Aim

Morphologic abnormalities of the pituitary gland volume (PV) have been reported in schizophrenia, but at what point in time they occur remains unclear.

As recent research has shown, the pituitary seems already to be increased during the prodromal phase of psychosis [1]. Pariente et al. [2, 3] also found increased PV in neuroleptic-free patients with a first episode psychosis (FEP compared to healthy controls (HC)). Following this enlargement, however, the pituitary seems to become smaller in established, treated schizophrenia [2].

This study determines PV across different stages of emerging psychotic disorders compared to healthy controls.

Methods

We compared PV of 36 individuals with an at-risk mental state (ARMS) for psychosis, 23 patients with a first episode psychosis (FEP) and 20 healthy controls (HC). Transition to psychosis was monitored using the BPRS transition criteria according to Yung et al. [4]. Applying these transition criteria, 16 of the 36 ARMS individuals made the transition to psychosis (ARMS-T) and 20 did not (ARMS-N). More than half of the FEP patients (14/23) were antipsychotic-naïve. The remaining nine participants were prescribed atypical antipsychotic medications, six of them for less than one month. Most of the ARMS individuals (32/36) never received antipsychotic medication, four participants received low doses of atypical antipsychotic medication for less than one month.

This imaging study was embedded in a naturalistic, prospective study on the prediction of transition to psychosis in individuals with ARMS, the Basel Early Detection of Psychosis (PoPsy) [5].

We traced PV manually on 1 mm slices of magnetic resonance images in three dimensions (coronal, sagittal and axial) blind to group status. We used univariate analysis of covariance (ANCOVA) with PV as dependent variable, group and sex as between-subject factors and whole brain volume as covariate.

Results

PV increased from HC to ARMS-NT to ARMS-T/FEP. ANCOVA with PV as dependent variable, group and sex as factors, and whole brain volume as covariate revealed a significant effect of group ($F_{1,34} = 3.0; p = .036$) and a sex x group interaction ($F_{1,34} = 6.5; p = .001$). Over all groups, women had considerably larger PV than men ($F_{1,34} = 9.8; p = .003$). Female sex in the ARMS-T group mainly drove this effect. These findings remained the same after adding age as covariate.

Conclusions

Our findings provide further evidence that PV is increased with emerging psychotic disorders and may reflect a hyperactivation of hormonal functions of the pituitary gland, particularly in women. Our findings encourage further investigation of the role of the HPA Hypothalamo-Pituitary-Axial and the HPG Hypothalamo-Pituitary-Gonadal axis in emerging psychotic disorders esp. regarding the hormones produced in the pituitary such as prolactin. Also more prospective longitudinal neuroimaging studies from ARMS onwards are urgently needed.

References


Table 1. PV are adjusted for sex, ANCOVA model with PV as dependent variable, group and sex as factors, whole brain volume as covariates: $F_{1,34} = 3.0; p = .036$

Figure 2. PV across groups. Boxplot with median, upper and lower quartiles and standard deviation separated for groups and sex. Men: HC n=13, ARMS-NT n=11, FEP n=17. Women: HC n=13, ARMS-NT n=10, ARMS-T n=5, FEP n=6.