

## Pregnancy with Stroke

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### ABSTRACT:

#### BACKGROUND:

Although stroke in pregnancy is uncommon, the risk of stroke is increased during pregnancy and puerperium, and considered a major contributor to the serious morbidity and mortality of pregnancy

#### OBJECTIVE:

This study had been designed to find the frequency of stroke in relation to different periods of pregnancy and puerperium, to assess the effect of variable risk factors and their association with stroke and to verify which type of stroke is more frequent among pregnant ladies

#### METHODS :

This is a cross sectional study that enrolled 30 pregnant patients who had stroke either during pregnancy or puerperium and being admitted to the Neurology wards of Al-Yarmouk, Baghdad and Al-kadhemia teaching hospitals during the period from the 1<sup>st</sup> of January, 2001, to the 31<sup>st</sup> of December, 2002. All of the patients, who had been included in this study, had been subjected to detailed history, physical and neurological examinations and investigations.

#### RESULTS:

19 patients (63.3%) of the sample included in this study acquired stroke during pregnancy while 11 patients (36.3%) had developed stroke during puerperium. 2/3<sup>rd</sup> of the sample had ischemic stroke. Impaired consciousness was the commonest presenting symptom with a frequency of 50% of the sample, cerebellar signs were the least observed signs, in the other hand; all of the patient included in this study had motor dysfunction during the disease course. 53.3% of the sample was hypertensive 6.7 % was diabetic, while 36.7% of them had no significant past medical history. Oral contraceptive pills had been used by 50% of the sample, 2/3<sup>rd</sup> of those using oral contraceptive pills had ischemic stroke. 63.3% of the sample had cesarean delivery, 50% of the sample had history of abortion, 60% of whom had positive history of recurrent abortion.

#### CONCLUSION:

This study revealed that most of stroke happened during the 3<sup>rd</sup> trimester and early weeks of puerperium. Being hypertensive, whether pregnant related or not, is the most important risk factor, in addition, other recognized risk factors included diabetes mellitus and use of oral contraceptive pills.

**KEY WORDS:** stroke, pregnancy, puerperium.

### INTRODUCTION:

Currently, it is believed that stroke is one of the most important mortality as well as morbidity leading causes worldwide. Stroke ranks as the third leading cause of death in the United States. It is now estimated that there are more than 700 000 strokes a annually and 4.4 million stroke survivors in the united states only, with an economic burden of about 51 \$ billion according to the record of the American heart Association in 1999. Annual incidence of stroke is variable from the geographical point of view, it is about 0.5-1.0 per 1000 population in the united states, while it is more than 1.5 per 1000 population in the western European countries and Japan , this variability could be attributed to the differences present between these communities particularly the ethnic

origin and the dietary habits<sup>(1,9)</sup>. Furthermore, not only geographic variability in the incidence of stroke had been observed but gender distribution had been found to be variable as well. Stroke is the second leading cause of death in women in Canada and United States, with higher incidence of it in young women than in men between ages of 15 and 30 to 35 years<sup>(10,12)</sup>. Different factors can be considered to increase the risk of stroke among women in this age group. The use of oral contraceptive pills by this group of population can increase stroke risk as part of its role in increasing the incidence of atherosclerotic cardiovascular disease in general<sup>(13-14)</sup>. In addition certain stroke associated diseases are particularly more frequent among young women, the best example of which is the anti-phospholipid syndrome that is regarded as an independent risk factor for stroke in young ladies<sup>(15)</sup>. However stroke associated with

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pregnancy has been long recognized and may be partly responsible for this increased incidence. Stroke related to pregnancy is associated with significant morbidity and mortality. The American Maternal Mortality Collaborative reported cerebrovascular disease as the fifth cause of maternal deaths during 1980-1985<sup>(16,17)</sup>.

The incidence of pregnancy associated ischemic stroke is approximately 3-4 cases /100,000 per year<sup>(18)</sup>. It had been observed from several studies that not only the risk of stroke or other circulatory disease is increased during the period of pregnancy but risks of these diseases are increased substantially during late pregnancy and around the time of delivery<sup>(19,20)</sup>.

Several factors had been claimed to increase the risk of stroke among pregnant mothers, the most important of which are pregnancy related hypertension including pre-eclampsia, and cesarean delivery<sup>(21,22)</sup>.

This study has been designed to find the frequency of stroke in relation to different period of pregnancy and puerperium, to assess variable risk factors and their association with stroke, and to verify which type of stroke is more frequent among pregnant ladies.

**PATIENTS AND METHODS:**

This is a cross sectional study that enrolled 30 pregnant patients who had strokes either during pregnancy or puerperium and being admitted to the Neurology wards in Al-Yarmouk, Baghdad and Al-kadhemia Teaching Hospitals during the period from 1<sup>st</sup> of January, 2001, to 31<sup>st</sup> of December, 2002. All of the patient who had been included in this study, had been subjected to detailed history, physical and neurological examination an investigations.

