STROKE

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Dear Doctor,

Greetings from Micro Labs. We are happy to bring you "Stroke Newsletter" which contains latest and interesting news in the field of Neuropsychiatry.

This issue contains:

1. **Relationship between the ocular motor cranial nerve palsy and subsequent stroke stratified by age**
2. **Association between night-time heat exposure and the risk of stroke**
3. **Correlation between early-life tobacco exposure and stroke risk**
4. **Case report on central vertigo caused by ischemic stroke**

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Looking forward to your valuable feedback
Best Regards,
Medical Team, Micro Labs Ltd

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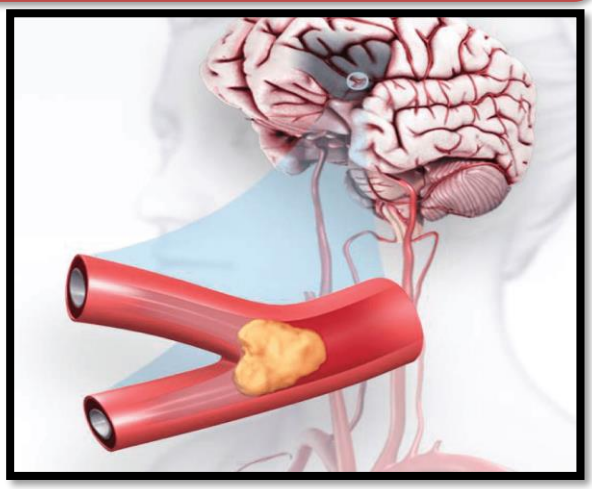
Relationship between the ocular motor cranial nerve palsy and subsequent stroke stratified by age

Introduction –

Ocular motor cranial nerve palsy patients in their 30s are up to eight times more likely than controls to experience subsequent stroke.

Microvascular ischemia is a prevalent cause of ocular motor cranial nerve palsy (CNP) and is frequently seen in elderly patients with diabetes, hypertension, and hyperlipidemia. Ocular motor cranial nerve palsy and stroke have been related in several studies because these patients have similar atherosclerotic risk factors. Previous studies have shown an increased risk of stroke after ocular motor CNP, using the Sample Cohort database of the Korean National Health Insurance Service (NHIS), which includes one million individuals. Since Ocular motor CNP is uncommon, this study sought to find out if it is associated with a higher risk of stroke in a broader population in order to guarantee a large enough sample size for a reliable analysis. Additionally, this study sought to investigate whether age might have an impact on the stroke risk linked to ocular motor cranial nerve palsy.[1]



Stroke

Methods – This nationwide, population-based cohort study included 52,076 individuals diagnosed with ocular motor CNP over a 7-year period, where baseline comorbidities were assessed using the patient's clinical records and medical history. The control group's age and gender were matched at a ratio of 1:5 using propensity scoring. About one year after the date of their CNP diagnosis (the one-year time lag), eligible individuals were monitored for stroke. During the national health examination, general health behavior and lifestyle data were gathered using standardized self-reported questionnaires. These questionnaires were used to collect data on regular physical activity, alcohol consumption, and smoking status. Samples of

blood were taken following an overnight fast. Measurements were made of the following serum levels: γ-GTP, aspartate aminotransferase, alanine aminotransferase, total cholesterol, triglycerides, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, hemoglobin, and serum creatinine. Utilizing age-stratified multivariable Cox proportional hazards regression analyses, the relationship between ocular motor CNP and a subsequent stroke was evaluated. Adjusted covariates included health behavior, lifestyle, underlying comorbidities, and Charlson comorbidity index score.

