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## Perinatal Mortality Risk Factors of Infants Born from Eclamptic Mothers at Tokoin Teaching Hospital of Lomé

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Eclampsia during pregnancy is often associated with a higher rate of perinatal mortality, especially in Africa. Implementation of preventive and curative strategies to reduce perinatal mortality in eclampsia needs regular assessment of risk factors. This study is held to determine the impact of several risk factors in eclampsia on perinatal mortality at Tokoin Teaching Hospital of Lomé, Togo (West Africa). It is a retrospective and comparative study concerning recorded files of 178 newborns from eclamptic women. Maternal and newborns risk factors have been compared in two groups of babies (dead ones versus still living ones: at 7th day of life). The data were processed by using SPSS 12.0 software. Chi-square Exact Test of Fisher and calculation of Odds Ratio have been used to establish significance ( $p < 0.05$ ) and correlation between variables. The total dead fetuses and newborns during the perinatal period was 17.4%. Vaginal rate of delivery increased significantly perinatal death, compared to cesarean section (OR = 5;  $p < 0.001$ ). Prematurity (gestational age less than 37 weeks) versus newborn at term was at risk of perinatal death (OR = 4.61;  $p < 0.001$ ). Perinatal mortality was increased in babies with lower Apgar score ( $< 7$ ) at first minute compared to those with Apgar score upper than 7 (OR = 2.9;  $p < 0.001$ ). Caesarean section in eclamptic women still prevents a lot from fetal and newborn death. Better handling of premature babies and improvement of newborn resuscitation in the center, will help to decrease perinatal mortality due to eclampsia.

**Key words:** Eclampsia, perinatal mortality, premature delivery, cesarean section, Togo

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## INTRODUCTION

Eclampsia is a severe complication of pregnancy characterized by tonic and clonic seizures in association with hypertension, proteinuria (>300 mg/24 h after 20 weeks of gestation) and edema (Kamyabi and Mahani, 2004). It is a frequent disorder with incidence of 2-8% among pregnancies that continues to be a major problem worldwide, particularly in developing countries, causing maternal and perinatal mortality (Sahin, 2003; Urassa *et al.*, 2006; Okafor *et al.*, 2009). Perinatal outcome and stillbirth rates often give an image of the quality of the obstetrical and neonatal services offered in a health care system. Complications that can occur during pregnancy and labor will have, therefore, a direct impact on fetal prognosis, leading to perinatal death (Makinde, 2012). Fetal death is one of the major complications during eclampsia and according to many authors; premature delivered babies are at risk to die within the first seven days of life (Sibai *et al.*, 1983; Fardiazar *et al.*, 2013). Studies have also revealed the evidence of low birth weight and advanced maternal age on perinatal mortality (Ahinko and Tuimala, 1994; Olusanya and Solanke, 2011; Yaliwal *et al.*, 2011).

West Africa sub-region has one of the highest perinatal mortality rates in the world (75-76/1000 births) (Ansari *et al.*, 1995). In Togo (West Africa), a recent study conducted in the Clinic of Gynecology and Obstetrics (Tokoin Teaching Hospital Center of Lomé) estimated maternal mortality of eclamptic woman at 8.8% (Adama-hondegla *et al.*, 2011) but there was little information about the perinatal outcome in eclampsia.

The objective of this study is to determine the impact of maternal and newborn risk factors on perinatal mortality in eclampsia at Tokoin Teaching Hospital of Lomé (Togo). The results of this work would help in implementation of preventive and curative strategies to reduce perinatal mortality due to eclampsia.

## MATERIALS AND METHODS

This is a retrospective and comparative study of 178 infants born in eclamptic mothers over three years from January 2007 to December 2009. The study was conducted at the maternity clinic of Gynecology and Obstetrics of Tokoin Teaching Hospital Center of Lomé in Togo (West Africa). Perinatal outcome of the newborns (dead or alive) in relation with several maternal risk factors and newborns parameters have been assessed.

The data have been collected by files review of delivery history of newborns from eclamptic mothers. Were included in this study all record files of newborn

over 28 weeks of gestation from mothers who were at diagnosis of eclampsia before delivering. Diagnosis of eclampsia has been considered on those criteriae: tonic and clonic seizures occurring over 20 weeks gestation, significant proteinuria (over 30 mg dL<sup>-1</sup>), hypertension (systolic blood pressure over 140 mm of mercury and/or diastolic blood pressure over 90 mm of mercury) and edema of the lower limbs or weight gain during pregnancy over than 15 kg.

The newborns files were divided in two groups: a first group of 147 still living babies till the 7th day of life and a second group of 31 dead babies (stillbirths and dead newborns within first seven days). We compared in the two groups: maternal risk factors as maternal age, blood pressure, proteinuria, Glasgow liege score, number of eclamptic seizures, use of Magnesium sulfate and route of delivery. Were also assessed in the two groups; newborns parameters as gestational age, weight, sex and Apgar score at first minute.

