WIDESPREAD EXTRA-MOTOR ABNORMALITY IS A PROMINENT MRI SIGNATURE OF ALS: A CROSS-COHORT STUDY

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AMYOTROPHIC LATERAL SCLEROSIS (ALS) IS A HETEROGENEOUS NEURODEGENERATIVE DISEASE CHARACTERISED BY MOTOR DYSFUNCTION, BUT NOW RECOGNISED AS A COMPLEX MULTI-SYSTEM DISORDER. NEUROIMAGING STUDIES INDICATE AN EXPANDING, THOUGH INCONSISTENT, LIST OF EXTRA-MOTOR NEURAL INVOLVEMENT. THE OBJECTIVE OF THE CURRENT STUDY WAS TO EXAMINE PATTERNS OF GREY MATTER CHANGE ACROSS TWO CLINICALLY WELL MATCHED PATIENT COHORTS TO IDENTIFY CORE NEURAL CHANGES UNDERLYING ALS.

Methods

Independent ALS and age-matched healthy control cohorts were compared from Oxford (ALS: 45; Control: 34) and Sydney (ALS: 45; Control: 27). Whole-brain voxel-based morphometry and subcortical volumetric analyses were carried out.

Results

Subcortical volumetric reduction was consistently observed in the thalamus, caudate and hippocampus (all p < 0.05). Pattern of cortical grey matter atrophy showed variability across ALS cohorts, but consistently implicated crus I-II of the cerebellum and orbitofrontal cortices (p < 0.01, family-wise error corrected).

Conclusions

The core grey matter signature of ALS comprises extensive extra-motor cortical and subcortical abnormalities. Significant variability exists, which highlights the heterogeneous nature of ALS as defined by current diagnostic guidelines.

ROLE OF TRANSCALLOSAL INHIBITION IN DISEASE SPREAD IN ALS

INTRODUCTION

Amyotrophic lateral sclerosis (ALS) is a heterogeneous neurodegenerative disease characterised by motor dysfunction, but now recognised as a complex multi-system disorder. Neuroimaging studies indicate an expanding, though inconsistent, list of extra-motor neural involvement. The objective of the current study was to examine pattern of grey matter change across two clinically well matched patient cohorts to identify core neural changes underlying ALS.

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