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Migraines during pregnancy linked to stroke and vascular diseases: US population based case-control study

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STUDY QUESTION What is the prevalence of peripartum migraine headache and its associated medical conditions and complications during pregnancy?

SUMMARY ANSWER The prevalence of migraine discharge codes is low (185 per 100 000 deliveries). However, this probably represents only pregnant women with active migraine during admission to hospital. Although cause and effect still need to be established, active migraine during pregnancy could be viewed as a marker of vascular diseases, especially ischaemic stroke.

Participants and setting

Our case-control study was based on the nationwide inpatient sample from the Healthcare Cost and Utilization Project, which included a total of 18 345 538 pregnancy related discharges from US hospitals during 2000 to 2003.

Design, size, and duration

We calculated frequencies of discharges with ICD codes for migraine for each maternal age group, ethnic group, timing of pregnancy related discharge, comorbidity, and pregnancy complication. We identified jointly associated factors with multivariable logistic regression modelling developed from statistically and clinically significant common vascular comorbidities.

Primary outcome(s), risks, and exposures

Migraine discharge codes and the jointly associated discharge codes for vascular and pregnancy complications.

Main results and the role of chance

We found 33 956 migraine discharges, or 185 per 100 000 deliveries, in this cohort. In the descriptive analysis, a strong association existed between migraine discharge codes and stroke codes of all types (odds ratio 15.8, 95% confidence interval 11.1 to 22.5), but especially ischaemic stroke (30.7, 17.4 to 34.1). Migraine discharge codes were also significantly associated with codes for myocardial infarction (4.9, 1.7 to 14.2), pulmonary embolus (3.1, 1.7 to 5.6), deep venous thrombosis (2.4, 1.3 to 4.2), thrombophilia (3.6, 2.1 to 6.1), diabetes (2.3, 1.9 to 2.7), hypertension (3.6, 3.1 to 4.2), cigarette smoking (2.7, 2.4 to 3.1), and pre-eclampsia or gestational hypertension (2.3, 2.1 to 2.5). We found no association with most non-vascular diagnoses. A multivariable logistic regression included age and removal of pre-eclampsia diagnoses from records with stroke, vascular diagnoses, hypertension, smoking, and

LOGISTIC REGRESSION ANALYSIS OF ASSOCIATIONS WITH MIGRAINE DISCHARGE CODES

Independent variable	Odds ratio (95% CI)	P value
Age	1.03 (1.02 to 1.03)	<0.001
Pre-eclampsia	2.29 (2.13 to 2.46)	<0.001
All strokes*	15.05 (8.26 to 27.4)	<0.001
Venous thromboembolism or pulmonary embolus*	3.23 (2.06 to 7.07)	<0.001
Acute myocardial infarction or heart disease*	2.11 (1.76 to 2.54)	<0.001
Hypertension*	8.61 (6.43 to 11.54)	<0.001

*Pre-eclampsia or eclampsia codes excluded from records

diabetes. Key findings from this analysis are shown in the table.

Bias, confounding, and other reasons for caution

The results of this study include only women with migraines that were active during hospital admission and listed as the primary or secondary discharge diagnosis. Therefore, the population does not include women with mild migraines treated as outpatients or women with a history of migraines that are quiescent during pregnancy. Other reasons for caution exist. Firstly, we were unable to separate migraines with aura from migraines without aura. Secondly, peripartum migraine could have been miscoded or inadvertently listed separately in the setting of cerebrovascular complications in which headache is a prominent symptom, such as cerebral venous thrombosis. Thirdly, the headache of severe pre-eclampsia often includes the presence of visual scotomata, which could have been confused with migraine. Fourthly, we were unable to compare these results in non-pregnant women because the database was limited to pregnancy discharge codes. Fifthly, this study does not allow us to establish cause and effect because the timing of migraine and onset of the vascular event is uncertain.

Generalisability to other populations

This analysis was done in US hospitals only. Whether the results are generalisable to non-US pregnancy discharges is unclear.

Study funding/potential competing interests

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