Original Research Article

Hemorrhagic strokes during pregnancy in central Indian population of Bhilai city: an observational study

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Abstract

Background: Hemorrhagic strokes are medical emergencies seen in less than 50% of the strokes encountered in pregnant females, and affect 6 pregnant females from 1000000 pregnancies. Despite of a very low occurrence rate of stroke in pregnant females, it acts as major risk factors for maternal and fetal mortality and morbidity owing to alteration of mechanisms involving hemodynamic, coagulation, and cardiovascular system.**Aims:** The present clinical trial is a description of a single pregnant female with a stroke observed for two years. The present study also retrospectively analyzed a cohort of pregnant females to assess risks of stroke during pregnancy.**Material and Methods:** A 28 years female after delivery presented left temporal intraparenchymal hematoma with sub falcine herniation managed uneventfully withdecompressive craniectomy with hematoma evacuation. Additionally, the study retrospectively analyzed 1876 females data for preexisting hypertension, pregnancy-induced hypertension, eclampsia,coagulopathy, and/orthrombocytopenia. The collected data were critically analyzed and the results were formulated. **Results:** A total of 19 cases among 1876 had hematoma where 14(73.68%) were managed conservatively and 5(26.31%) were managed surgically, where only one subject died showing a mortality rate of 5.26%. It was seen that preexisting hypertension was there in 10.52% of subjects (n=2),whereas, pregnancy-induced hypertension was seen in 47.36% (n=9) subjects. Eclampsia was observed in 57.89% of subjects (n=11). Coagulopathy was found in 42.10% (n=8) and 36.84% (n=7) subjects respectively.**Conclusion:**Within its limitations, the present study shows that hemorrhagic stroke encountered during pregnancy is an emergency requiring prompt diagnosis and adequate management as it involves both maternal and fetal life.

Keywords: Hemorrhagic Stroke, Hematoma, Intracerebral Hematoma, Pregnancy, Hematoma, Hypertension

Introduction

Hospitalization requirements owing to the strokes related to pregnancy are increasing recently despitethe rare occurrence.

These strokes comprise the hemorrhagic strokes including both intracerebral hemorrhage (ICH) and Subarachnoid hemorrhage (SAH).Hemorrhagic strokes are seen in less than 50% of the strokes encountered in pregnant females and affect 6 pregnant females from 1M pregnancies[1].Cerebral strokes are emergency conditions affecting neurological system of the subject. Strokes during pregnancies are a leading cause for morbidity(disability) and mortality (death) for mother and fetus both. Stroke or cerebral stroke presents a situation where there is damage to the brain secondary to vascular etiology. Impaired blood supply leading to tissue death describes the ischemic stroke. Ischemic shock can be attributed to various etiological factors including thrombi, embolism, thrombo-embolism, hypotension, and/or atherosclerotic diseases[2]. Etiology for hemorrhagic shock is rupture in a blood vessel leading to tissue damage and resultant spreading of blood in the parenchyma of brain. Hemorrhagic stroke can be caused by aneurysms, secondary to hypertension, and/or atrio-venous malformations. Tissue damage in hemorrhagic shock can also be done by increase in intracranial pressure from hemorrhage and edema[3].Clinical presentation of the stroke depends on the affected area of the brain by etiological factors. The stroke can present as numbness, weakness, slurred speech, and/or vision, or their combination. Abnormality in psychology of the subject can result from ischemic as well as hemorrhagic shock and infarctions. Despite of a very low occurrence rate of stroke in pregnant females, it acts as major risk factors for maternal and fetal mortality and morbidity owing to dysregulation of mechanisms involving hemodynamic, coagulation, and cardiovascular system[4]. The increase in proportion is seen versus the stroke by ischemia. This increased proportion points towards the possible role of phenotypes, genetics, and other risk factors that might have an effect on pregnancy and act during pregnancy[5]. Concerning subarachnoid hemorrhage, previous literature work suggests that SAH is related with better results compared to subarachnoid hemorrhage in non-pregnant females,and is improbably aneurismal[6].Arteriovenous lesions from malformation, cavernous malformations, and other vascular lesions also constitute a small part of the intracerebral hemorrhage of pregnancy. Deaths seen with intracerebral and

