

Headache pathophysiology: clinical

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ALTERATIONS IN CEREBRAL BLOOD FLOW ASSOCIATED WITH THE PREMONITORY PHASE OF MIGRAINE

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Introduction:

The premonitory phase of migraine is an area of increased research interest, because of the insights it can offer into understanding the neurobiology of the disorder (1,2).

Objectives: We aimed to study the phenotype and imaging characteristics of the premonitory stage using nitroglycerin-triggered attacks.

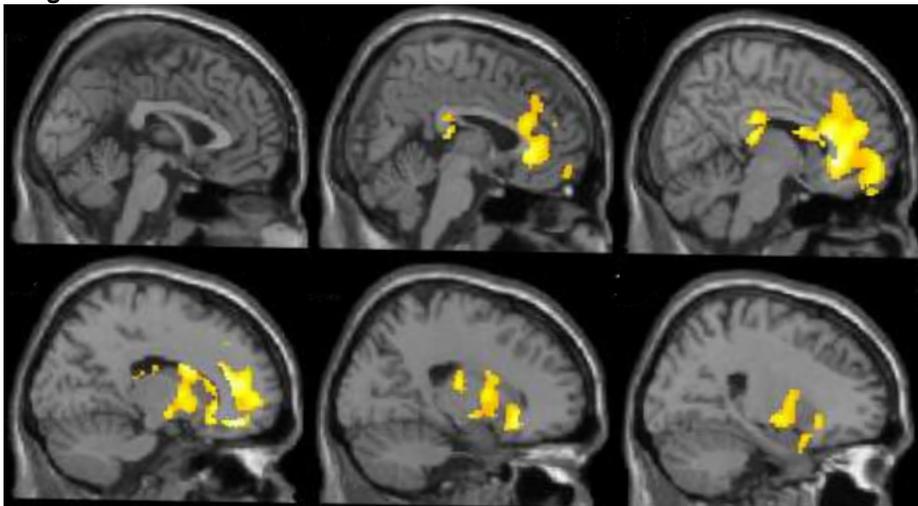
Methods:

Subjects ($n=25$) were recruited following screening and informed consent and exposed to either a 0.5mcg/kg/min NTG infusion over 20 minutes or placebo. Each subject was randomised to receive both infusions on two different visits and was blinded to which treatment was being administered. Following the infusion, the timeline and phenotype to development of migraine symptoms was documented. Pseudocontinuous arterial spin labelled (pCASL) imaging as a measure of cerebral blood flow (CBF), was acquired at baseline, during the premonitory stage, during migraine headache and following headache resolution with treatment.

Table:

Symptom	Tiredness	Neck stiffness	Yawning	Mood change	Thirst	Concentration change	Photophobia
Cohen's kappa coefficient	0.51	0.4	0.3	0.075	0.4	0.2	0.14
Percentage of agreement between spontaneous and triggered attacks (%)	85% (45/53)	70% (37/53)	64% (34/53)	47% (25/53)	72% (38/53)	66% (35/53)	51% (27/53)
p value	<0.001	0.006	0.028	0.468	0.004	0.117	0.177

Image:



Results:

There was a significant difference in increases in CBF with NTG relative to placebo during the premonitory phase compared to baseline in a large cluster that included the frontal and cingulate cortices, thalamus, amygdala, head of caudate, putamen and pallidum ($p < 0.001$, FWE-corrected for multiple comparisons at the cluster level). Small volume correction revealed significant increases in blood flow in the hypothalamus ($p = 0.026$, peak-level FWE corrected). Post-hoc paired t -tests revealed significantly increased CBF in the region of the substantia nigra ($p = 0.041$, peak-level FWE corrected) and significant decreases in CBF in a cluster including the occipital and posterior parietal cortices ($p < 0.001$, FWE-corrected for multiple comparisons at the cluster level).

Conclusion: The premonitory stage of migraine is associated with significant alterations in CBF in brain areas of interest in migraine, in particular in areas with functional correlation with the clinical symptomatology displayed during this phase.

References: 1. Giffin NJ, Ruggiero L, Lipton RB et al. Premonitory symptoms in migraine: an electronic diary study. *Neurology* 2003; 60(6):935-40.
2. Maniyar FM, Sprenger T, Monteith T et al. Brain activations in the premonitory phase of nitroglycerin-triggered migraine attacks. *Brain* 2014; 137(1):237-41.

Disclosure of Interest: None Declared

Keywords: None