

Cerebrovascular Pathologies in Women during Pregnancy and Postpartum In the Neurology Departments of the Yalgado Ouédraogo and Bogodogo University Hospitals

Kyelem Julie Marie Adeline Wendlamita^{1*}, Dabilgou A Alfred¹, Ouedraogo P Victor², Sawadogo A Aziz², Napon Christian³ and Millogo Athanase²

¹Neurology Department of Yalgado Ouedraogo Teaching Hospital of Ouagadougou, Burkina Faso.

²Neurology Department of Sourou Sanou Teaching Hospital of Bobo Dioulasso, Burkina Faso.

³Neurology Department of Bogodogo Teaching Hospital of Ouagadougou, Burkina Faso.

*Correspondence:

Kyelem Julie MAW, Neurology Department of Yalgado Ouedraogo Teaching Hospital of Ouagadougou, Burkina Faso, Phone: (0026)62833362.

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ABSTRACT

Introduction: Pregnancy and post-partum are periods of risk for cerebrovascular complications in women. These pathologies can affect the vital prognosis of the woman.

Objectives: To describe the determinants of cerebrovascular pathologies during pregnancy and postpartum in the neurology departments of the CHU-YO and CHU-B.

Method: This was a descriptive cross-sectional study collected retrospectively over a period from January 1, 2019 to December 31, 2021.

Results: We included 113 patients, mean age 23.35 years with extremes of 15 and 45 years. Eclampsia predominated in 64.60% of cases. Other etiologies were stroke (18.58%), cerebral venous thrombosis (11.51%), reversible posterior encephalopathy syndrome (3.54%) and reversible cerebral vasoconstriction syndrome (1.77%). Factors associated with the occurrence of cerebrovascular pathology were young age [15-19 years] ($p=0.001$), high blood pressure ($p=0.001$). The mortality rate was 8.85%.

Conclusion: Cerebrovascular pathologies during pregnancy and postpartum with regard to their morbidity and mortality constitute a reproductive health problem and therefore require a multidisciplinary approach.

Keywords

Cerebrovascular pathology, Pregnancy, Postpartum.

Introduction

Pregnancy and the postpartum period are periods of risk for women, including cerebrovascular complications. Some of these pathologies are benign and can benefit from symptomatic management, while others are more serious and can jeopardise the woman's vital prognosis, such as neurovascular pathologies

[1]. The haematological changes observed during pregnancy responsible for a state of hypercoagulability, the hormonal changes with the rise in oestrogens favouring the dilation of abnormal vessels and the cardiovascular changes with the progressive rise in blood volume and cardiac output are all factors for the occurrence of cerebrovascular complications [2]. Cerebrovascular pathologies include all conditions that affect the vessels of the brain, i.e. the cerebral circulation, and result in neurological deficit attributed to acute focal injury to the central nervous system (ischaemic

strokes, haemorrhagic strokes, eclampsia, acute reversible cerebral angiopathy of the postpartum period, cerebral venous thrombosis) [3].

The risk of stroke increases during pregnancy and even more so in the postpartum period [4]. Stroke accounts for 4-11% of indirect causes of maternal death [1]. The incidence of stroke in pregnancy and postpartum varies from 5 to 67 per 100,000 deliveries and differs widely from country to country. The figures vary from 4 to 36/100,000 for cerebral infarctions (sometimes including venous infarctions), from 4 to 19/100,000 for cerebral hemorrhages and from 2 to 14/100,000 for meningeal hemorrhages. The incidence of cerebral venous thrombosis (CVT) ranges from 0.6 to 16/100,000 deliveries in Western countries, with an average of around 10/100,000 [5].

Analysis of US registries from 1979 to 1991 showed that pre-eclampsia and caesarean section are important risk factors for stroke and CVT [6]. Although studies have been conducted in Burkina Faso on eclampsia [7], our study is the first to take into account cerebrovascular pathologies specific to pregnancy and the peripartum period, such as acute reversible postpartum angiopathy (ARPA) or reversible cerebral vasoconstriction syndrome (RCVS) and posterior reversible encephalopathy syndrome (PRES). The aim of this study was to analyse the etiological aspects of cerebrovascular pathology and the associated risk factors.

Patients and Methods

This was a retrospective cross-sectional study with a descriptive and analytical aim which took place from 1 January 2019 to 31 December 2021. The setting of the study was the neurology and gynaeco-obstetrics departments of the Yalgado Ouédraogo and Bogodogo University Hospital Centers in Ouagadougou, Burkina Faso. Patients hospitalized for neurovascular pathology during pregnancy and postpartum were included in the study.

