Medical and Research Publications
International Open Access

Case Report **Journal of MAR Gynecology (Volume 3 Issue 3)**

Intracerebral Hemorrhage in a Patient with Eclampsia

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Received Date: June 24, 2022

Published Date: July 01, 2022

DOI: 10.1027/margy.2022.0156

Abstract

Most cases of ischemic and hemorrhagic stroke in pregnancy are due to the complications of severe pre-eclampsia and eclampsia. Pregnancy-associated brain hemorrhages have a poor prognosis with high maternal mortality and morbidity. Our case illustrates the rare atypical presentation of eclampsia in a nulliparous teenager, consequently leading to its potential life-threatening complication of intracerebral hemorrhage (ICH). Preeclampsia was manifested late at the onset of labor at 40 weeks + 5 days of gestation. The disease showed a rapid progression leading to the onset of atypical eclampsia at full dilatation of the cervix. Consequently, 5 hours after delivery, she developed left-sided weakness, and an intracerebral hemorrhage was confirmed on computed tomography (CT) scan. She was evaluated by a multi-disciplinary team and made a good recovery with surgical management.

Our case highlights the importance of early diagnosis and treatment to achieve a good outcome, though it is relatively rare in pregnancy. It demonstrates the significance of the involvement of experts in the management of life-threatening emergency conditions like ICH.

Background

Pre-eclampsia is the most common serious medical disorder during pregnancy. The worldwide prevalence of preeclampsia and eclampsia is 4.6 percent (95% CI 2.7-8.2) and 1.4 % (95% CI 1.0-2.0) respectively **[**1**]**. There is a 10.92% rise in the occurrence of pregnancies complicated with high blood pressure all over the world over the last 20 years from 1990 to 2019 with the number of cases increasing from 16.30 million to 18.08 million. However, the number of maternal deaths from complicated hypertensive pregnancies showed a decreasing trend of 30.05% reduction from 1990 which was approximately 27.83 thousand in 2019**[**2**]**. As per the recent MBBRACE-UK report published in January 2022, though there is a reduction in the maternal mortality rate due to pre-eclampsia and eclampsia, it still shows a nonsignificant high rate if compared with the lowest observed rate of 2012-14. The pregnancy-related death due to Hypertensive disorders is 0.28 with 95% CI (0.10-0.60) **[**3**]**.

Pathogenesis and risk factors of preeclampsia have been studied extensively. The nulliparous state shows a strong association with preeclampsia (RR 2.1, 95% CI 1.9-2.4) **[**4**]**. It is explained by the lack of desensitization of the immune system of the nulliparous individual due to limited exposure to paternal antigen. Uterine immaturity in very young teenagers results in defective deep placentation and leads to the development of preeclampsia **[**4**]**. It has been observed that younger women experience worse mother and baby outcomes with a high rate of severe complications like small for gestational age babies, premature deliveries, operative deliveries, admission to high dependency units, and morbidities

including maternal near-miss cases [5]. Around 6.7 % of adolescent pregnancies are characterized by a preponderance to develop preeclampsia/ Eclampsia as stated by Macedo et al in a systematic review, almost twice comparing the adult population [5-6]. However, the literature review revealed contradictory statements. While some authors opinionated that there is a 20% increase in the incidence of preeclampsia among adolescent pregnant mothers in and around the age of 15 years (OR 2.97,95% CI 1.62-5.42), others have the opinion that it is 23% less [7]. The evidence suggests that the nulliparous state and uterine immaturity are not the sole determining factor for the development of preeclampsia. Poor antenatal care, obesity, nutritional deficiencies, and geographical area are the other contributing factors.

Case Report

A 16-year-old, nullipara attended triage at 40 + 5 weeks of gestation with spontaneous rupture of membrane and contractions. She was fit and well. Her blood pressure was normal throughout the pregnancy. Her BMI was 22. Her booking investigations, dating, and anomaly scans were normal. At admission, blood pressure was found to be 149/104mm of mercury with 1 + protein in the urine. She was not having any impending symptoms of eclampsia. Her PET blood reports showed the normal result.

