DIFFERENTIAL DIAGNOSIS OF SCHIZOPHRENIA VS. BORDERLINE PERSONALITY DISORDER USING PATTERN CLASSIFICATION METHODS IN STRUCTURAL MRI IMAGES

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Introduction:

Everyday clinical routine is frequently challenged by difficulty to choose among differential diagnostic options, since many psychiatric disorders share similar phenotypes. E.g., borderline personality disorder (BPD) and schizophrenia (SZ) can both be associated with psychotic syndromes.

Objectives

Our objective was to evaluate the effectiveness of combining sMRI data and pattern classification methods to differentiate between BPD and SZ.

Aims

We aim to introduce objective diagnostic measures to improve the reliability of clinical evaluations.

Methods:

sMRI data of 114 female patients were used to train a multivariate disease classifier.

MR images were processed using voxel-based morphometry and high-dimensional registration to the MNI template. Grey matter volume maps were fed into a machine learning pipeline consisting of adjustment for possible age effects, PCA for dimensionality reduction and linear v-support vector classification. Diagnostic performance of the classifier was determined by repeated nested 10-fold cross-validation.

Results:

We were able to correctly classify unseen test subjects' diagnosis with 74% accuracy. Classification sensitivity and specificity was 74%. Volume reductions in SZ vs. BPD were predominantly located in the left peri- and intrasylvian regions, orbitofrontal regions, the nucleus caudatus and the right cerebellum. Volume reductions in BPD compared to SZ were found predominantly in the left cerebellum, in limbic areas and the left inferior occipital gyrus.

Conclusions
Our results suggest that SZ can be differentiated from BPD at the single-subject level using sMRI and pattern classification methods. In future, this method might enhance clinical evaluations and improve accuracy and reliability of differential diagnosis.