All patients subjected to battery of Biochemical and Haematological tests including (Hb, PCV, Blood Film, INR, Liver function test, Blood Urea, S.Creatinin, Connective Tissue Study Had ECG, ECH, Doppler study of carotids, CT,NMRI, MRV and MRA were done for the majority of Patients. The statistical analysis was done using Microsoft excel.

**RESULTS:**

This study revealed that 19 out of 30 patients (63.3% of the sample) had acquired stroke during pregnancy, and only 11 out of 30 patients (36.3%) had developed stroke during puerperium.

Loss of consciousness was the main presenting symptom as indicated by this study (15 patients, 50% of the sample), in the other hand, no patients

from those who had been enrolled by the study had presented with sensory symptoms. Table 3 shows patients' distribution according to their presenting symptoms.

Reviewing of the past medical history of the patients included in this study revealed that 16 patients (53.3% of the sample) were hypertensive (7 patients 44% had pregnancy induced hypertension, 6 patients 35% had chronic hypertension, 3 patients 17% had pre-eclampsia), (table 5 shows patient distribution according to the type of hypertension) , 2 patients (6.7) were diabetic, 1 patient 3.3 % had ischemic heart disease, while 11 patients (36.7 % of the sample) showed negative medical history. Table-4 shows patients' distribution according to their past medical history.

Oral contraceptive pills were the commonest way for contraception used by the patients who are involved in this study (15 patients, 50% of the sample), in contrast 10 patients (33.3%of the sample) didn't use any way of contraception. Table-6 shows patients' distribution according to the way of contraception.

Cesarean section was the commonest method of delivery among pregnant patients who had enrolled in this study, 19 patients (63.3 % of the sample) delivered by cesarean section, while only 11 patients (36.7% of the sample) delivered by normal vaginal delivery.

History of abortion had been detected in 15 patients (50% of the sample). Six patients (40%) showed history of abortion for once. 9 patients, 60% had history of recurrent abortion i.e., history of 3 or more abortions

Motor system dysfunction was the most frequent focal neurological deficit observed in all of the patients who had been included in this study (30 patients,100% of the sample). Cerebellar signs were the least observed signs; they had been noticed in only 10 patients (33.3 % of the sample) table -7 shows the frequency of various neurological deficits among the patients included in this study.

Table 8 summarizes the results of the investigation done for the patients enrolled in this study.

This study revealed that ischemic stroke (infarction) had been diagnosed in 20 patients (66.67% of the sample), while hemorrhagic stroke was found in 10 patients 33.33% of the sample). Table 9 shows patients' distribution according to the type of the cerebrovascular accident to the possible underlying etiology.

**Table 1: Patient distribution according to age.**

No of patient	<30 years	≥30
30	7	23

**Table 2: Patient distribution according to parity.**

No. of patients	≤3	3-6	≥6
30	16	9	5

**Table 3: patients' distribution according to the presenting symptoms.**

The presenting symptom		No.	%
1-	Headache	6	20%
2-	Fit	4	13.3%
3-	Loss of consciousness	15	50%
4-	Motor weakness	5	16.7%
5-	Sensory symptoms	0	0%
Total		30	100%

**Table 4: Patients' distribution according to their past medical history.**

The medical illness		No.	%
1-	Hypertension	16	53.3%
2-	Diabetes mellitus	2	6.7%
3-	Ischemic heart disease	1	3.3%
4-	Negative past medical history	11	36.7%
5-	abortion	15	50%
Total		30	100%

**Table 5: Distribution of patient according to the type of hypertension.**

Pregnancy induced hypertension	Chronic hypertension	Pre-eclampsia	Total
7	6	3	16

**Table 6 Patients distribution according to way of contraception.**

Way of contraception		No.	%
1-	Oral contraceptive pills	15	50%
2-	Intrauterine contraceptive device	5	16.7%
3-	Didn't use any method of contraception	10	33.3%
Total		30	100%

**Table 7: Patient distribution according to the observed neurological deficit.**

The neurologic deficit		Normal findings		Abnormal findings		Total
		No.	%	No.	%	
1	Higher cerebral function	14	46.7%	16	53.3%	30
2	Cranial nerves	3	10%	27	90%	30
3	Motor signs	0	0	30	100%	30
4	Sensory signs	15	50%	15	50%	30
5	Cerebellar signs	20	66.7	10	33.3	30

**Table 8: Patients' distribution according to the results of investigations.**

The investigation	Normal results		Abnormal results	
	No.	%	No.	%
Cerebrospinal fluid analysis	20	66.67	10	33.33
Connective tissue screen	25	83.3	5	16.7
CT scan	0	0	30	100
MRI	2	6.67	28	93.33
Magnetic resonance angiography (MRA)	29	96.67	1	3.33
Magnetic resonance venography	21	70.0	9	30.0
Electro-encephalogram (EEG)	24	80.0	6	20.0