Results–

After controlling for potential confounders, the ocular motor CNP group had a higher risk of stroke (hazard ratio [HR], 1.23 [95% CI, 1.08–1.39) compared to the control group. When comparing individuals with ocular motor CNP history to controls, the Kaplan–Meier survival curve revealed a significant increase in the incidence probability of stroke over a maximum of 8 years of follow-up observation (Figure 1). People with ocular motor CNP in their 30s had an 8.91-fold increased risk of stroke (HR, 8.91 [95% CI, 1.63–48.66]). Individuals in their 40s had a 2.49-fold increase in risk, followed by those in their 50s a 1.78-fold increase and those in their 60s a 1.32-fold increase (HRs, 2.49, 1.78, and 1.32 [95% CI, 1.39–4.45, 1.31–2.42, 3.08–1.62], respectively). Nonetheless, there was no discernible rise in the incidence of stroke among individuals in their 20s, 70s, or 80s.

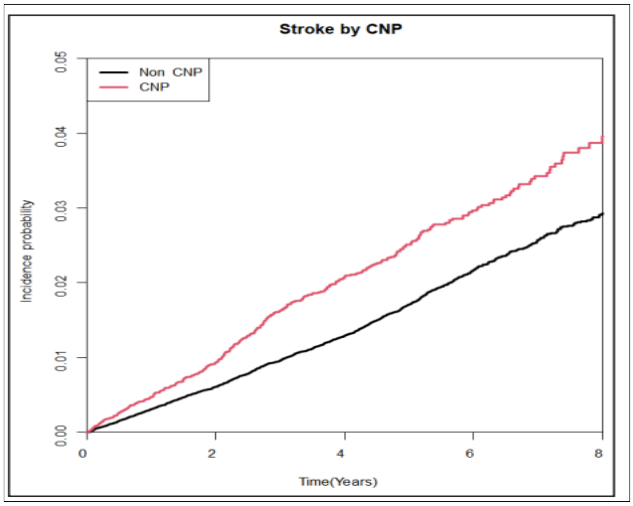


Figure 1. Kaplan–Meier survival curve revealing a statistically significant increase in the incidence risk of stroke over a maximum of 8 years of follow-up

Discussion –

The results of this study indicated that an ocular motor CNP diagnosis increased the risk of stroke, even after controlling for age, sex, and medical comorbidities related to cerebrovascular disease. An HR of 5.96 for a subsequent stroke following isolated ocular motor CNP within the first year has been shown in a recent meta-analysis. Three years later, the HR dropped to 3.27. It held steady at 2.9 for a period of 12 years.[2] It's interesting to note that the risk of stroke linked to ocular motor CNP varied with age, according to subgroup analysis. The HR of 5-year stroke-free survival following ocular motor CNP is 3.25 for older subjects (aged ≥65 years) and 4.20 for younger subjects (aged <65 years), according to a previous study by Rim et al.[3]

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Conclusion –

The current study showed a correlation between ocular motor CNP and a higher risk of stroke, in younger people. In particular, the risk of having another stroke was up to eight times higher for young adults in their 30s who had a history of ocular motor CNP than for those in the control group. Further research is required to explore into the underlying mechanisms of this association and possible younger patient-specific prevention measures.

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Association between night-time heat exposure and the risk of stroke

Introduction-

Heat exposure at night was linked to a higher risk of stroke and vulnerability was higher in older individuals, females, and patients with mild stroke symptoms.

Stroke is characterized by an obstruction or rupture in the blood supply to the brain. Depending on the cause, stroke can be further classified into three subtypes: ischemic stroke, haemorrhagic stroke, and transient ischemic attack (TIA).[1] Risk factors for stroke include high blood pressure, diabetes, elevated cholesterol levels, smoking, and excessive alcohol consumption. Additionally, environmental factors such as unfavourable ambient temperature may also have an impact because of their widespread exposure in the general public. Several studies have examined the impact of day average or maximum temperatures, no study has investigated the relationship between night-time heat exposure and stroke risk.[2] Furthermore, a growing body of research indicates that the risk of stroke may also be impacted by increases in daily minimum temperatures, even though many studies have concentrated on the effects

of daily average or maximum temperatures. The purpose of the study was to evaluate the relationship between nighttime heat exposure and the incidence of stroke across various time periods.