She developed generalized tonic-clonic seizures at full dilatation, around 6 hours after the admission. The baby was delivered with forceps in good condition. She had mild postpartum hemorrhage with a blood loss of 800ml. She appears drowsy but was responding well. It was attributed to the postictal state along with blood loss. She developed pyrexia and sepsis protocol was initiated. 5 hours after delivery, left-sided weakness was reported and on examination reduced power on the left arm was noted. An urgent CT scan was arranged. It revealed parenchymal hematoma of size 55x42mm in the right striatum at the Lentiform and Caudate nucleus with a midline shift to the left to 9mm [Figure1]. There was no hydrocephalus. An immediate neurosurgery referral was done and she was transferred to the ITU. She underwent surgical management and made a good recovery.

Figure1; Image of an axial view of a computed tomographic scan of the head.

Large arrows – Intracranial hemorrhage

Small arrows- Midline shift suggestive of mass effect

LV- Blood in the right lateral ventricle.

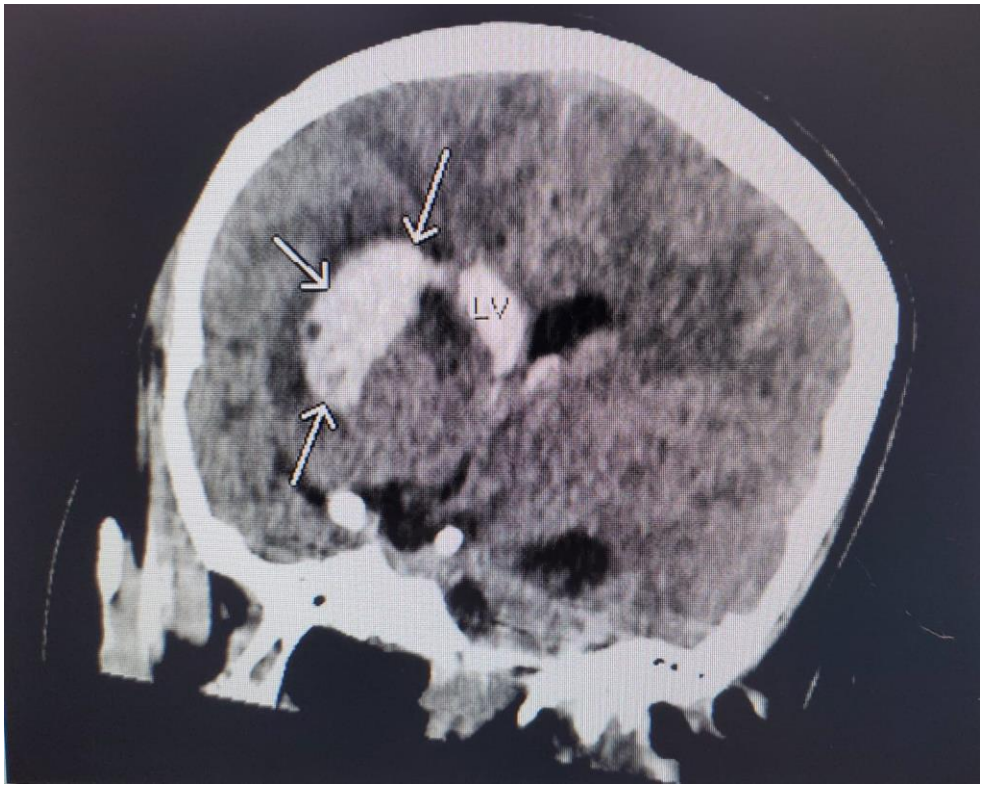

Figure 2. Image of the coronal view of a computed tomographic scan of the head.