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subarachnoid hemorrhages are approximately 10% and 20% with ICH and SAH respectively. These mortality rates are considerable and also affect previously healthy pregnant females having no other systemic disease or complication[7].These accidents usually occur in the last days of pregnancy and the first few weeks postpartum. Pregnancy does not contraindicate complementary examinations, including those using X-rays if they are deemed necessary[8]. Pregnant females with hemorrhagic stroke may present minimal to no symptoms like high blood pressure making the diagnosis difficult and challenging, and hence delaying accurate and early intervention [9]. The present clinical trial is a description of a single pregnant female with a stroke observed for two years. The present study also retrospectively analyzed a cohort of pregnant females to assess risks of stroke during pregnancy.

Material and methods

The present study is a description of a single pregnant female with a stroke observed for two years. The present study also retrospectively analyzed a cohort of pregnant females to assess risks of stroke during pregnancy.The trial was carried out at the Department of Neurosurgery and in Department Of Obstetrics And Gynaecology. The informed consent was taken from the included females and the data was collected from the Department of Neurosurgery after obtaining the ethical clearance from the concerned committee. To be included in the history the subjects had to be 18 years or older with no associated systemic disease or medication, no smoking history, no disease affecting the brain or neuronal activity, no headaches, and/or any drug abuse.The single female observed was 28 years old with no associated medical history of smoking, hypertension was a mother 2-year-old healthy child delivered by caesarian section. The subjects reported to the Department of Obstetrics and Gynecology at the gestational age of 35 weeks with no complaints other than labor pain. After monitoring and examination, the subjects were advised the caesarian section which was performed the same day as admission. 2 days after surgery the patient had a sudden intense headache followed by loss ofconsciousness with a single episode of generalized tonic-clonic convulsion. Clinical examination showed a GCS 13 score andnormotensive status. A brain scan was then performed showing left temporal intra-parenchymal hematoma with sub falcine herniation. The patient was transferred to intensive care under antiepileptic treatment. After workup,compressive craniotomy with the evacuation of hematoma was performed.Additionally, the present study also retrospectively analyzed previous data of 2 years in the Department of Neurosurgery of the subjects referred from the Department of Obstetrics and Gynecology. The data included a total of 1876 females that were referred from the Department of Obstetrics and Gynecology to the Department of Neurosurgery within a span of 2 years from January 2019 to December 2020.

These 1876 females were assessed for preexisting hypertension, pregnancy-induced hypertension, eclampsia, coagulopathy, and/or thrombocytopenia. The collected data were critically analyzed and the results were formulated.

Results

The present clinical trial is a description of a single pregnant female with a stroke observed for two years. The present study also retrospectively analyzed a cohort of pregnant females to assess risks of stroke during pregnancy.The 28-year-old female subject was extubated on day 2 of decompression surgery,with progressive neurological improvement.Angio-MRI did not objectify arterio-venous malformation. 48 h post-operative scanner revealed an adequate decompression. The patient was extubated on day 2 of surgery with progressive neurological improvement. Concerning obstetrical care, the pregnancy has evolved harmoniously without any growth retardation or other abnormalities, with full-term delivery of a healthy 3 kg 200 g baby.At 2 years follow-up, no complication was seen in the subject and the patient followed a normal day-to-day routine.A total of 19 cases were found to have intra cerebral hematoma in a cohort of 1876 patients(1.012%) who delivered from January 2019 to December 2020. The demographic characteristic of the 19 subjects with intracerebral hematoma is described in Table 1. The females were in the age range of 23 years to 38 years with a mean age of 27.3 years. The majority of the subjects were within the age group of 28 years to 33 years (n=9, 47.36%). 10.52% (n=2) females were from a low socioeconomic background, whereas, majority of the subjects were from the middle socio-economic background(n=12, 63.15%).

Concerning the occurrence of preexisting hypertension, pregnancy-induced hypertension,eclampsia, coagulopathy, and/or thrombocyto-penia in the study subjects, the results are summarized in Table 2. It was seen that preexisting hypertension was there in 10.52% of subjects (n=2), whereas, pregnancy-induced hypertension was seen in 47.36% (n=9) subjects. Eclampsia was observed in 57.89% of subjects (n=11). Coagulopathy was found in 42.10% (n=8) and 36.84% (n=7) subjects respectively.Among 19 cases of intracerebral hematoma 14(73.68%) subjects were managed conservatively and 5(26.31%) subjects were managed surgically, where only one subject died showing a mortality rate of 5.26%. These study results for also assessment the short-term outcomes in these 19 subjects after the hematoma management are described in Table 3.