The data were processed using the SPSS 12.0 software. For comparison of variables chi-square test of Fisher Yates has been used and the relation has been considered significant for  $p < 0.05$ . Logistic regression was used to estimate the Odds Ratio (OR); for establishing the degree of correlation between variables.

## RESULTS

It has been recorded a total of 178 births from the 170 eclamptic patients (There were 8 twins). The total of dead fetuses and newborns in the perinatal period was 17.4% (31/178).

In Table 1 are mentioned the newborns outcome according to the maternal parameters.

Maternal age over 35 years, very high blood pressure from 16/11 millimeters of mercury (mmHg), proteinuria over 3 g per day, Glasgow Liege score under 12, more than 3 eclamptic seizures before delivery and the use of magnesium sulfate did not influence perinatal death. Vaginal delivery route (74.2%), increased significantly (OR = 5;  $p < 0.001$ ) the number of perinatal death compared to cesarean section (25.8%).

As reported in Table 2, about 37.64% (67/178) of newborns were <37 weeks gestational age. The logistic regression show that infants born from eclamptic mothers with gestational age <37 weeks gestation lead to 67.7% of death (OR = 4.61;  $p < 0.001$ ). Neither newborn weight, nor newborn gender influenced the perinatal death ( $p > 0.05$ ). Apgar score at first minute <7 presented a high risk of perinatal death.

Birth weights ranged from 720 to 3740 g with average weight as 2850 g. Newborn weight in relation to gestational age shown that:

Table 1: Maternal risk factors and impact on perinatal mortality

Maternal risk factors	Status of newborn		Adjusted OR	p-values
	Alive (N = 147)	Dead (N = 31)		
<b>Maternal age (years)</b>				
< 35	92.5% (136)	90.3% (28)	1.32	>0.05
≥35	7.5% (11)	9.7% (3)		
<b>Blood pressure (mmHg<sup>-1</sup>)</b>				
<160/110	28.6% (42)	38.7% (12)	0.67	>0.05
≥160/110	71.4% (105)	61.3% (19)		
<b>Proteinuria (grams/24 h)</b>				
<3	61.2% (90)	48.4% (15)	1.68	>0.05
≥3	38.8% (57)	51.6% (16)		
<b>Glasgow Liege score</b>				
<12	69.4% (102)	71.0% (22)	0.93	>0.05
≥12	30.6% (45)	29.0% (9)		
<b>Eclamptic seizures before delivery</b>				
From 1 to 3 seizures	73.5% (108)	80.6% (25)	0.66	>0.05
More than 3 seizures	26.5% (39)	19.4% (6)		
<b>Magnesium sulfate*</b>				
Used	87.8% (129)	87.1% (25)	1.04	>0.05
Not used	12.2% (18)	12.9% (6)		
<b>Route of delivery**</b>				
Cesarean section	63.9 % (94)	25.8 % (8)	5	<0.001
Vaginal birth	36.9 % (53)	74.2 % (23)		

\*Magnesium sulfate was used by intravenous route; by putting 10 g in 500 mL of ringer lactate with a rate of 20 drops/minute, \*\*Cesarean sections were performed under general anesthesia, Value in brackets are numbers

Table 2: Newborn parameters and impact on perinatal mortality

Newborn parameters	Status of newborn		Adjusted OR	p-values
	Alive (N = 147)	Dead (N = 31)		
<b>Gestational age (WG)</b>				
< 37	31.3% (46)	67.7% (21)	4.61	<0.001
≥37	68.7% (101)	32.3% (10)		
<b>Birth weight (g)</b>				
< 2500	72.8% (107)	74.2% (23)	1.2	>0.05
≥2500	27.2% (40)	25.8% (8)		
<b>Sex of newborn</b>				
Female	53.1% (78)	58.1% (18)	1.57	>0.05
Male	46.9% (69)	41.9% (13)		
<b>Apgar score at 1 minute</b>				
< 7	10.2% (15)	93.5% (29)	2.9	<0.001
≥7	89.8% (132)	6.5% (2)		

Value in brackets are numbers

- Among premature newborns (<37 weeks gestational age), 15 (8.4%) were more than 2500 g and 52 (29.2%) less than 2500 g
- Among newborns from 37 weeks gestational age and more, 78 (43.8%) were subjects to hypotrophy (less than 2500 g) and 33 (18.6%) were more than 2500 g. The hypotrophic babies (called small for gestational age) represented 70.3% of low birth weight infants and 43.82% of all newborns. Impact on perinatal mortality doesn't show any significant difference (p>0.05 and OR = 0.68)

## DISCUSSION

For many authors, eclampsia is the most common medical complication in pregnancy which can be classified as a true obstetrical emergency (Moller and Lindmark, 1980; Ahinko and Tuimala, 1994; Yaliwal *et al.*, 2011).