Discussion

Our case illustrates the classic presentation of atypical preeclampsia in a nulliparous teenager ultimately leading to the grave complication of ICH. The predisposing factors for the development of preeclampsia in our case were nulliparous state and adolescent age. Our case also adheres to the fact that the third trimester of pregnancy, close to full-term delivery, is when the disease in adolescents with preeclampsia generally occurs **[**7**]**. Early recognition and diagnosis are the mainstays of treatment. However, diagnosis of atypical preeclampsia can be challenging due to its variable clinical presentation with extremely vague symptoms. A significant proportion of women do not exhibit impending signs and symptoms of eclampsia before the onset of seizure except for minor symptoms like an unwell feeling **[**8**]**. Retrospectively, our patient also stated that she had experienced a sort of uneasiness a few hours before the onset of the seizure. Atypical preeclampsia-eclampsia can manifest in different ways. It can be cases of high blood pressure but with trace or negative urine protein or significant proteinuria with either normal or marginally elevated blood pressure, or without any evidence of hypertension and proteinuria **[**9**]**. Our case fulfills the criteria of atypical preeclampsia by manifesting the disease at the onset of labor with the presence of marginally elevated blood pressure and 1+ proteinuria and development of eclampsia without any warning signs and symptoms. Eclamptic convulsions occur in around 2-3% of

patients with preeclampsia. Eclamptic convulsions occurring at antepartum, intrapartum, and postpartum are 38-53%, 18-36%, or 11-44% respectively. Rarely it may be the presenting feature of this condition as like in our case. An extensive study was conducted among 383 eclamptic UK women which demonstrated that around 1/3rd of the eclamptic convulsions occurred in the absence of proteinuria and hypertension, and 2/3rd of the convulsions happened while they were admitted to the hospital **[**10**]**. Sibai et al reported eclampsia in women without edema in 32 %, with minimal or no hypertension in 23 %, and with negative urine dipstick in 19% of cases respectively **[**11**]**.

The neurological manifestations of eclampsia include seizures, alteration of the sensorium, or coma on a background of pre-eclampsia, and rarely focal neurological deficits or stroke due to intracranial hemorrhage (ICH). ICH is a rare neurological complication of eclampsia that can result in life-threatening complications to both mother and fetus. Batman et al demonstrated that pre-eclampsia /eclampsia was independently associated with ICH during maternity and up to the postnatal period in around 30.5% of cases **[**12**]**. Preeclampsia eclampsia usually results in Intracerebral hemorrhages; however, subdural or subarachnoid hemorrhages also have been reported. Preeclampsia-induced pathophysiological changes on the endothelium of the blood vessels are altered endothelial function, microvascular dysfunction, vasospasm, and increased brain capillary permeability eventually leading to failure of cerebral autoregulation, rupture of vessels, cerebral edema, and hemorrhage. Similar to our case, where there is the rapid development of preeclampsia, which generally highlights the fact that the disease was already serious with the features of multiorgan failure upon admission. Adding to this, pregnancy especially the puerperal period is thrombogenic that can lead to the formation of simultaneous cerebral hemorrhages, the end-stage manifestation of preeclampsia.

The incidence of pregnancy-related Intracranial hemorrhage ranges from 3.8 to 18.1 per 100,000 deliveries **[**12-14**]**. The clinical diagnosis of ICH can be challenging to obstetricians due to its low incidence and confounding nature of its early symptoms with that of preeclampsia like dizziness and headache. The early symptoms of ICH may be mistaken for side effects of treatment with magnesium sulfate. In cases like ours, symptoms like dizziness, weakness, and tiredness were attributed to the postictal recovery phase from eclampsia and the effects of magnesium sulfate. Adding to it, those symptoms were considered as the manifestation of anemia due to the postpartum hemorrhage or the associated features of probable sepsis. Pregnancy-associated ICH has a poor prognosis for both mother and baby compared with other causes **[**13-14**]**. The mortality rate due to pregnancy-associated ICH is 9 to 38 %, contributing to more than 12 % of all maternal deaths **[**14**]**. Mortality rate can result in fatality in 40-50% of patients within 30 days. National inquiries on the reasons for death during pregnancy in the United Kingdom proved that cerebral hemorrhage is the major cause of maternal mortality in preeclampsia **[**15**]**. Early diagnosis and treatment are the cornerstones determining the prognosis of the condition. The onset to diagnosis (O-D) time is crucial in predicting the success of the treatment and it is inversely related. Women are most vulnerable to developing ICH during the postpartum period due

to sudden hormonal and hemodynamic changes. According to Kittner's population-based study, the relative risk of ICH during gestation is 2.5 whereas the postpartum period carries a relative risk of 28.3**[**16**]**.