Methods –

This was a 15 years' registry-based time-stratified case-crossover study where the author obtained 22,284 stroke cases. Then the cases were classified using the International Classification of Diseases, (ICD-10) to categorize the subtypes includes haemorrhc strokes, transient ischemic attacks, and ischemic strokes. The National Institutes of Health Stroke Scale (NIHSS) was used as an additional scoring system to classify stroke patients based on the severity of their symptoms as well as to assess and track their neurological status. After accounting for the possible confounding effects of the daily maximum temperature and other climatic variables, the hot night excess (HNE) index, a measure of extreme nighttime heat, was used to estimate the stroke risk associated with it using a time-stratified case-crossover analysis with a distributed lag non-linear model. Subgroup analyses were conducted to identify differences in the susceptibility to heat at night by age group, sex, stroke subtype, and stroke severity.

Results-

The study's overall findings indicated that there was a statistically significant increase in the risk of stroke on days with extremely high nighttime heat (97.5% percentile of HNE) (odds ratio 1.07, 95% confidence interval 1.01–1.15). There were noticeable variations in each stroke subtype's exposure-response curve (Figure 1). There was a significant ($P < 0.05$) increase in HNE-related risk for all strokes, and specifically for ischemic strokes, during the more recent period when comparing the results for 2013–20 with the results for 2006–12. Moreover, those who were elderly, female, or had mild symptoms of a stroke showed a markedly higher susceptibility to heat during the night. Significantly, higher risks of stroke related to HNE were also observed in younger age groups and males during the more recent period. On the other hand, for these subgroups, no significant effects were found between 2006 and 2012.

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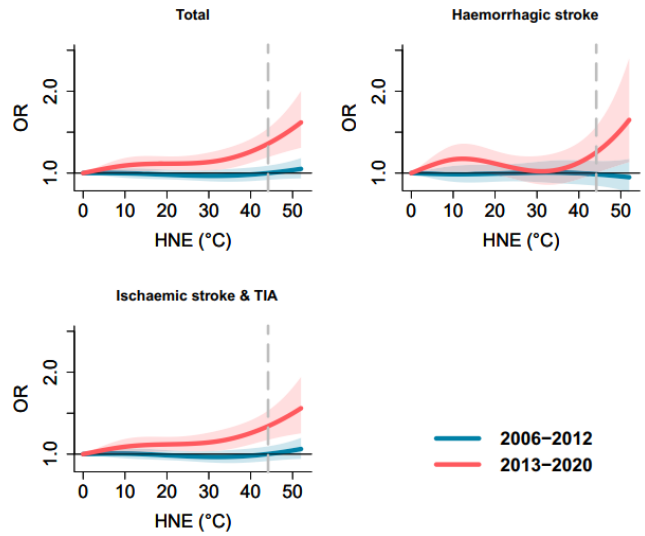

Figure 1. Hot night excess (HNE) and stroke risk over Lag 0–6 days: cumulative exposure–response relationships with corresponding 95% confidence intervals (shaded areas) for 2006–12 and 2013–20

Discussion –

This study showed that exposure to heat throughout the night considerably raises the risk of stroke, indicating that it may have an impact on health outcomes other than overall mortality. Multiple studies that have demonstrated a substantial correlation between exposure and an elevated risk of stroke-related mortality support this finding.[3,4] This study showed that there was a substantial increase in the risk of ischemic strokes and TIA during periods of excessive heat at night. The magnitude of this risk was higher in the more recent era (2013–20) compared to the earlier period (2006–12) ($P < 0.05$). This was consistent with a recent study showing a positive correlation between elevated hourly temperature and ischemic strokes, and it also implies a relationship between low temperatures and haemorrhagic stroke incidence.[5]

Conclusion –

Heat exposure at night was related to a higher risk of stroke. Also, it was found that the risk of heat-related stroke at night increased significantly throughout the more recent period (2013–20) as compared to the previous period (2006–12). These results highlight how important it is for precautionary steps to reduce the potential effect of heat stress at night on stroke incidents.

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Correlation between early-life tobacco exposure and stroke risk

Introduction –

Early exposure to tobacco smoke was associated with a higher lifetime risk of stroke.

