

¹H MRSI in the putamen and thalamus of homosexual pedophiles does not show similarities to OCD

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Introduction

Pedophilia has generated a great deal of public attention and is a highly emotionally charged issue. Despite the brain's role as the "master organ" governing sexual function (1) research in neurobiological correlates of pedophilia is scarce (2).

As pedophilia is characterized by socially deviant, repetitive, highly arousing sexual fantasies, urges and activities, it shares some phenomenological similarities with obsessive compulsive disorder (OCD), which is also characterized by inadequate urges and poorly inhibited, repetitive behaviors. Providing that pedophilia does indeed share neurobiological similarities with OCD we hypothesized differences in striatal NAA as reported for OCD patients by Ebert et al. (3) and Bartha et al. (4).

Methods

10 homosexual pedophiles (mean age 35.3 years, SD 8.3 years) and 10 healthy age matched controls (mean age 33.1 years, SD 8.9 years) participated in this study. All homosexual pedophiles were inmates of forensic security hospitals judged by their therapists as still dangerous and not able to control their pedophile behavior. Homosexual pedophiles fulfilled ICD-10 criteria for homosexual pedophilia (F65.4), and did not deny sexual abuse of boys. Sexual abuse of girls was an exclusion criterion. Age of misused boys was 8-13 years. Average hospital stay was 9 (\pm 3.5) years. The MRSI data were acquired on a 1.5 T Magnetom VISION™ (Siemens, Erlangen, Germany) using a standard circularly polarized head coil. A MRSI sequence with PRESS volume selection was used with the volume centered on the thalamus in AC-PC orientation. Measurement parameters included a FOV of 210 \times 210 mm, 15 mm slice thickness, TE = 135 ms and TR = 1.5 s resulting in a measurement time of 11 minutes. For postprocessing of the MRSI data an automated spectral fitting program (5) was used. The signals of NAA, creatine and phosphocreatine (tCr), and choline containing compounds (Cho) were curve fit and voxels from left and right putamen and thalamus, respectively were manually selected. For all selected voxels the metabolite linewidth was well below 10 Hz. The high resolution 3D mprage data set was segmented into gray matter (GM), white matter (WM) and cerebrospinal fluid (CSF) which was achieved using a SPM99 routine. These data were then coregistered with the MRSI data and three mean images (GM, WM, CSF) matching the size, position and exact excitation profile of the MRSI data are created. It was assumed that CSF contains no detectable metabolite concentration and only voxels containing more GM than WM and less than 25% CSF were included in the analysis. Absolute integral values of the model peaks obtained by the fitting algorithm for NAA, tCr, and Cho were then corrected for the individual point-spread-function, PRESS volume profile, chemical shift of different metabolites and CSF content of the voxel (6). Additionally, metabolite signals were corrected for differential head coil loading by multiplication with the transmitter reference voltage. This yields a semi-quantitative measure avoiding metabolite ratios.

Results

In a paired t-test metabolites in both groups were tested for hemisphere differences which could not be detected (all $p > 0.2$). Therefore, mean values for left and right thalamus and putamen are reported, respectively. In a multivariate general linear model analysis with the concentration estimates for the individual metabolites NAA, Cho and tCr as dependent variables and with group as the between-subject factor and age and voxel GM content as covariates we could not determine significant differences in any of the metabolite measures from the putamen and thalamus of homosexual pedophiles in comparison to healthy controls. The mean and SD of NAA, Cr, Cho from the putamen and thalamus are summarized in the Table.

[i.u.]	thalamus pedophiles	thalamus healthy controls	putamen pedophiles	putamen healthy controls
NAA	17.9 \pm 2.2	16.9 \pm 1.2	14.4 \pm 1.4	13.9 \pm 0.7
tCr	9.6 \pm 1.0	10.0 \pm 1.3	8.5 \pm 0.7	9.0 \pm 0.9
Cho	10.1 \pm 1.1	9.7 \pm 1.3	7.3 \pm 0.8	7.7 \pm 1.2

Discussion

We could not corroborate our initial hypothesis that phenomenological similarities of pedophilia with obsessive compulsive disorder (OCD) are expressed in similar differences in striatal NAA in pedophiles as reported for OCD patients by Ebert et al. (3) and Bartha et al. (4).

References

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