**Table 9 : Patients distribution according to the type of cerebrovascular accidents and the possible underlying etiology.**

Possible etiology	Infarction		Hemorrhage	
	No.	%	No.	%
Anti-Phospholipid antibodies	4	20%	1	10%
Atherosclerosis	3	15%	0	0
Disseminated intravascular Coagulopathy (DIC)	3	15%	0	0
Venous sinus thrombosis	7	35%	5	50%
No Obvious cause	3	15%	4	40%
Total	20	100%	10	100%

**DISCUSSION:**

The problem of pregnancy associated stroke stimulate many research workers to study the epidemiological aspect of this vital health problem, and to assess the different risk factors, particularly when they take into their consideration the importance of primary prevention of stroke in general and pregnancy associated stroke in the term of the medical as well as economic benefits. The other important factor that stimulates the researchers is the inconclusive evidence about what was believe that stroke is significantly more frequent during pregnancy yielding a stimulating controversy about this epidemiological phenomenon (23). Furthermore, recently there are evidences that maternal death resulting directly from obstetric causes are decreasing in frequency, while stroke as well as other non-obstetric causes of maternal mortality has become of increasing importance (24).

This study revealed that essential hypertension as well as pregnancy related hypertension including pre-eclampsia is the main possible risk factor for stroke among the patients enrolled in this study (16 patients, 53.3% of the sample). This coincides with the results of many other similar studies, with higher frequency observed in the sample studied in this study. The Baltimore-Washington Cooperative Young Stroke Study revealed a frequency of hypertension as a risk for stroke in 41-50% depending on whether the hypertension was related

to pregnancy or not, respectively(25). Sharshar et al report for the French Stroke in Pregnancy study Group also complements the results of our study (hypertension observed in 47% of the cases included in the French study)(26). These findings suggest a similar important role for hypertension in the pathogenesis of stroke during pregnancy and puerperium similar to that role in the general non-pregnant population (27). This higher incidence of stroke in those patients with pre-eclampsia increased the long term risk of death by 1.2 fold higher than women who did not have pre-eclampsia (28). Good percentage of the patients included in this study had negative past medical history (11 patients, 36.7% of the sample). It is essential for well practiced physician to search for many possible hidden risk factors, the most important of which are inherited and acquired thrombophilia syndromes. Thus pregnant women with focal neurological symptoms should be evaluated for thombophilia(22,29)

Recent epidemiological study suggests that the relative risk of stroke rises to 8.7 during the post-partum period. In that same population-based report the relative risk of stroke during gestation was found to be 0.7 (25). In addition, the post-partum period, not the pregnancy itself, is associated with an increased risk of recurrent stroke (30). In this study only 36% of the sample (11 patients) had post

partum strokes, in most of whom cesarean section was the method of their delivery. Cesarean section is one of the most important risk factors that increase the probability of pregnancy associated stroke, the other important risk factor is the hypertensive disease of pregnancy including pre-eclampsia<sup>(20,22)</sup>

There is a known association between cerebral venous thrombosis and pregnancy especially during the puerperium. The condition is seen throughout the gestation but most commonly is identified during the second to third week post-partum<sup>(31-33)</sup>.

This study revealed that 12 patients (40% of the sample) had cerebral venous thrombosis, 10 patients from the 12 had their stroke due to cerebral venous thrombosis during the puerperium. This phenomenon could be related to the fact that the period of puerperium is associated with higher incidence of cerebral venous thrombosis associated risk factors mostly dehydration and infection.

The use of oral contraceptive pills particularly traditional pills are considered as important risk factor for accelerated atherosclerosis with all of its related disease like myocardial infarction and stroke. This effect pronounced in young adulthood including the childbearing age<sup>(34-35)</sup>. 50% of pregnant ladies enrolled in this study had used oral contraceptive pills as a method for contraception. In addition, it is important to realize that the risk of ischemic events in patients using oral contraceptives is directly related to estrogen dose, particularly in women who have other risk factors like diabetes, hypertension or being older than 35 year old. Current concepts of evidence based medicine showed that low dose of oral contraceptive are safer with high degree of efficiency<sup>(36)</sup>, but even this low dose preparations carry an increased risk for stroke in current users<sup>(37)</sup>.

Anti-phospholipid syndrome is considered as an independent factor for stroke in young women. The frequency of positive anti-cardiolipin or lupus anticoagulant among young females with stroke is about 42%. However not all studies gave such association<sup>(38)</sup>. This study revealed that only 16.7% of the sample had positive anti-phospholipid antibodies (20% of infarction cases, 10% of hemorrhagic stroke patients).

### CONCLUSION:

This study revealed that most of stroke happened during the 3<sup>rd</sup> trimester and early weeks of puerperium. Being hypertensive, whether pregnant related or not, is the most important risk factor, in

addition, other recognized risk factors included diabetes mellitus and use of oral contraceptive pills.

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