Table 1: Demographic Characteristics of the study subjects

Characteristic	Subgroup	Number (n)	Percentage (%)
Age	23 years to27 years	7	36.84
	28 to 33 years	9	47.36
	34 years or more	3	15.78
Socioeconomic status	Low	2	10.52
	Middle	12	63.15
	High	5	26.31
Previous deliveries	Caesarean	9	47.36
	Normal	10	52.63
Complications during delivery	Yes	2	10.52
	No	17	89.47

Table 2: Neurological parameters in the study subjects

Parameter	Number (n)	Percentage (%)
Preexisting hypertension	2	10.52
Pregnancy-induced hypertension	9	47.36
Eclampsia	11	57.89
Coagulopathy	8	42.10
Thrombocytopenia	7	36.84

Table 3: Short-term outcomes regarding hematoma management in the study subjects

Outcome	Number (n)	Percentage (%)
Conservative Management	14	73.68
Surgical Management	5	26.31
Mortality	1	5.26
Discharge to home with uneventful recovery	18	94.73

Discussion

The present clinical trial is a description of a single pregnant female with a stroke observed for two years. The present study also retrospectively analyzed a cohort of pregnant females to assess risks of stroke during pregnancy.In the present study, 19 females among 1876 observed had hematoma showing its rare occurrence during the pregnancy. These findings were in agreement with the studies by Moatti Z et al[10]in 2014 where authors reported a rare occurrence of intracerebral hematoma in pregnant females. Similar results were also reported by the Fairhall JM and Stoodly MA[11] in 2009 where intracerebral hematoma in pregnancy was reported as a rare finding. It was seen that preexisting hypertension was there in 10.52% of subjects (n=2), whereas, pregnancy-induced hypertension was seen in 47.36% (n=9) subjects. Eclampsia was observed in 57.89% of subjects (n=11). Coagulopathy was found in 42.10% (n=8) and 36.84% (n=7) subjects respectively. These findings were following the findings of Da Silva E et al[12]in 2006 where 44% of the subjects with hematoma had eclampsia. Similar findings were also reported by Sibai B et al[13] in 2011 where authors reported similar incidence of mentioned parameters. For a 28-year-old female, the scan was done to assess the lesion pre-operatively and post-operatively. However, the safety of radiography during pregnancy is being questioned. Various studies have reported the safety of radiography during pregnancy mentioning that scanning doesn't harm developing fetus as suggested by TuranT et al[14] in 2004 who mentioned radiography in pregnancy. Also, Ray JG et al[15] in 2016 reported similar findings for MRI in pregnancy.Concerning the hemorrhagic brain strokes of pregnancy, series of event occur following increased intracranial pressure and spinal cord compression, which necessitates cesarean section delivery in females with late pregnancy before any surgical intervention as suggested by Wang ZL et al[16] in 2013. In subjects with aneurysms and other vascular malformations, the treatment and delivery decisions should be via interdisciplinary management approach involving radiologists, anesthesiologists, neurologists, and the surgeon. It was seen that among 19 cases of intracerebral hematoma 14(73.68%) subjects were managed conservatively and 5(26.31%) subjects were managed surgically, where only one subject died showing a mortality rate of 5.26%. These findings were contradictory to the findings of Meeks JR et al [17] in 2020 where relatively higher mortality of approximately 17% was reported by the authors.

Conclusion

Within its limitations, the present study shows that hemorrhagic stroke encountered during pregnancy is an emergency requiring prompt diagnosis and adequate management as it involves both maternal and fetal life. Adequate management and interdisciplinary coordination play an important role in saving maternal and fetal life. However, the present study had few limitations including smaller sample size, shorter monitoring period, geographical area biases, and a single institution involvement. Hence, more longitudinal studies with larger sample size and longer monitoring periods are required to reach a definitive conclusion.

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