The variables studied were sociodemographic characteristics (age, profession, marital status, geographical origin), clinical data (gynaeco-obstetrical history, vascular risk factors, reason for hospitalization, time to onset of symptoms, physical examination data), paraclinical data (brain imaging, biological examinations, electrocardiogram, cardiac echocardiography, supra-aortic trunk ultrasound). Data concerning the evolution during the hospitalization was also collected.

Data analysis was done using Epi-info 7.2.2.6 software. Statistical calculations were carried out using a Chi-square test allowing us to compare the different variables with an alpha risk of 0.05. The test was considered significant if the p-value was less than 0.05.

Ethical and Deontological Considerations

The results and records were examined during the study with respect for the anonymity and confidentiality of the patients concerned and with the agreement of the ethics committee of the hospitals concerned.

Results

Socio-Demographic Data

The average age of onset was 23.35 years with extremes of 15 and 45 years. The age group [15-19 years] was the most represented (37.17%) (Figure 1). The patients were not educated in 45.7% of the cases. Those with primary education (31.29%), secondary and university education (8.85%) and post-graduate education (11.5%).

Clinical Data

Neurovascular pathology occurred in 45.13% (n=51) during pregnancy and in 54.87% (n=62) during the postpartum period (Table 1). Pre-eclampsia and a history of arterial hypertension were the most frequent vascular risk factors in our series with 68.15% and 13.27% respectively (Table 2).

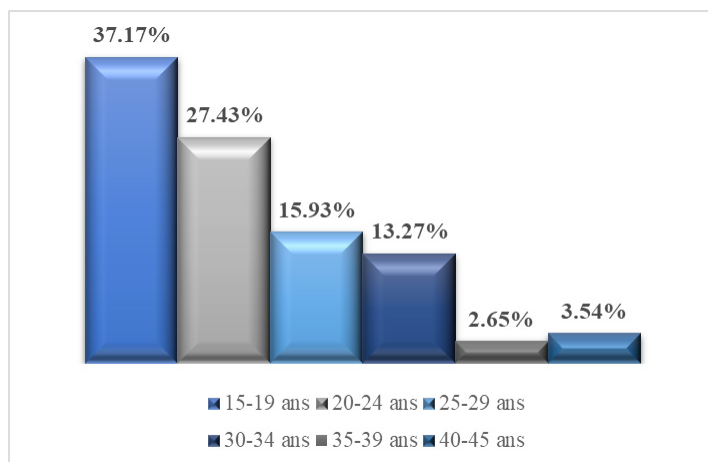


Figure 1: Distribution of patients by age group.

Table 1: Distribution of patients according to the period of onset of cerebrovascular pathology.

Period	Number (N=113)	Percentage (%)
Prégnancy (45.13%)		
1st Trimester	01	0.88
2 nd Trimester	17	15.04
3rd Trimester	33	29.20
Postpartum (54.87%)		
Immediate postpartum J0-J6	43	38.05
Late postpartum J7-J45	19	16.81

The main symptoms were convulsions (36.28%), headache (32.75%) and altered consciousness (23.89). Symptoms were of abrupt onset in 76.11% of cases. The consultation time was \leq 24h in 70.80% of cases (Table 3).

Hyperthermia was found in 14.15%. Arterial hypertension was noted on admission in 68.15% of cases. The neurological examination revealed a coma with a Glasgow score of less than 8 in 10.62% of cases, obtundation with a Glasgow score of between [14-9] in 53.10% of cases and normal consciousness in 36.28%. In addition, the patients had presented generalized convulsions, signs of intracranial hypertension, motor deficit, signs of meningeal irritation in 77%, 56.64%, 50.44% and 0.88% of cases respectively.

Table 2: Distribution of patients according to risk factors.

Risk factors	Number (n)	Percentage (%)
History of high blood pressure	15	13.27
Estrogen/progestin use	07	6.19
Preeclampsia	29	25.66
Gestational diabetes	01	0.88
Delivery haemorrhage	01	0.88
Use of oxytocin	113	100

Paraclinical Data

Brain imaging was available in 46.01% (n=52) of cases. It was normal in 23.53%. Cerebral imaging led to the diagnosis of stroke and cerebral venous thrombosis in 18.58% and 11.51% of cases respectively. Hyperproteinuria was found in 78.74%, hyperleukocytosis in 47.80% and anemia in 33.63% of cases (Table 4).

Table 3: Distribution of patients by first symptoms and time of onset.

