

# Depicting areas of cerebral blood flow changes in nitroglycerin-induced cluster headache attacks using arterial spin labelling

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## Aim

To investigate cerebral blood flow (CBF) changes during nitroglycerin (NTG) triggered attacks in subjects with cluster headache, using arterial spin labelling (ASL).

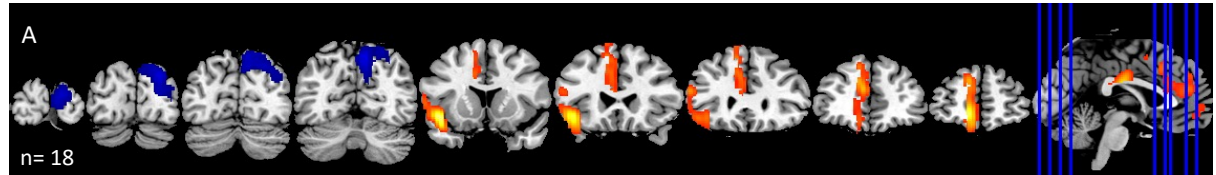
## Method

- Subjects had 2 scanning visits receiving either:
  - intravenous NTG (0.5µg/kg/min) or
  - an equivalent amount of 0.9% sodium chloride
- Whole-brain CBF maps were acquired using a 3 Tesla MRI scanner at "baseline" and post-infusion "headache".
- Normalised to symmetric template and analysed with all attacks on left side.
- This study was approved by an NHS Research Ethics Committee.

## Conclusion

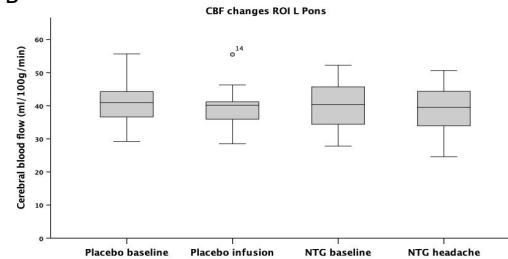
- Increases in regional CBF were observed in pain perception and processing areas ipsilateral to attack side.
- Decreases in CBF were observed in areas involved in the default brain network.
- Region of interest analysis showed increased CBF in the hypothalamus and ipsilateral pons.
- Normalising to a symmetric template prior to rotating of images could be used for other lateralised headache disorders

## Results

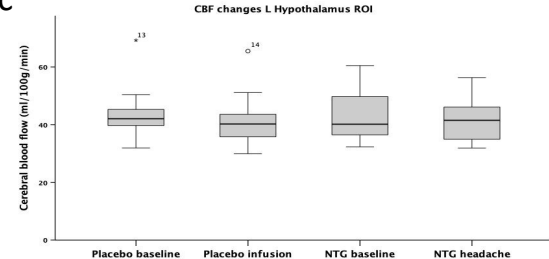


Whole-brain comparison using a 2x2 factorial analysis (A) with increases in CBF (shown in red) and decreases in CBF (shown in blue). Clusters of significant change were determined using the cluster-extent criterion ( $P_{FWE} < 0.05$ ) using an uncorrected voxel-wise cluster-forming threshold of  $P < 0.005$ .

## B



## C



Increases in CBF in *a priori* regions of interest, during the NTG visit compared to placebo visit, in left anterior cingulate, left thalamus, left pons (B), left hypothalamus (B) and right hypothalamus.

FUNDED BY

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