Strokes are an infrequent condition during pregnancy and the estimated incidence rate ranges from 10 to 34/100,000 deliveries. The rarity was proved by comparing the incidence rate with non-pregnant women such that it is lower during the antepartum period. However, the early peripartum period and the early postpartum period showed 9-fold and 3-fold higher rates respectively **[**17**]**. There is a six – to nine-fold chance to develop stroke while pregnant with high blood pressure than without it. Pre-eclampsia/eclampsia accounts for almost 30 % of cases of stroke in pregnancy. Pregnancy-associated stroke includes both hemorrhagic and ischaemic aetiologies, with a hemorrhagic stroke occurring in 38% to 60 % of cases **[**18-19**]**. Tang et al's study supported the fact that women during their gestational period up to a year of postpartum are highly prone to developing stroke with a background history of preeclampsia and eclampsia **[**20**]**. The diagnosis of hemorrhagic stroke can be confirmed by the presence of a hyperechogenic region in the brain using a non-contrast computed tomography (CT) scan **[**Figure2**]**. Management of intracerebral hemorrhages is by the usual neurosurgical principles. Surgery remains the appropriate treatment if there is a progressive deterioration of the clinical condition or if there is exacerbating neurological deficit. In cases of devastating nonrecoverable hemorrhage, to deliver a healthy baby, operative treatment might be considered to lengthen the life of the mother **[**18**]**.

Diagnosis of ICH is crucial and should not be oversight of a presumed diagnosis of pre-eclampsia or eclampsia. Intracerebral hemorrhage is an acute emergency and early diagnosis and prompt action for the treatment are required to prevent severe morbidity and mortality. Timely and effective input from well-equipped multidisciplinary care including a neurologist, neurosurgeon, and ITU specialist is highly warranted to achieve a favorable maternal and fetal outcome.

References

1. Abalos E, Cuesta C, Grosso AL, Chou D, Say L. Global and regional estimates of preeclampsia and eclampsia: a systematic review. Eur J Obstet Gynecol Reprod Biol. 2013 Sep;170(1):1–7) https://doi.org/10.1016/j.ejogrb.2013.05.005.

2. Wang W, Xie X, Yuan T, Wang Y, Zhao F, Zhou Z, et al. Epidemiological trends of maternal hypertensive disorders of pregnancy at the global, regional, and national levels: a population-based study. BMC Pregnancy Childbirth. 2021 May 8;21(1):364. https://doi.org/10.1186/s12884-021-03809-2

3. Knight, M., Bunch, K., Tuffnell, D, Patel, R., Shakespeare, J., Kotnis, R., Kenyon, S., & Kurinczuk, J. J. (Eds.). (2021). Saving lives, improving mothers' care: Lessons learned to inform maternity care from the UK and Ireland confidential enquiries into maternal deaths and morbidity 2017-19. MBRRACE-UK. https://www.npeu.ox.ac.uk/assets/downloads/mbrrace-uk/reports/maternal-report-2021/MBRRACE-UK_Maternal_Report_2021_-_FINAL_-_WEB_VERSION.pdf

4. Bartsch E, Medcalf KE, Park AL, Ray JG. Clinical risk factors for pre-eclampsia determined in early pregnancy: systematic review and meta-analysis of large cohort studies. BMJ. 2016 Apr 19;i1753 https://doi.org/10.1136/bmj.i1753

5. Parra-Pingel PE, Quisiguiña-Avellán LA, Hidalgo L, Chedraui P, Pérez-López FR. Pregnancy outcomes in younger and older adolescent mothers with severe preeclampsia. Adolesc Health Med Ther. 2017 Jun 6;8:81–6. https://doi.org/10.2147/AHMT.S131050