Symptoms	Number (N=113)	Percentage (%)
Convulsion	41	36.28
Acute headache	37	32.75
Altered state of consciousness	27	23.89
Motor deficit	19	16.81
Dizzines	15	13.27
Intracranial hypertensive sign	10	8.85
High blood pressure	7	6.19
Fever	5	4.42
Time to consultation	Number(N=113)	Percentage (%)
≤24H	80	70.80
]24H-7days]	28	24.78
]7days-30days]	4	3.54
>30days	1	0.88

Etiological and Evolutionary Data

In our series, eclampsia was noted in 64.60% of cases. Stroke accounted for 18.58%, dominated by ischemia (10.62%) (Table 5). The factors associated with the occurrence of cerebrovascular pathology were young age between 15 and 19 years (p=0.001), and high blood pressure (p=0.001). The mode of delivery by caesarean section was a factor associated with the occurrence of cerebral venous thrombosis (p=0.040). The evolution was marked by a recovery without sequelae in 77.88% of cases. A motor deficit persisted in 13.27%. Mortality was 8.85%.

Table 5: Distribution of patients by diagnosis.

Diagnosis retained	Number(n=113)		Percentage (%)
	Pregnancy	Postpartum	
Eclampsia	38	35	64,60
Stroke	8	13	18,58
CVT	3	10	11,51
PRES	2	2	3,54
SVCR	0	2	1,77

Discussion

The limits and constraints of our study were related to the insufficient financial means of the patients, which considerably limited neuro-radiological explorations and the accessibility to reference examinations such as cerebral MRI.

In our series, the average age of the patients was 23.35 years. Khan et al. [8] in the multicenter study (including 5 countries: Pakistan, India, Syria, Thailand and Sri Lanka) on gravido-periperal CVT had noted a higher average age than ours (27.94 years).

The 3rd trimester (29.20%) and the immediate postpartum (38.05%) were the periods at high risk of cerebrovascular pathology, corroborated by data from the literature which reports that cerebrovascular events are more frequent during these periods [9-11]. A study of a Taiwanese population of women of childbearing age found that 12.2% of all strokes occurred during pregnancy and postpartum and pre-eclampsia were the major causes of stroke [7]. The risk of cerebrovascular complications varies with the age of pregnancy [12]. Kittner et al. [4] estimate that the relative risk of ischemic stroke is 0.7 during pregnancy and increases to 5.4 during the first 6 weeks postpartum. The incidence of eclampsia varies according to the level of development of the countries concerned; the lowest rate (24/100,000 deliveries) is reported in Finland [13]. Eclampsia is the third most common cause of maternal death in developing countries [15].

In our series eclampsia, stroke and cerebral venous thrombosis are the most common etiologies found. Studies show an increased risk of venous or arterial infarction in the postpartum period [15-17]. This increased risk includes infarction, hemorrhage and venous thrombosis, while the risk of eclampsia is increased in the third trimester of pregnancy [16,18]. The diagnosis of posterior reversible encephalopathy syndrome (PRES) and reversible cerebral vasoconstriction syndrome (RCVS) was retained in 3.54 and 1.77% respectively. These are two relatively rare entities whose diagnosis is mainly radiological and whose evolution is favourable. The posterior reversible encephalopathy syndrome is a radio-clinical entity occurring during pregnancy and post-critical favoured mainly by arterial hypertension, infection or maternal anemia [19,20]. Favoring factors found in our series were hypertension in 68.15%, anemia in 33.63% and maternal infection with hyperleukocytosis in 47.79%. Reversible cerebral vasoconstriction syndrome is a rare entity with an excellent prognosis despite a severe initial clinical picture and occurs mainly in the postpartum period as in our series. The use of vasoactive substances such as oxytocics after delivery has been incriminated in several studies [9,21].

The factors associated with the occurrence of cerebrovascular pathology were young age (p=0.001), hypertension (p=0.0001). The mode of delivery by caesarean section was a factor associated with the occurrence of cerebral venous thrombosis with a P value of 0.040. Several series confirm that gestational hypertension, maternal age and delivery by caesarean section are the main risk factors for the occurrence of these conditions [2,17,18,22]. Stroke during pregnancy and the post-partum period is now the leading cause of maternal morbidity and mortality [23]. Our study found a maternal mortality rate of 8.85%, close to that of Owono Etoundi with a rate of 9.6% [22].

Conclusion

Pregnancy and the peripartum are periods at risk of neurovascular pathologies. However, their occurrence in pregnant women poses several problems, including that of the means of exploration and therefore diagnosis, that of the tolerance of pregnancy by the mother whose neurological state is altered, and that of the tolerance of the maternal pathology and its means of exploration and treatment by the foetus. Our study has made it possible to highlight neurovascular pathologies as well as their main etiological factors during pregnancy and the post-partum period in order to orientate actions to fight effectively against maternal and infant mortality.

In fact, perfect knowledge of these pathologies and mastery of the etiological factors will ensure that pregnant women have a healthy post-partum period. Preventing them through good prenatal consultations and consultations between gynecologists-obstetricians and neurologists would reduce mortality and avoid disabling motor sequelae.

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