred in postpartum. Postpartum Eclampsia was diagnosed in 17.9 % of cases compared to 8.3 % of post-partum Pre-eclampsia ($P = 0.01$) (table 1).

Systolic and diastolic blood pressure values distribution was quite similar in both groups ($P > 0.05$) (table 1). Among all the patients, 21.1% had significant proteinuria with only 10.7% of eclamptic patients having a positive test for proteinuria. However, a urinary test for proteinuria was not performed in 51.8 % in the eclamptic group and in 43.4 % of cases in both groups. Oedema of the lower extremities and epigastric pain at the moment of diagnosis were evenly distributed in both groups.

In order to prevent or control convulsions and or hypertension, magnesium sulphate alone, magnesium sulphate and Diazepam, magnesium sulphate and an antihypertensive or an antihypertensive alone were used depending on the severity of the disease and the availability of the drugs. 82.2% of eclamptic patients received magnesium sulphate combined with Diazepam as anticonvulsant therapy. 36.8% of our patients were administered only magnesium sulphate. The use of this drug alone to control convulsions is standard practice in our unit in cases of severe Pre-eclampsia and Eclampsia (table 2).

More pre-eclamptic patients undergone labour induction (20.8%) compared to Eclamptic ones (12.5%) ($P = 0.003$). Six maternal deaths were recorded; 5(8.9%) and 1(1.0%) in the eclamptic and Pre-eclamptic groups respectively leading to the overall case fatality rate of 3.9%; ($p = 0.016$). Eclampsia was significantly associated with an increased risk of delivery by caesarean section (26.8% vs. 9.4%; Odds Ratio [OR]: 3.3, 95% CI: 1.3-8.2) and maternal death (8.9% vs. 1.0%; OR: 9.3, 95% CI: 1.05-81.8). Birth weight was equally distributed among the two groups, 28.3% of neonates weighed less than 2.5kg ($p = 0.6$).

Among the patients with available information on the Agar score, foetal death was 9(16%) among the 50 eclamptic patients, compared to 25(32%) among the 78 pre-eclamptic patients leading to the overall 26.6% foetal death. Among the eclamptic patients, induction of labour was associated with an increased risk of foetal death [(50% vs. 13%); OR: 6.3, 95% CI: 1.02-38.2].

Table 1: Patients characteristics according to the group of hypertension.

History of present disease	Eclampsia	Pre-eclampsia	Total	*P*
	N = 56	N = 96	N = 152	
	N (%)	N (%)	N (%)	
Age (classes)(years)				
10-16	15(26.8)	10(10.4)	25(16.4)	0.0000
17-19	23(41.1)	9(9.4)	32(21.1)	
20-24	12(21.3)	20(20.8)	32(21.1)	
25-29	3(5.4)	29(30.2)	32(21.1)	
30-34	3(5.4)	9(9.4)	12(7.8)	
35-39	0(0.0)	17(17.7)	17(11.2)	
40-44	0(0.0)	2(2.1)	2(1.3)	
Pregnancy age at diagnosis (weeks)				
20-36	9(16.1)	34(35.4)	43(28.3)	0.0083*
> 36	43(76.8)	61(63.6)	104(68.4)	
NS	4(7.1)	1(1.0)	5(3.3)	
Moment of diagnosis				
Before labour	18(32.1)	54(56.3)	72(47.4)	0.0117*
During labour	28(50.0)	34(35.4)	62(40.8)	
Post partum	10(17.9)	8(8.3)	18(11.8)	
Systolic BP at diagnosis				
<140 MmHg	6(10.7)	6(6.3)	12(7.9)	0.6126
[140-159] MmHg	19(33.9)	35(36.4)	54(35.5)	
≥ 160 MmHg	31(55.4)	55(57.3)	86(56.6)	
Diastolic BP at diagnosis				
< 90 MmHg	7(12.5)	10(10.4)	17(11.2)	0.8635
[90-109] MmHg	25(44.6)	41(42.7)	66(43.4)	
≥ 110 MmHg	24(42.9)	45(46.9)	69(45.4)	
Proteinuria at diagnosis				
Yes	6(10.7)	26(27.1)	32(21.1)	0.0491*
No	21(37.5)	33(34.4)	54(35.5)	
Ns	29(51.8)	37(38.5)	66(43.4)	
Oedema al lower limb at diagnosis				
Yes	30(53.6)	51(53.1)	81(53.3)	0.4049
No	26(46.4)	42(43.8)	68(44.7)	
NS	0(0.0)	3(3.1)	3(2.0)	
Epigastric pain at diagnosis				
No	28(50.0)	58(60.4)	86(56.6)	0.2113
Yes	28(50.0)	38(39.6)	66(43.4)	
Treatment administered				
Magnesium Sulphate	27(48.2)	29(30.2)	56(36.8)	0.0000*
Magnesium sulphate + anti HTA	12(21.4)	8(8.3)	20(13.2)	
Magnesium Sulphate + Diazepam	11(19.6)	2(2.1)	13(8.6)	
Other Anti HTA	6(10.8)	34(35.4)	40(26.3)	
NS	0(0.0)	23(24.0)	23(15.1)	

