

## Short report

## Cavum septum pellucidum and psychopathy\*

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**Summary**

The presence of cavum septum pellucidum (CSP) has been reported to be a neurodevelopmental marker of psychopathy. We scanned 26 violent offenders and 25 controls; 2 offenders and 2 controls had CSP (8% in both groups). Thus, the presence of CSP is not a

common or a unique feature of antisocial personality disorder or psychopathy.

**Declaration of interest**

None.

Studying psychopathy has several medico-legal implications. In 1999 the British Home Office drafted a proposal whereby an individual could be incarcerated if deemed potentially dangerous without being sentenced for violent criminal activity.<sup>1</sup> Later this was launched as the Dangerous and Severe Personality Disorder Programme.<sup>2</sup> However, psychopathy has gained attention as a form of behaviour that is destructive not only to society but also to the individual. At an individual level, studying psychopathy may provide a proxy to observe several domains of cognition, such as decision-making: psychopaths tend to choose wrong actions and not learn from these.<sup>3,4</sup> If changes in the functioning of the central nervous system could be scanned, this would provide clues to detecting psychopathy. Hence, if a surrogate marker for psychopathy was to be found, it might help in the selection of individuals for incarceration. However, if such a marker was used carelessly or if it was unspecific, gross violations of basic human rights would ensue.

Raine *et al* have studied the presence of cavum septum pellucidum (CSP) in people with antisocial personality disorder and psychopathy.<sup>5</sup> In their study, people who had CSP had a higher degree of psychopathy and higher levels of antisocial personality disorder. What prompted Raine *et al* to study CSP was data from trials conducted with various experimental animals, ranging from rodents to monkeys, where anomalies or irritation of septum pellucidum has been found to be associated with increased aggression.<sup>6,7</sup> So far, Raine *et al*'s study has not been replicated (Google Scholar, accessed on 5 May 2013). We therefore set out to replicate their study, using our own material, aiming to confirm or contest their results.

**Method****Participants**

Participants in this study were all men; there were 26 violent offenders and 25 age-matched healthy controls from a control pool (mainly hospital staff, friends, students, spouses, etc.). Data about the offenders were derived from university forensic psychiatric hospital records where they had been evaluated for pre-trial purposes. All were charged with violent offences (two murder, ten manslaughter, four attempted murder or manslaughter, one assisting manslaughter, six aggravated assaults

and three armed robberies). Each had a history of recurrent violent acts, and all but two had previous convictions. None had a history or current diagnosis of psychosis. The diagnoses were made by consensus by using multiple sources of information. All of the offenders fulfilled criteria for both antisocial personality disorder (DSM-IV)<sup>8</sup> and dissocial personality (ICD-10).<sup>9</sup> Psychopathy Checklist – Revised (PCL-R)<sup>10</sup> ratings were used to assess psychopathy. Moreover, all met the DSM-IV and the ICD-10 criteria for substance abuse related to polysubstance drugs ( $n=20$ ) or alcohol abuse ( $n=6$ ) with early-onset alcoholism corresponding to Cloninger type 2 young-onset alcoholism. As none were psychotic, all were judged to be competent to stand trial. The study setting was approved by the local ethics committee.

**Imaging**

The participants were scanned with a 1.0 T Impact (Siemens; Erlangen, Germany) using a standard head coil and a tilted T<sub>1</sub>-weighted sequence (MPRAGE, repetition time (TR) = 10 ms, echo time (TE) = 4 ms, inversion time (TI) = 250 ms, flip angle 12°, field of view (FOV) = 250 mm, matrix 256 × 192, 1 acquisition), no interslice gap. The images thus acquired were resliced to 1.0 mm thick continuous coronal slices, no gap, perpendicular to the anterior–posterior commissural (AC–PC) line using SPM2 software on Windows.

**Image analysis and the definition of CSP**

Image analysis took place using Analyze 6.0 software on Windows. Identical criteria to those used by Raine *et al*<sup>5</sup> were used. The presence of CSP was defined as CSP present in six or more 1.0 mm thick coronal slices.

**Results**

The two groups were matched for age (control group: mean age 35 years (s.d. = 8), offender group: mean age 34 years (s.d. = 10)). The mean PCL-R score in the offenders was 26.2 (s.d. = 3.8, range 20–34). Cavum septum pellucidum was present in two controls and two offenders (8% in both groups). In addition to CSP, one of the controls had cavum vergae.

**Discussion**

In this study we investigated whether violent offenders have an increased prevalence of CSP compared with a control group. We found this not to be the case. Our setting was similar to that in Raine *et al*'s study;<sup>5</sup> the only difference being that Raine *et al*

\*This short paper is published here to offset the common tendency for journals to publish positive rather than negative results. I stress that its publication should not indicate to potential authors that submission of papers showing similar contradictory findings in other areas of psychiatry will be published in the same way. The *British Journal of Negative Results in Psychiatry* has yet to be launched. The Editor

collected data from temporary employment agencies, whereas we collected ours from pre-trial forensic psychiatric examinations. Therefore Raine and colleagues' material is from, as they state, 'successful' criminals who have avoided incarceration. Be that as it may, our criminals were probably studied more carefully, with the forensic psychiatric examination typically lasting months.

A large neuropathological study has suggested that 100% of preterm children have CSP. Postpartum, in full-term infants the prevalence falls quickly, ranging from absent to about 10% by the age of 16.<sup>7</sup> Our finding of 8% in both groups is very close to this. In conclusion, we suggest that the presence of CSP is not an exclusive, or even a typical, feature of violent individuals with antisocial personality disorder or psychopathy.

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