



Effect of Methamphetamine Administration in Prenatal Period on Pentylentetrazol-Induced Seizure in Rat Offspring

Mehrdad Negini^{1,2*}, Mehrshad Marouei Milan^{1,2}, Denise Motazakker^{1,2}, Armita Jamshidi^{1,2}, Razieh Aghazadeh^{2,4}, Shiva Roshan-Milani^{3,4}

¹Student Research Committee, Urmia University of Medical Sciences, Urmia, Iran

²School of Medicine, Urmia University of Medical Sciences, Urmia, Iran

³Neurophysiology Research Center, Cellular and Molecular Medicine Research Institute, Urmia University of Medical Sciences, Urmia, Iran

⁴Department of Physiology, School of Medicine, Urmia University of Medical Sciences, Urmia, Iran

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*Corresponding Author:

Student Research Committee, Urmia University of Medical Sciences, Urmia, Iran; School of Medicine, Urmia University of Medical Sciences, Urmia, Iran

Citation:

Negini M, Marouei Milan M, Motazakker D, Jamshidi A, Aghazadeh R, Roshan-Milani S. Effect of Methamphetamine Administration in Prenatal Period on Pentylentetrazol-Induced Seizure in Rat Offspring. *Iranian biomedical journal* 2024; 28(7): 280.

ABSTRACT

Introduction: Prenatal methamphetamine exposure (PME) affects fetal growth and development, potentially leading to a variety of behavioral and neurological abnormalities. Behaviorally, PME is associated with increased anxiety/depressed problems and emotional reactivity, increased attention-deficit/hyperactivity disorder symptoms, and aggressive behaviors. Studies have demonstrated that PME increases seizure susceptibility in adult male and female rats. This study aimed to examine the effect of PME on seizure behaviors in male and female pre-pubertal rats.

Methods and Materials: Female pregnant rats were investigated in three groups: control, methamphetamine (0.1 mg/mL), and methamphetamine (0.6 mg/mL). Pregnant rats in the control group received only drinking water. The second and third groups received 0.1 and 0.6 mg/mL of methamphetamine, respectively, starting on day 15 until 19 of gestation (for five consecutive days). After parturition, on postnatal day (PND) 21 and 33, the pentylentetrazol (50 mg/kg, IP)-induced epileptic behaviors of the offspring were investigated.

Results: In male pups of PME rats in PND33 subgroups, both the number and duration of focal seizures increased, whereas latency to focal seizures decreased, indicating more prevalent and severe seizure behaviors in these animals. Conversely, in PND21 subgroups of female PME rats, latency to immobility decreased while latency to focal seizure increased, but both number and duration of focal seizures greatly decreased. Other subgroups did not show any specific changes.

Conclusion and Discussion: The findings of this study suggest that prenatal environmental conditions can influence individual behaviors, and the incorporation of genetic and epigenetic aspects in the development of neurobehavioral abnormalities may contribute to this phenomenon. Because of this evidence for child and adolescent behaviors being strongly influenced by prenatal conditions, along with the substantial and growing national and global threat of the methamphetamine consumption, primary prevention strategies aimed at girls and women are warranted.

Keywords: Pentylentetrazol, Rats, Seizures