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Publication date:
2021

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
Brain activity during working memory in congenital adrenal hyperplasia

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INTRODUCTION

- The disrupted cortisol rhythm, in addition to other physiological challenges in CAH might affect the developmental trajectory of the brain
- Patients have been found to have problems with working memory (WM)¹ and reduced cortical thickness in regions of the working memory brain network in adulthood²
- These changes might be accompanied by changes in brain activity during working memory

AIM

- We aimed to compare working memory related brain activity between patients with CAH and healthy controls
- We also tested the modulating effect of sex

METHOD

- 29 patients with CAH (17 female) and 40 Controls (24 female), aged 16-33 years
- Participants underwent MRI 3T functional brain scanning while performing a verbal and visuo-spatial working memory task

During the tasks, participants memorized (encoding) a sequence of five letters (A), or the location of dots in a grid (B), and were then probed for the position in the sequence of one of the items (decoding).

RESULTS

- Working memory related brain activity was assessed by comparing activity during the encoding and decoding phases to activity during control conditions
- There were no differences in brain activity between CAH and controls during any of the WM tasks on a whole group level
- Sex-dependent effects were found only during the decoding phase of visuo-spatial working memory:
  - Males with CAH showed stronger activity in regions of the left dorsal visual stream compared to male controls
  - Females with CAH showed reduced activity in these areas compared to female controls
- There were no relationships between brain activity and performance (accuracy or reaction time) on this task in any of the groups

CONCLUSIONS

- CAH does not seem to have a major impact on the functional brain responses during working memory at adult age, for this specific task
- The similar level of activity in the presence of reduced cortical thickness suggests patients’ brains are able to compensate well during certain tasks
- However, activity of the left dorsal visual stream might be affected depending on sex
- Future multi-modal analyses will investigate the relationship between brain structure and function during working memory in patients with CAH

REFERENCES


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ACKNOWLEDGEMENTS

We thank Dr Malin Thomsen Sandberg and Licensed psychologist Anton Gezelius for patient recruitment and testing.

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