6. Macedo TCC, Montagna E, Trevisan CM, Zaia V, de Oliveira R, Barbosa CP, et al. Prevalence of preeclampsia and eclampsia in adolescent pregnancy: A systematic review and meta-analysis of 291,247 adolescents worldwide since 1969. Eur J Obstet Gynecol Reprod Biol. 2020 May;248:177–86. https://doi.org/10.1016/j.ejogrb.2020.03.043

7. Rosales-Ortiz S, Rodríguez OS, Borbolla-Ramos M, García-Pérez KD. Adolescence and Preeclampsia **[**Internet**]**. Prediction of Maternal and Fetal Syndrome of Preeclampsia. IntechOpen; 2019 **[**cited 2022 Apr 21**]**. Available from: https://www.intechopen.com/chapters/67595

8. Goodlin RC. Preeclampsia is a great impostor. Am J Obstet Gynecol. 1991 Jun;164(6 Pt 1):1577–80; discussion 1580-1581. https://doi.org/10.1016/0002-9378(91)91439-4

9. Kodandapani S. Atypical Preeclampsia: A Review. JGWH **[**Internet**]**. 2018 Nov 21 **[**cited 2022 Apr 24**]**;12(5). Available from: https://juniperpublishers.com/jgwh/JGWH.MS.ID.555849.php

10. Douglas KA, Redman CW. Eclampsia in the United Kingdom. BMJ. 1994 Nov 26;309(6966):1395–400. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2541348/

11. Sibai BM. Eclampsia: VI. The maternal-perinatal outcome in 254 consecutive cases. American Journal of Obstetrics and Gynecology. 1990 Sep 1;163(3):1049–54. https://doi.org/10.1016/0002-9378(90)91123-T

12. Bateman BT, Schumacher HC, Bushnell CD, Pile-Spellman J, Simpson LL, Sacco RL, et al. Intracerebral hemorrhage in pregnancy: Frequency, risk factors, and outcome. Neurology. 2006 Aug 8;67(3):424–9. https://doi.org/10.1212/01.wnl.0000228277.84760.a2

13. Lin LT, Tsui KH, Cheng JT, Cheng JS, Huang WC, Liou WS, et al. Increased Risk of Intracranial Hemorrhage in Patients With Pregnancy-Induced Hypertension: A Nationwide Population-Based Retrospective Cohort Study. Medicine. 2016 May;95(20):e3732.

14. Liang ZW, Lin L, Gao WL, Feng LM. A clinical characteristic analysis of pregnancy-associated intracranial hemorrhage in China. Sci Rep. 2015 Mar 30;5(1):9509. https://doi.org/10.1038/srep09509

15. Gogarten, W. Preeclampsia, and anesthesia. Curr Opin Anaesthesiol 22, 347–351 (2009). https://doi.org/10.1097/ACO.0b013e32832a1d05

16. Pregnancy and the Risk of Stroke | NEJM **[**Internet**]**. **[**cited 2022 Apr 24**]**. Available from: https://www.nejm.org/doi/full/10.1056/NEJM199609123351102

17. Ban L, Sprigg N, Abdul Sultan A, Nelson-Piercy C, Bath PM, Ludvigsson JF, et al. Incidence of First Stroke in Pregnant and Nonpregnant Women of Childbearing Age: A Population-Based Cohort Study From England. J Am Heart Assoc. 2017 Apr 21;6(4):e004601. https://doi.org/10.1161/JAHA.116.004601

18. Fairhall JM, Stoodley MA. Intracranial hemorrhage in pregnancy. Obstet Med. 2009 Dec 1;2(4):142–8. https://doi.org/10.1258/om.2009.090030

19. Aoyama K, Ray JG. Pregnancy and Risk of Intracerebral Hemorrhage. JAMA Network Open. 2020 Apr 14;3(4):e202844. https://doi.org/10.1001/jamanetworkopen.2020.2844

20. Tang CH, Wu CS, Lee TH, Hung ST, Yang CYC, Lee CH, et al. Preeclampsia-eclampsia and the risk of stroke among peripartum in Taiwan. Stroke. 2009 Apr 1;40(4):1162–8. https://doi.org/10.1161/STROKEAHA.108.540880