The perinatal mortality rate in this series was 17.4%. This rate was similar to the one (17%) reported in Gabon (Mayi-Tsonga *et al.*, 2006) but lower than that of Noutsougan (28.6%) in Lomé (Noutsougan, 1999) and that of Adam (35.5%) in Sudan (Adam *et al.*, 2009). By comparing our result with those of Noutsougan (done in the same center), it appears that perinatal outcome was in improvement in those last 10 years in the department.

Maternal age over 35 years, high blood pressure (more than 160/110 millimeters of Hg, proteinuria (≥3 g/24 h), Glasgow Liege score (≥12), more than three eclamptic seizures before delivery and the use of magnesium sulfate did not affect significantly the newborns status (p>0.05). In the present study, gestational age less than 37 weeks leads to 67.7% of death (OR = 4.61; p<0.001). Indeed, fetal complications in eclampsia are directly related to gestational age and the severity of maternal disease including increased rates of

preterm delivery and perinatal death (Sibai *et al.*, 1983). Then, the major complications for the newborn are related to prematurity, although data on morbidity and outcome for preterm infants of women who have eclampsia are conflicting. Otherwise, perinatal mortality was found to be closely linked to birth weight and gestational age. Samueloff *et al.* (1989) reported that, perinatal mortality rate was over 20-fold higher for infants with a birth weight below 2500 g or born before 37 weeks of gestation; but in the present study, birth weight below 2500 g had no influence in the perinatal mortality (OR = 1.9;  $p > 0.05$ ).

Another aspect of the newborn risk factor on perinatal mortality was the newborn gender bias eclampsia. According to Hall, two issues have been considered: the association of a particular gender with the development of eclampsia or the role that gender plays in the perinatal outcomes (Hall, 2002). The increased male/female ratio in infants born in pre-eclampsia, suggests the probable role of androgens and testosterone in the pathophysiology of pre-eclampsia (Steier *et al.*, 2002). It has been noticed in this study that newborn gender (male or female) did not influence the perinatal mortality (OR = 1.57;  $p > 0.05$ ) though, 54% (96/178) of the newborns were female versus 46% (82/178) of male.

Fetal growth restriction risk in eclampsia was estimated by comparing infant birth weight to term delivery (gestational age). It has been noticed a high prevalence of low birth weight (weight  $< 2500$  g) with gestational age  $\geq 37$  among newborns. The hypotrophies represented 70.3% of low birth weight infants and 43.82% of all newborns versus 18.53% normal birth weight infants (of all newborns). They had so presented a fetal growth restriction which was not correlated (OR = 0.68;  $p > 0.05$ ) with perinatal mortality in eclampsia. According to De Souza Rugolo *et al.* (2011) among patients who had chronic hypertension, eclampsia development did not affect the risk for intra uterine growth restriction, suggesting different pathways of fetal growth impairment.

The most predominant route of delivery in pregnant eclamptic women was cesarean section due to the emergency of the pathology (Moller and Lindmark, 1980; Fardiazar *et al.*, 2013). In this series, vaginal birth increased significantly (OR = 5;  $p < 0.001$ ) the perinatal death (74.2%) compared to cesarean section (25.8%). It can be explained by the fact that vaginally route of delivery represents a supplementary proof for the fetus which was already bearing effects of the pathology and its treatment. Apgar score at first minute  $< 7$  presented a high risk (OR = 2.9;  $p < 0.001$ ) of perinatal death. This shows that a fetus in eclampsia mother must be going under chronic distress. The pathogenesis for the observed association between low Apgar scores and eclampsia is not clear but may be related to the hypothesis of reduced uteroplacental blood flow from

morphologic changes in the placenta accompanied by vasospasm and decreased intravascular volume (Olusanya and Solanke, 2011).

The severity of neonatal outcome of this study may be related to the insufficient Antenatal Care (ANC) for pregnant women, predisposing them to pre-eclampsia and its complications. The same observation was made in the literature (Mayi-Tsonga *et al.*, 2006) where only preventive measures awareness, public education; screening and early treatment of hypertension during pregnancy could reduce mortality.

## CONCLUSION

This study shows that several maternal risk factors in eclampsia as advanced maternal age, high blood pressure, proteinuria, Glasgow-Liege score, number of eclamptic seizures and use of magnesium sulfate did not influence significantly perinatal mortality. Vaginal delivery has increased significantly perinatal death in newborns of eclamptic mothers. Within newborn parameters, premature delivery and Apgar score less than 7 at first minute were at significant higher risk of perinatal mortality. Cesarean section as route of delivery is still the best choice in eclampsia occurring on a viable fetus but chances of resuscitation and handling premature and low birth weight babies of the center must influence the decision. The more the pregnancy is close to term greater will be the chances of newborn survival. Collaboration between pediatrics and obstetricians should also be encouraged.

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