Stroke causes about 10% of deaths worldwide and it is one of the main causes of long-term disabilities.[1] Smoking is a substantial risk factor for the global burden of stroke, ranking sixth overall among all stroke risk factors for both males and females combined.[2] There were certain drawbacks to the stroke prevention or prediction techniques currently in use. Early-life tobacco exposure, such as adolescents who smoke and maternal smoking during pregnancy, can have a detrimental impact on adolescent development. It is unknown, nevertheless, whether early tobacco exposure and stroke are related.[1] So, this study was conducted to investigate the association between early-life exposure to tobacco smoke and the risk of stroke.

Methods –

In this prospective cohort study, the author included 304,984 and 342,893 participants, from the UK Biobank for the analyses pertaining to exposure to maternal smoking during pregnancy and age of smoking initiation. The study evaluated early tobacco exposure based on the

participants' smoking initiation age and whether their mothers smoked while they were pregnant. The age of initiation was determined for participants who had a history of regular smoking. With the use of algorithmic defined outcomes (ADOs), the commencement of the stroke was recognized. Subgroup analyses and the Cox proportional hazard regression model were used to investigate into a possible association between early-life tobacco exposure and stroke. To determine biological aging's mediating role in the relationship between early tobacco exposure and stroke, mediation analyses were carried out.

Results – Individuals whose mothers smoked during pregnancy had an 11% higher risk of stroke than individuals whose mothers did not smoke during pregnancy, according to the Cox proportional hazards regression analysis. Moreover, individuals who began smoking in their adult, teenage, or adolescent years showed a 22%, 24%, and 38% higher risk of stroke, in comparison to non-smokers (Table 1). In subgroup analysis, it was found that smoking during childhood raised the risk of stroke by 42% in those who were exposed to maternal smoking during pregnancy and by 30% in the group whose mothers did not smoke during pregnancy.

	In utero tobacco smoke exposure		Age of smoking initiation			
	No	**Yes**	**Never smokers**	**Adulthood ≥18 years**	**Adolescence 15–18 years**	**Childhood <15 years**
Number	215,730	89,254	233,792	16,969	46,612	45,520
Events	4061	1830	3954	466	1232	1140
Model 1[a]	1	1.09	1	1.52	1.61	1.69
Model 2[b]	1	1.12	1	1.24	1.26	1.42
Model 3[c]	1	1.11	1	1.22	1.24	1.38

Table 1. Participants who started smoking during adulthood, adolescence, and childhood exhibited an increased risk of stroke

[a]Crude model [b]Model was adjusted with sex, age, race, educational level, TDI, physical activity, drinking status [c]Model was again adjusted with hypertension, diabetes, health diet score base on model 2

Discussion –

The risk of stroke was increased by tobacco smoke. Compared to individuals whose mother did not smoke during pregnancy, those whose mothers smoked throughout pregnancy have an increased risk of stroke. When compared to non-smokers, those who began smoking in their maturity, adolescence, or childhood have a higher risk of stroke that increases over time.

Similar to this study, Rissanen I et al. showed the impact of early tobacco exposure on the risk of stroke.[3] Also, the risk of stroke associated with second-hand smoke was high compared with people exposed to 15 cigarettes per day.[4]

Conclusion –

This study shown a relationship between early exposure to tobacco smoke and a higher lifetime risk of stroke. According to mediation analysis, early-life tobacco smoke exposure has been shown to accelerate age-related changes and increase the risk of stroke.

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Case report on central vertigo caused by ischemic stroke

Introduction –

Ischemic stroke is one of the causes of central vertigo

Central vertigo is a clinical condition in which an individual experiences hallucinations of motion in their surroundings or a feeling of spinning even when stationary because of dysfunction of the vestibular structures in the central nervous system.[1] One of the causes of central vertigo is vertebrobasilar stroke. Although older people are typically the victims of ischemic stroke, younger people have been experiencing an increase in cases recently. Furthermore, although women have been experiencing an increase in stroke cases recently, men still have a higher prevalence of stroke

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than women.[2] This study reported on central vertigo caused by ischemic stroke in a young woman.