Among the pre-eclamptic patients, spontaneous vaginal delivery was associated with an insignificant risk of foetal death compared to labour induction (35 vs. 24%).

Among the two study populations, the risk of foetal death was not influenced by the presence of proteinuria or the period during which the diagnosis of the hypertensive disorder was made (P > 0.05), (table 5,6). However, significantly more foetal deaths were recorded in the eclamptic group for patients who had induction (table 5).

DISCUSSION

Among the overall 152 women with pregnancy induced hypertension 56 had convulsion (36.8%). and this was higher than seizure rate of 20.8% reported in Benin [17]. The high rate of seizure could be due to the proportional effect of the teenage status and housewife status on this condition as recently reported in Maroua, Cameroon [20].

The overall case fatality rate was 3.9% lower than , 5.8% and 8% reported in Nigeria and Benin, West African Countries respectively [1,17]. Eclampsia was significantly associated with an increased risk of maternal death [(8.9% vs. 1.0%); OR: 9.3, 95% CI: 1.05-81.8]. Similar case fatality rate of 8.8% was reported among eclamptic patients in Congo [21]. In developing countries, previous reports evoked high case fatality rates among eclamptic patients compared to Pre-eclampsia (5.2% vs. 0. 4%)[22] .

Among the patients with available information on the Agar score, foetal death was 16% among the eclamptic patients compared to 32% among the Pre-eclamptic ones leading to the overall 26.6% foetal death. These findings are coherent to those from the literature, as perinatal mortality are reported at 4-36% [1,12,23,24]. Foetal death of 16% among eclamptic patients is lower than the 33.4% perinatal death reported in Congo [21]. The overall perinatal death of 20.8% was reported among hypertensive patients in Benin [17]. Among patients with eclampsia, a similar perinatal mortality rate of 35.9% was reported in Senegal [25].

Contrary to what is usually described, there was no prognostic impact of the presence of oedema of both lower extremities, proteinuria and epigastric pain at diagnosis of hypertension (table 5). Our findings are similar to those of United Kingdom where 38% of patients had seizure before occurrence of proteinuria [26].

Table 2: Characteristics of patients at delivery.

