INTRODUCTION

Postmortem and in-vivo imaging studies have demonstrated an impairment of energy metabolism in the brain of schizophrenic patients. Functional neuroimaging studies show that patients exhibit reduced glucose utilization and blood flow in the prefrontal cortex. It has been shown that PCP, non-competitive N-methyl-D-aspartate (NMDA) receptor antagonist, produces both positive and negative symptoms of schizophrenia as well as cognitive deficits in normal subjects. Perinatal phencyclidine administration to rodents represents one of the actual animal models of schizophrenia. Decreased cytochrome c oxidase (COX) activity was found in the broad spectrum of brain regions of adult rats chronically treated with PCP.

Since, there are no data about the changes of COX activity in the brain of rats perinatally treated with PCP, the aim of our study was to assess the COX activity in different brain regions of adult rats perinatally treated with PCP or saline, before and one hour after the administration of PCP challenge dose.

MATERIAL AND METHODS

Four groups of animals were subcutaneously treated on 2nd, 6th, 9th and 12th postnatal (PN) day, with either PCP (10 mg/kg; two groups) or vehicle (0.9% saline; two groups). One PCP (PCP) and one saline (NaCl) treated group were sacrificed on PN70. The two other groups received challenge dose of PCP (3mg/kg) on PN70 and were sacrificed after 1 hour (PCP-Ch and NaCl-Ch groups). In the crude mitochondrial fractions the COX activity was assayed by spectrophotometric method of Hess and Pope. Results are presented as mean with standard error and were analyzed using the one-way ANOVA with Bonferroni’s post hoc test.

CONCLUSION

Obtained results have revealed region-specific changes of COX activity as a long term effect of perinatal PCP administration. This result is in accordance with the finding of the reduced COX activity in the caudate and increased in putamen and nucleus accumbens in the post mortem studies of schizophrenic patients. The finding of different response to PCP challenge dose in the rats perinatally treated with PCP or saline suggests long term disturbance in energy metabolism that can be a result of the changes in neuronal network organization. Further investigations are necessary in order to identify mechanism by which PCP induces these changes, as well as to elucidate the role of hypometabolism in the pathogenesis of schizophrenia.