Case presentation –

A 25-year-old woman presented with complaints of sudden vertigo in the morning when she woke up and she also reported headache, nausea, vomiting, blurred vision, and left leg weakness. In addition, the patient reported having numbness in their left limbs. There were no convulsions, loss of consciousness, or related head position changes. and she experienced no tinnitus, hearing loss, or vertigo. She also had no prior history of vertigo, cardiovascular disease, diabetes, or hypertension. The patient has never used hormonal birth control, has never smoked.

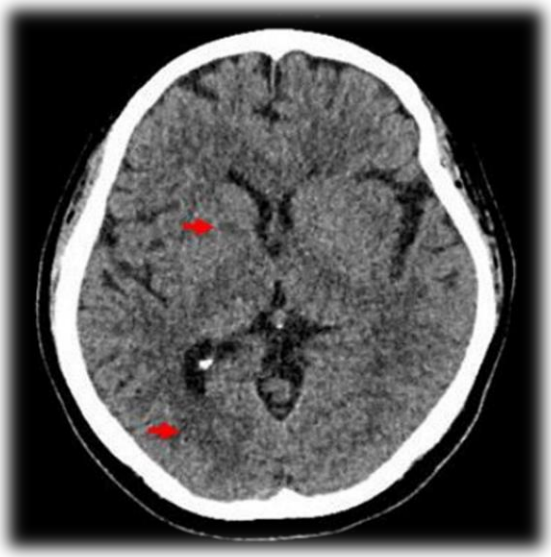

Figure 1. Head CT scan without contrast showed multiple lacunar infarctions in the right basal ganglia and periventricular

On examination, the patient exhibited no symptoms, and vital signs were within normal ranges. Comprehensive laboratory tests, including a complete blood count, lipid profile, fasting blood glucose, uric acid, and serum electrolytes, were performed. The results indicated an HDL cholesterol level of 10 mg/dL, while all other values were within normal limits. Neurological examination revealed bidirectional horizontal and vertical nystagmus, left hemiparesis, and left hemihypesthesia, but no pathological reflexes or cranial nerve palsy. A head CT scan without contrast showed several periventricular and right basal ganglia lacunar infarctions (Figure 1).
Treatment included pharmacological management with 325 mg of aspirin, followed by 80 mg of aspirin once daily; 24 mg of betahistine twice daily; 10 mg of flunarizine twice daily; 300 mg of gabapentin once daily; 12.5 mg of amitriptyline once daily; 500 mg of citicoline IV three times daily; 10 mg of diphenhydramine IV three times daily; 30 mg of ketorolac IV twice daily; and 40 mg of omeprazole IV once daily. Non-pharmacological therapy included raising the head of the bed by 30 degrees and mobilizing the patient to prevent pressure sores. The patient responded well to treatment, showing clinical improvement over her four-day hospital stay. She experienced no further vertigo by the one-week post-hospitalization follow-up. Although a head MRI (Magnetic Resonance Imaging) was scheduled, the patient failed to attend the follow-up appointment.

Discussion:

In this study, the neurological exam revealed bidirectional nystagmus, left hemiparesis, and hemi hypesthesia, consistent with stroke-related deficits. Differentiating vertigo in the ED involves the HINTS (Head Impulse test, Nystagmus, and Test of Skew) test and hearing evaluation. Central vertigo features a negative or normal Head Impulse Test, bidirectional nystagmus, corrective movements on the Test of Skew, normal hearing, and neurological deficits. Peripheral vertigo shows a positive Head Impulse Test, unidirectional nystagmus, normal Test of Skew, abnormal hearing results, and no neurological deficits. Based on these findings, the patient's symptoms and examination suggest central vertigo due to stroke.[3]

Conclusion –

Differentiating between peripheral and central vertigo is important since it will impact the patient's course of treatment. Ischemic stroke is one of the causes of central vertigo. Stroke usually affect the elderly, but a growing number of young people have been affected recently. Men typically experience strokes at a higher rate than women. But still a rise in young women having strokes has been observed recently. Consequently, an ischemic stroke must be considered as one of the possible causes if a young woman presents with complaints of vertigo.

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