P01-44

IN VIVO EVIDENCE FOR LONG-TERM CNS TOXICITY ASSOCIATED WITH CHRONIC BINGE USE OF METHAMPHETAMINE

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Purpose: Methamphetamine has strong addictive characteristics and is a potent neurotoxin. We use Single PhotonEmission Computed Tomography (SPECT) to study brain perfusion in persons who were formerly chronic binge users of methamphetamine and who at the time of imaging had abstained from methamphetamine use for anaverage of 2 years.
Mehtods: Members of the methamphetamine group were 20 men who had previously injected methamphetamine intravenously for over 30 months and who were now abstinent for a minimum of 9 months and for an average of 2 years. Controls were 12 healthy men who had never injected methamphetamine. Images were obtained 40 minutes after intravenous injection of 1110 MBq of Tc-99m ECD using a dual-head gamma camera (ECAM plus; Siemens).

Results: The mean global count was significantly decreased in methamphetamine group compared with that of control group ($p < 0.0001$). After global normalization, rCBF in methamphetamine user group compared with the control group was significantly disproportionately reduced in the striatum, thalamus, cingulum, mesiodorsal prefrontal cortex, and pons. Furthermore, normalized rCBF was strongly intercorrelated across all regions where disproportionate hypoperfusion was identified, including striatum and thalamus ($r=0.90$), thalamus and cingulum ($r=0.91$), thalamus and pons($r=0.89$), and striatum and pons ($r=0.94$).

Conclusions: Binge use of methamphetamine produces long-term changes in global and regional blood flow producing a pattern of hypoperfusion that resembles patterns reported previously for persons with atypical Parkinson disease. These findings suggest that methamphetamine abusers may be at increased risk for neurodegenerative diseases later in life.

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