Delivery characteristics		Eclampsia N = 56 N (%)	Pre-eclampsia N = 96 N (%)	Total N = 152 N (%)	*P*
Need of stimulation					0.0130*
	No	42(75.0)	59(61.4)	101(66.4)	
	Yes	11(19.6)	14(14.6)	25(16.4)	
	NS	3(5.4)	23(24.0)	26(17.2)	
Need for 'induction					0.0030*
	No	46(82.1)	54(56.3)	100(65.8)	
	Yes	7(12.5)	20(20.8)	27(17.8)	
	NS	3(5.4)	22(22.9)	25(16.4)	
Foetal weight					0.6734
	500-1499	5(8.9)	9(9.4)	14(9.2)	
	1500-2499	13(23.2)	16(16.6)	29(19.1)	
	2500-3999	29(51.8)	43(44.8)	72(47.4)	
	4000-5000	1(1.8)	5(5.2)	6(3.9)	
	NS	8(14.3)	23(24.0)	31(20.4)	
Apgar Score					0.0713*
	0	9(16.1)	25(26.0)	34(22.4)	
	1-6	7(12.5)	4(4.2)	11(7.2)	
	7-10	34(60.7)	49(51.0)	83(54.6)	
	NS	6(10.7)	18(18.8)	24(15.8)	
Caesarean delivery					0.0108*
	Yes	15(26.8)	9(9.4)	24(15.8)	
	No	39(69.6)	78(81.2)	117(77.0)	
	NS	2(3.6)	9(9.4)	11(7.2)	
Maternal death					0.0160*
	Yes	5(8.9)	1(1.0)	6(3.9)	
	No	51(91.1)	95(99.0)	146(96.1)	

*significant

Table 3: Risk of caesarean section in case of eclampsia compared to pre-eclampsia.

Disease	Total of women (N)	Caesarean delivery (N)	Rate (%)	Crude Risk (Odd Ratio) (95% CI)	Adjusted Risk (Odd Ratio)[A] (95% CI)
Preeclampsia	87	9	10.3	1[c]	1[c]
Eclampsia	54	15	27.8	3.3*(1.3-8.2)	2.9** (1.1-7.6)

[A]Adjusted on need for induction
[c] reference category
* P = 0.0074
**P = 0.0173

Table 4: Risk of maternal death in case of eclampsia compared to preeclampsia.

Disease	Total of women (N)	Death(+) (N)	Rate (%)	Crude Risk (Odd Ratio) (95% CI)
Pre-eclampsia	96	1	1.0	1[c]
Eclampsia	56	5	8.9	9.3*(1.05-81.8)

[c] reference category
**P* = 0.0160

Table **5:** Risk factors for foetal death among eclamptic patients according to pregnancy and delivery characteristics.

Variables	Total of women (N)	Death (+) (N)	Rate (%)	Crude Risk (Odd Ratio) (95% CI)	*P*
Need for stimulation					
No	39	7	17.9	1c	
Yes	11	2	18.2	1.01 (0.1-5.7)	0.9858
Need for induction					
No	44	6	13.6	1c	
Yes	6	3	50.0	6.3 *(1.02-38.9)	0.0296
Proteinuria at diagnosis					
No	19	3	15.8	1c	
Yes	6	2	33.3	2.6 (0.3-21.7)	0.3489
Caesarean delivery					
No	36	5	13.9	1c	
Yes	13	3	23.1	1.8 (0.3-9.2)	0.4423
Moment of diagnosis					
During/after labor	38	5	13.2	1c	
Before labor	12	4	33.3	3.3 (0.7-15.1)	0.1127

*Significant

In the present study, among the eclamptic group, 90% of patients were administered magnesium sulphate alone or in combination with other anticonvulsants. The use of magnesium sulphate in the prevention and control of convulsions in hypertensive disorders in pregnancy is recommended by WHO as the safest, most effective and low cost medication for use against hypertensive disease in pregnancy to reduce the risk of Eclampsia and maternal death [22,9].

Low use rate of magnesium sulphate were reported in some countries because of lack of national priority guidelines, lack of education, lack of training and supply shortage of the drug in the management of Eclampsia and severe preeclampsia. In Mexico, only 11 of 22 hospitals used magnesium sulphate for Eclampsia (range 9.1% to 60.0%) [27].

A report on the management of eclampsia from Sweden shows the remarkably increased use of magnesium sulphate: from 8% during 1980–1989 to 83% during 1990–1999 [28]. A survey among obstetricians in the United Kingdom and Ireland in 1996 indicated that 40% and 60% of respondents would use magnesium sulphate for severe Pre-eclampsia and Eclampsia, respectively [29]. Current use of magnesium sulphate in some developing countries for the management of Eclampsia has been reported in some studies to vary between 25 and 100% [24,27,30].

