

Original Paper

## Effect of stress on morphine withdrawal signs in rats

Safari H (M.Sc)<sup>1</sup>, Makvand-Hosseini Sh (Ph.D)<sup>2</sup>, Miladi-Gorji H (Ph.D)\*<sup>3</sup>

<sup>1</sup>Master of Psychology, Department of Psychology, Faculty of Psychology and Educational Sciences, University of Semnan, Semnan, Iran. <sup>2</sup>Associate Professor, Department of Psychology, Faculty of Psychology and Educational Sciences, University of Semnan, Semnan, Iran. <sup>3</sup>Assistant Professor, Research Center and Department of Physiology, School of Medicine, Semnan University of Medical Sciences, Semnan, Iran.

---

### Abstract

**Background and Objective:** Exposure to a stressor generates a wide variety of adaptive responses and alters the pharmacological effects of opioids. Common neural pathways are activated by morphine and stress. This study was done to determine the effect of chronic restraint stress and acute water immersion stress on the severity of naloxone precipitated morphine withdrawal manifestation in morphine-dependent rats.

**Methods:** In this experimental study, 32 adult male Wistar rats were allocated into four groups equally including: morphine-dependent - no chronic restraint stress (D/NS) (Control), morphine-dependent with chronic restraint stress (D/R), morphine-dependent with acute water immersion stress (D/WI) and morphine-dependent with chronic restraint stress under acute water immersion stress (D/R+WI). Rats were injected with bi-daily doses (10 mg/kg/bw, sc, at 12h intervals) of morphine over a period of 10 days in the presence or absence of restraint stress (1 h/day). On day 11, immediately after naloxone hydrochloride injection (2mg/kg/bw, ip), withdrawal manifestation were recorded. Water immersion stress was performed prior to naloxone injection in D/WI and D/R+WI groups.

**Results:** The overall score of morphine withdrawal was significantly lower in D/RS and D/RS+WI rats in compared to controls ( $P<0.05$ ). Among the graded signs, the mean number of abdominal contractions and jumps was reduced in D/RS+WI and D/RS rats in compared to control groups ( $P<0.05$ ). Among the checked signs, the number of rats per group with erection and genital grooming were reduced in restraint rats by 25% than control group ( $P<0.05$ ).

**Conclusion:** Chronic restraint stress with or no acute water immersion stress diminished severity of dependency on morphine. Thus, restraint stress may be applied as a method to ameliorate some of the withdrawal behavioural consequences of morphine.

**Keywords:** Morphine dependence, Stress, Rat

---

\* Corresponding Author: Miladi-Gorji H (Ph.D), E-mail: miladi331@yahoo.com

Received 6 May 2014

Revised 29 Nov 2014

Accepted 14 Dec 2014