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Pregnancy and Risk of Intracerebral Hemorrhage

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Pregnancy is a known risk factor for stroke, and hemorrhagic stroke accounts for approximately 60% of all strokes arising in pregnancy and up to the conventional 6-week postpartum period.[1] Meeks et al[2] completed a US population-based cohort study including 3 314 945 pregnant women. They chose to extend the postpartum period to 24 weeks after birth and used a cohort-crossover study design to minimize cofounding. With the cohort-crossover design, a pregnant or postpartum woman was compared with her future nonpregnant self. Specifically, the pregnancy period of assessment for intracerebral hemorrhage (ICH) was from 40 weeks before the index birth up to 24 weeks thereafter (the cohort period), whereas the follow-up comparison (crossover) period started 52 weeks after the cohort period ended and continued for another 64 weeks thereafter. Sandwiched in between the cohort and crossover periods was a 52-week interim period, in which a death or subsequent pregnancy was excluded from the analyses. Clearly, a woman had to be alive at the end of the interim period, which may introduce survivor bias, in that ICH has a high case-fatality rate,[1] so a woman with a fatal ICH would be missed. Moreover, it was assumed that each pregnancy ended at 40 weeks' gestation, which is certainly not the case in women who experience ICH in pregnancy, who are at much higher risk for preterm birth. This may introduce time selection bias, because the duration of exposure to pregnancy among women in the cohort period can vary. Also, with this type of study design, potential cofounding may arise by within-person or between-time fluctuating variables.

Notwithstanding the aforementioned limitations, Meeks et al[2] showed that, compared with the crossover period, the risk of ICH was increased (rate ratio, 9.15; 95% CI, 5.16-16.23) during the 12-week postpartum period but not during the 12- to 24-week postpartum period. They also identified preexisting risk factors associated with ICH, including increasing maternal age, nonwhite race, and chronic hypertension. All of these findings are informative given the paucity of data on ICH in pregnancy and the postpartum period.

Importantly, ICH arising in pregnancy or peripartum is often due to new-onset preeclampsia and eclampsia, especially when acute hypertension is not controlled.[1] Meeks et al[2] showed that women with gestational hypertension had a 2.73 times higher risk of ICH compared with those without gestational hypertension. In addition, approximately one-third (35.29%) of women who had ICH also had eclampsia or preeclampsia, with a corresponding 9.23 times higher risk of ICH higher than those without eclampsia or preeclampsia. Although the definitive treatment of eclampsia and preeclampsia is delivery, delivery can be delayed in some cases to gain fetal maturity; even after delivery, preeclampsia may escalate, such that, in either scenario, the prevention of severe hypertension is crucial to avoid ICH. The American College of Obstetricians and Gynecologists recommends starting antihypertensive therapy once the systolic blood pressure is greater than 160 mm Hg and/or diastolic blood pressure is greater than 110 mm Hg.[3] Those with severe hypertension should be hospitalized and administered labetalol or hydralazine, for example.[4]

In women at higher risk of developing preeclampsia, and who do not have an evident contraindication, low-dose aspirin should be initiated at 12 to 20 weeks' gestation.[5] Level I evidence supports a clear benefit for mother and fetus.[5] Even so, there are no data showing that aspirin prophylaxis reduces the risk of ICH.

Pregnant women who develop disseminated intravascular coagulation are certainly at higher risk of death.[6] In the study by Meeks et al,[2] 9.20% of patients with ICH also had a diagnosis of nonspecific coagulopathy, and approximately one-half of those patients had disseminated

intravascular coagulation, with a corresponding adjusted relative risk of 14.17 (95% CI, 9.17-21.89). Hence, in addition to blood pressure control, maternal coagulation should be normalized in women with preeclampsia, including the use of intravenous tranexamic acid and fibrinogen replacement.

Finally, the timely diagnosis of ICH is vital for subsequent management and treatment, and neuroimaging is a critical step in therein. Conventional computed tomography or magnetic resonance imaging is safe in pregnancy.[7,8] Venous or arterial vessels can be further imaged by non–contrast-enhanced magnetic resonance imaging, such as time-of-flight and phase-contrast techniques, or by using computed tomography angiography or venography. If ICH arises, neurosurgical consultation is recommended, in addition to placing the affected woman in a high-acuity monitored setting.

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