Concerning the mode of delivery, the overall caesarean section rate among hypertensive patients was 15.8%, with 9.4% and 26.8% respectively in pre-eclamptic and eclamptic groups. The caesarean section rate among eclamptic patients was low as compared to the Congolese, Moroccan, Madagascar and Singapore studies where the caesarean section rates varied between 40-96% [31,21]. However, the caesarean section rate was higher in the eclamptic group (26.8%) compared to patients with Pre-eclampsia (9.4%) (OR: 3.3; 95%CI: 1.3-8.2). Regarding delivery of hypertensive women, one must consider maternal and foetal prognostic factors as pre-requisite determinant for indication of mode of delivery. Any factor indicative of severe instability of the maternal condition or foetal distress is a contra-indication for the induction of labour. This is confirmed by our data, as augmentation and induction of labour were readily employed in the management of patients with preeclampsia than those with Eclampsia (table 2).

In our setting, evaluation of foetal well-being is only possible by periodic auscultation unlike in other institutions where this is possible by electronic foetal monitoring with Doppler, Ultrasound and foetal blood Hydrogen Pressure sampling. Though the sensitivity of the other methods as compared to periodic auscultation in detecting foetal distress in low risk pregnancies is not significant [18,19] in this region with few qualified personnel, the non-availability of these monitoring methods in detecting foetal distress in this high risk pregnancies probably explains the increase number of cases with undiagnosed foetal distress with or without intrauterine growth retardation. In this group of patients, caesarean section would have been a better option for delivery, thus decreasing perinatal morbidity and mortality associated with vaginal delivery.

As presented in (table 2), we found that, 29.6% of neonates had severe asphyxia; this could be attributed to the lower caesarean section rate and low detection of foetal distress. Other studies reported severe neonatal asphyxia at 14.7-18% [30,32].

Other factors like late reference, drugs availability and time of pregnancy termination could also play a contributory role as documented in some series [27]. The rate of prematurity and low birth weight was 28.3% but the birth weights were not significantly different in the eclamptic and Pre-eclamptic groups ($P = 0.67$). Our findings are lower than that reported in the literature, where the rate ranging between 32-65% was reported [17,31, 32]. Among the study population, 68.4% patients were admitted after 36 weeks of gestation, this partly explains why the rate of prematurity is lower in our series in both groups with varying degree of hypertensive disease in pregnancy. It is well known that Pre-eclampsia and Eclampsia are high risk pregnancies; the risk of prematurity is usually increased because of the underlying pathology, therapeutic measures be it surgical or medical that are used for the termination of pregnancy [33].

Table 6: Risk factors for foetal death among pre-eclamptic according to pregnancy and delivery characteristics.

Variables	Total of women (N)	Death(+) (N)	Rate (%)	Crude risk (Odd Ratio) (95% CI)	*P* value
Need for stimulation					
No	55	16	29.1	1c	
Yes	14	2	14.3	0.4 (0.08-2.0)	0.2600
Need for induction					
Yes	50	12	24.0	1c	
No	20	7	35.0	1.7 (0.5-5.2)	0.3498
Proteinuria at diagnosis					
No	28	8	34.8	1c	
Yes	24	8	33.3	0.9 (0.2-3.1)	0.9165
Caesarean delivery					
No	64	19	29.7	1c	
Yes	8	0	0.0	-	-
Moment of diagnosis					
During/after labour	37	9	24.3	1c	
Before labour	41	16	39.0	1.9 (0.7-5.2)	0.1647

CONCLUSION

In low income areas of Maroua Cameroon, among patients with eclampsia, induction of labour is associated with poor neonatal outcome. Among the patients with pre-eclampsia, induction and caesarean section were associated with better foetal outcome. An early and appropriate management of diagnosed cases of hypertensive disorders of pregnancy are urgently needed to reduce maternal, foetal morbidity and mortality. The national priority guidelines, education, training and supply of the drug in the management of cases of eclampsia and severe preeclampsia are required.

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